

QST

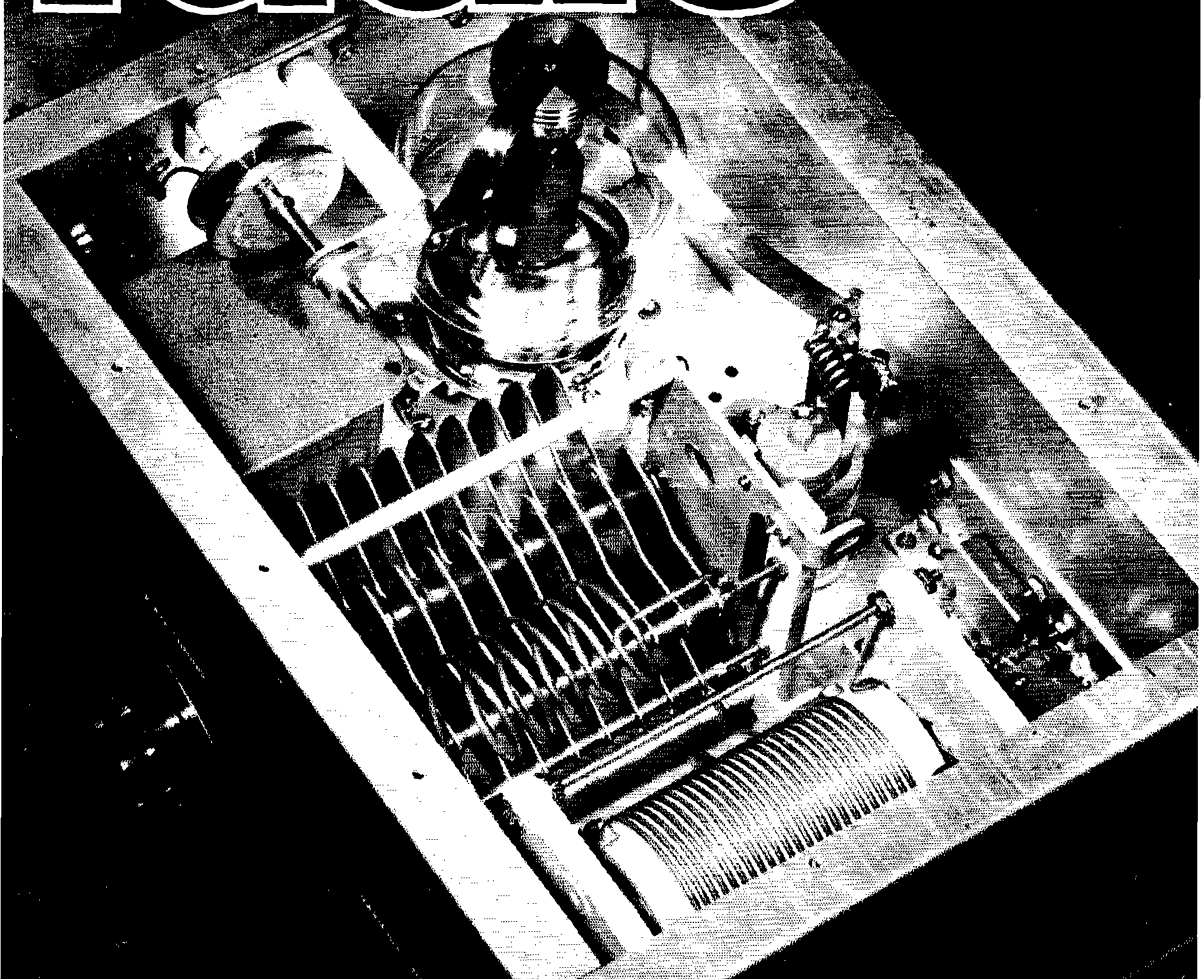
October, 1952

40 Cents

45c in Canada

devoted entirely to

amateur radio



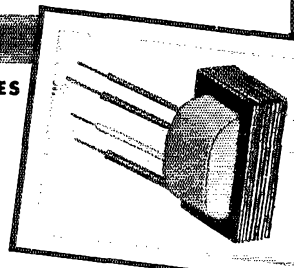
In This Issue — PI-NETWORK TANK CIRCUITS FOR HIGH POWER

MINIATURE COMPONENTS FROM STOCK...

SUBOUNCER UNITS

FOR HEARING AIDS...VEST POCKET RADIOS...MIDGET DEVICES

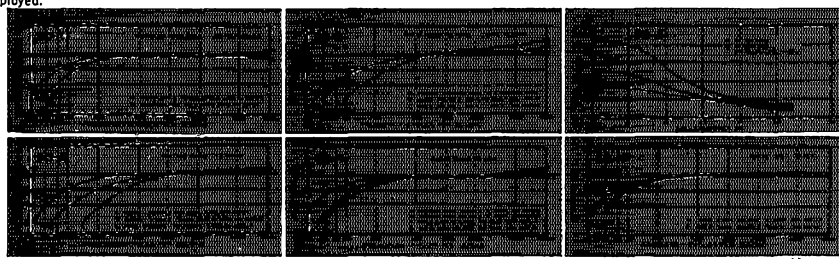
UTC Sub-Ouncer units fulfill an essential requirement for miniaturized components having relatively high efficiency and wide frequency response. Through the use of special nickel iron core materials and winding methods, these miniature units have performance and dependability characteristics far superior to any other comparable items. They are ideal for hearing aids, miniature radios, and other types of miniature electronic equipment. The coils employ automatic layer windings of double Formex wire... in a molded Nylon bobbin. All insulation is of cellulose acetate. Four inch color coded flexible leads are employed, securely anchored mechanically. No mounting facilities are provided, since this would preclude maximum flexibility in location. Units are vacuum impregnated and double (water proof) sealed. The curves below indicate the excellent frequency response available. Alternate curves are shown to indicate operating characteristics in various typical applications.



SUBOUNCER UNIT
Dimensions...9/16" x 5/8" x 7/8"
Weight......03 lb.

Type	Application	Level	Pri. Imp.	D.C. in Pri.	Sec. Imp.	Pri. Res.	Sec. Res.	List Price
*S0-1	Input	+ 4 V.U.	200 50	0	250,000 62,500	16	2650	\$5.60
S0-2	Interstage/3:1	+ 4 V.U.	10,000	0	90,000	275	1850	5.60
*S0-3	Plate to Line	+ 20 V.U.	10,000 25,000	3 mil. 1.5 mil.	200 500	1300	30	5.60
S0-4	Output	+ 20 V.U.	30,000	1.0 mil.	50	1800	4.3	5.60
S0-5	Reactor 50 HY at 1 mil. D.C. 3000 ohms D.C. Res.							5.10
S0-6	Output	+ 20 V.U.	100,000	5 mil.	60	3250	3.8	5.60

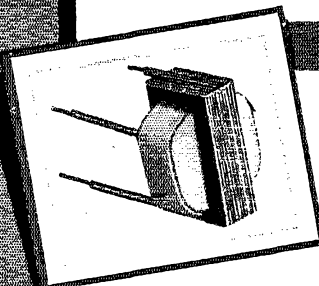
*Impedance ratio is fixed, 1250:1 for S0-1, 1:50 for S0-3. Any impedance between the values shown may be employed.



SUB-SUBOUNCER UNITS

FOR HEARING AIDS AND ULTRA-MINIATURE EQUIPMENT

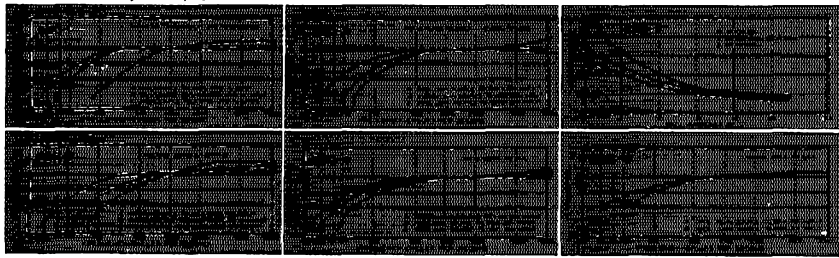
UTC Sub-SubOuncer units have exceptionally high efficiency and frequency range in their ultra-miniature size. This has been effected through the use of specially selected HiPerm-Alloy core material and special winding methods. The constructional details are identical to those of the Sub-Ouncer units described above. The curves below show actual characteristics under typical conditions of application.



SUB-SUBOUNCER UNIT
Dimensions...7/16" x 3/4" x 5/8"
Weight......02 lb.

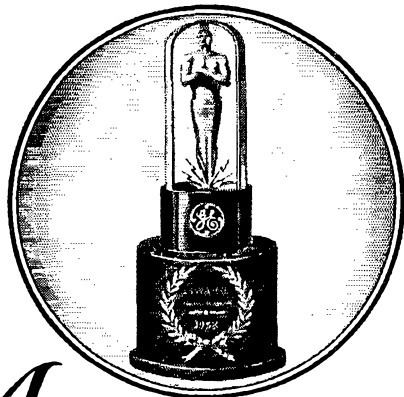
Type	Application	Level	Pri. Imp.	D.C. in Pri.	Sec. Imp.	Pri. Res.	Sec. Res.	List Price
*SS0-1	Input	+ 4 V.U.	200 50	0	250,000 62,500	13.5	3700	\$5.60
SS0-2	Interstage/3:1	+ 4 V.U.	10,000	0	90,000	750	3250	5.60
*SS0-3	Plate to Line	+ 20 V.U.	10,000 25,000	3 mil. 1.5 mil.	200 500	2600	35	5.60
SS0-4	Output	+ 20 V.U.	30,000	1.0 mil.	50	2875	4.6	5.60
SS0-5	Reactor 50 HY at 1 mil. D.C. 4400 ohms D.C. Res.							5.10
SS0-6	Output	+ 20 V.U.	100,000	5 mil.	60	4700	3.3	5.60

*Impedance ratio is fixed, 1250:1 for SS0-1, 1:50 for SS0-3. Any impedance between the values shown may be employed.



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A n n o u n c i n g

THE EDISON RADIO AMATEUR AWARD

To gain greater recognition for the many vital and humane public services performed by radio amateurs, G. E. offers the Edison Radio Amateur Award for 1952

Who is eligible for the Edison Radio Amateur Award: Radio amateurs eligible for nomination will be those men and women who, during 1952, have performed a meritorious public service on behalf of an individual or a group, in a disaster area, in civil defense, or in similar situations.

Nominations may be made by any amateur, club, association, or individual familiar with the service performed.

Winner of the award will receive the Edison Radio Amateur trophy in a public ceremony in a centrally located metropolitan city. National recognition will be accorded the winner of the award, and as a token of appreciation for his service, General Electric will present him with a 24-hour watch to clock DX accurately.

How to nominate a candidate: To nominate a candidate for the award, you need only submit his name, address, call letters, and a description of the service performed.

Entries will be reviewed by a distinguished group of impartial judges, and the decisions of the judges will be based on (1) the greatest benefit to the individual or group (2) the greatest amount

of ingenuity and sacrifice displayed in performance of the service.

Your candidate must hold a radio amateur's license issued by the F. C. C., Washington, D. C., and the service must have been performed while he was pursuing his hobby as an amateur within the continental limits of the United States.

Your letter must be postmarked not later than December 31, 1952.

Judges who will decide which candidate's achievement is most worthy of the award, are:

Mr. E. R. Harriman, President, The American Red Cross.

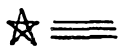
Mr. G. E. Sterling, Commissioner, Federal Communications Commission.

Mr. G. L. Dosland, President, American Radio Relay League.

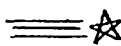
Winner will be announced on or before March 1, 1953, and the award will be publicly bestowed soon thereafter.

Employees of the General Electric Company may nominate candidates for the Edison Radio Amateur Award, but are not permitted to receive the award.

Choose your candidate . . . prepare your letter of nomination . . . and mail to Edison Award Committee, Tube Dept., General Electric Co., Schenectady 5, N. Y.



GENERAL ELECTRIC



166-1810

exceptional features of the 75A-2

LINEAR CALIBRATION DIAL:

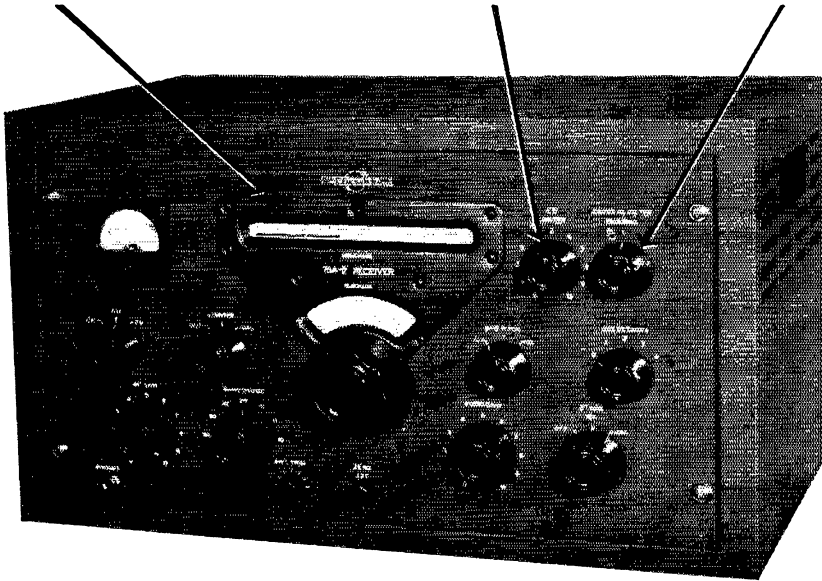
All divisions are same width. On the 160, 80, 40, 20 and 15 meter bands, each division equals 1 kc. The dial is accurate within 1 kc to 21.8 mc, and 2 kc between 26 and 30 mc after calibration. This all adds up to exceptional band spread and accurate dial setting.

NOISE LIMITERS:

The phone limiter is a series diode type that automatically adjusts the threshold of limiting to signal level for optimum performance. Can be turned on or off by front panel controls. The cw limiter is a shunt diode type following the first audio amplifier. Provides front panel control of limiting level. Limits both negative and positive peaks.

CRYSTAL FILTER:

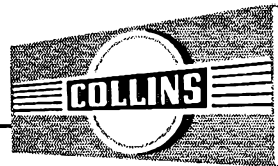
Factory adjusted. Selectivity is variable in five steps from 4 kc at 6 db down to about 12 kc at 60 db down with selectivity knob at zero — crystal filter out. With selectivity knob at 4, bandwidth is approximately 200 cps at 6 db down and 6.5 kc at 60 db down.



WITH the Collins 75A-2 you'll pick out signals you've never been able to hear before. Two noise limiters, one for cw and one for phone, hold interference to below signal level. Nerve-wearing noise is reduced, and by clipping interference the limiters help you identify and copy otherwise unreadable signals.

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OFFICES

38 La Salle Road

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TEL: 3-6268 TWX: HF 88
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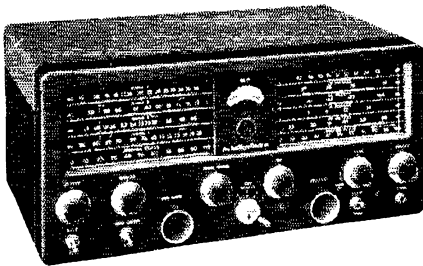
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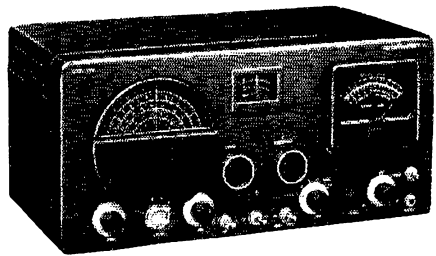
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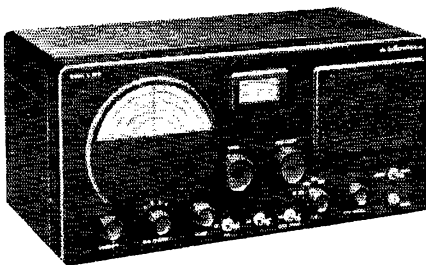
Accepted and praised expert in the



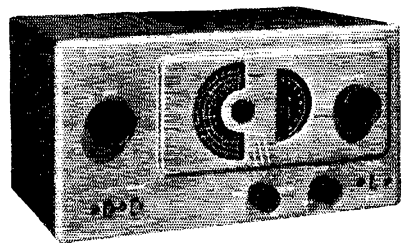
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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in *QST*. All ARRL Field Organization appointments are now available to League members. These include ORS, OES, OPS, OJ 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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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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

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

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

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



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ALFRED M. GOWAN WØPHR
325 S. Menlo Ave., Sioux Falls, S. D.
Vice-Director:

Delta Division

JAMES W. WATKINS W4FLS
220 N. Howell Ave., Chattanooga, Tenn.
Vice-Director: George S. Acton W5BMM
Plain Dealing, La.

Great Lakes Division

JOHN H. BRABB W88PF
417 Ford Bldg., Detroit 26, Mich.
Vice-Director: Harold E. Stricker W8WZ
247 W. 6th St., Marysville, Ohio

Hudson Division

JOSEPH M. JOHNSTON W2SOX
423 Monmouth Ave., Bradley Beach, N. J.
Vice-Director: George V. Cooke, Jr. W2OBU
58-31 239th St., Bellerose 6, L. I., N. Y.

Midwest Division

WILLIAM J. SCHMIDT WØOZN
308 E. Yassar, Wichita, Kansas
Vice-Director: James E. McKim WØMVG
1404 S. Tenth, Ballina, 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
810 W. Orange Ave., So. San Francisco, Calif.
Vice-Director: Richard F. Chelkowitz W6ATO
243 Colon Ave., San Francisco 12, Calif.

Roanoke Division

WILLIAM H. JACOBS W4CVQ
Route 6, Raleigh, N. C.
Vice-Director: Gus M. Browning W4BPD
135 Broughton St., S. E., Orangeburg, S. C.

Rocky Mountain Division

FRANKLIN K. MATEJKA WØDD
P. O. Box 212, Estes Park, Colo.
Vice-Director: Ramon S. Walker WØOWP
P. O. Box X, Brush, Colo.

Southeastern Division

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

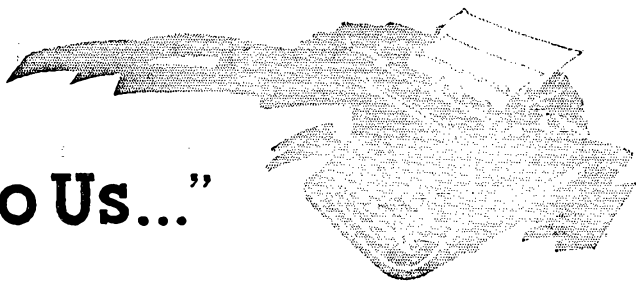
Southwestern Division

JOHN R. GRIGGS W6KW
10412 Don Pico Rd., RFD 2, Spring Valley, Calif.
Vice-Director: Walter R. Joss W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.

West Gulf Division

A. DAVID MIDDLETON W5CA
9 Kay Road, Tlajeras, N. M.
Vice-Director: Frank E. Fisher W5AHT/AST
104 E. 11th, Pawhuska, Okla.

"It Seems to Us..."



IT'S FALL—LET'S GO!

Here in New England, it's Fall again. The foliage is a burst of color. Every Sunday afternoon the front yards of the cider mills are packed with customers. Unfortunately, Fall in New England doesn't last long enough. Soon, now, the autumn foliage will have fluttered to the ground, the cider mills will have closed again, and winter will be upon us.

Fall, to amateur radio, means the beginning of another operating season, of week ends crowded with contests and on-the-air get-togethers of one sort or another. It's time, too, for that last "final" rearrangement of the operating room, that last check on the antenna halyards (we're positively going to check ours this week end), that perennial promise to the family not to spend too much time on the air this year.

To many of us, this will be our first year in amateur radio; we'll be especially eager to participate in ham activities to the utmost. But whether this be a first year, or a twentieth, the wonderful thing about it is that everyone will be equally full of enthusiasm. It's that fact that makes ham radio a dynamic hobby, one that is continually growing. Why a person becomes a ham is something no one has ever answered satisfactorily. But last year, some 14,000 more citizens of the U.S. got their tickets as amateurs.

Did someone wonder if ham radio were slowing down? Just mull over that figure a bit. Fourteen thousand potential members of the AREC! Fourteen thousand possible members of DXCC! We'd say 14,000 potential members of the League, too, were it not that many thousands of them are already members. But no matter how you look at it, 14,000 new hams shows that ham radio is a strong, growing institution.

It also means 14,000 potential participants in the many organized activities of the League. For those in the new group — and many of the old-timers, too — who haven't given serious thought to horning in on these activities, we'd like to have a special word. Sure, ham radio is fun in any of its aspects, and just to work other stations is pretty exciting for quite a while, whether it's a Novice learning the ropes on 3.5 mc. or a new General Class ham spreading his wings and learning the thrill of foreign DX. To many, the organized activities, the contests of various sorts, are something for

the other fellow — especially contests. Forget it; come on in, the water's fine!

First, we want to urge every amateur, whether Novice or higher class, League member or not, to enroll in the Amateur Radio Emergency Corps. Apply to your Section Emergency Coördinator (see the list on page 67 of this *QST*) or to your SCM (page 6 of every issue). Whether you thereafter participate regularly in the emergency tests in your area, or whether you can get in on them only occasionally, this is one activity every amateur should embrace. While you're about it, too, send for the League's pamphlet "Emergency Communications"; it's free.

Next, are the many operating appointments that the League makes available — Official Relay Station, Official Phone Station, Official Bulletin Station, and others. You can learn about them from another booklet you can have for the asking, "Operating an Amateur Radio Station." You may find, as thousands have, that one or more of these appointments and the type of operating activity involved, is just what the doctor ordered for you.

And now to contests:

Understandably, it usually takes a little time and some pushing to get most new hams to enter a contest, unless it be one aimed deliberately at the beginner. We know how it is ourselves, having sat around for years reading contest announcements and scores, but somehow figuring this was for only the hot operators, all of whom (we were sure) knew each other and would immediately spot us as a rank newcomer. And we still remember the first time, on a rainy Saturday afternoon, we heard a Sweepstakes going full blast and, being a little bored, thought it wouldn't do any harm to see if we could work one, or maybe two. So, despite the fact we had only one crystal and 40 watts behind it, we tried a couple of calls. Whooooo! Four hours later we had filled several pages of the log with calls (an amazing number being contacts), were calling to the XYL to please bring our supper on a plate to the operating table, and were at it hammer and tongs. True, we never did send in that first score but score was secondary; we'd got more action than we'd dreamed of, and that was enough in itself. We also found that the bug once having bitten, the bite stays bit.

(Continued on page 104)

19th ARRL Sweepstakes — Nov. 15th–16th and 22nd–23rd

How many ARRL sections and how many stations in those sections can you work in two week ends? If you are located anywhere in the League's field-organization territory (see page 6), you are cordially invited to take part in this popular annual operating activity. Any amateur bands, 'phone or c.w., may be used. The total operating time allowed each contestant is 40 hours. The Sweepstakes comprises seventy-two c.w. and seventy-two 'phone contests! 'Phone entries are compared only with other 'phone entries — c.w. scores only with other c.w. scores — in your particular section, in the competition for awards. The week-end periods starting Saturday afternoon (1500 PST or 1800 EST) on the 15th and 22nd of November mark the open season for SS contacts.

A complete announcement of the contest, including the rules governing participation, will appear in November *QST*. The rules will be the same as those of the 1951 SS. Amateurs in remote ARRL sections who do not receive the November issue before the Sweepstakes may refer to November, 1951, *QST* for contest details.

Contest reporting forms will be sent to all amateurs who request them by mail or radiogram. It is not necessary to make advance entry or to use these forms, if the report form prescribed in November 1951 or in the next issue of *QST* is followed.

A.R.R.L. ROANOKE DIVISION CONVENTION

The ARRL Roanoke Division Convention, sponsored by the Richmond Amateur Radio Club, will be held at the Hotel Jefferson, Richmond, Virginia, on October 11th and 12th. Informal "get-acquainted" parties will be held Friday night for the early arrivals. Registration starts Saturday the 11th at 9 A.M. with the general and technical sessions beginning at 10. An historical bus tour has been arranged for the ladies. Banquet at 7 P.M. followed by cabaret-style dance with Burt Repine's orchestra until 1 A.M. "Dutch" breakfasts Sunday followed by mobile judging at Bryan Park.

The Richmond Club has planned the finest in programs, food and entertainment for this first Roanoke Division convention in eleven years. Advance reservations should be made to P. O. Box 1985, Richmond, Virginia, to insure that a place is available for everyone. Send hotel reservations direct to the Jefferson, mentioning the RARC, to take advantage of the special block of rooms that has been set aside. Registration fee \$6.50, including banquet and dance.

Strays

An Associated Press item, called to our attention by W2MMW, points out that there really is a town named Podunk — Podunk, Mass., to be precise — and the folks there are not too appreciative of the way its good name has been bandied about in jocular vein. Future *QST* Field Day covers take note!

— . . . —

Excerpt from a newspaper advertisement clipping furnished by W5DRW:

. . . Beautiful hair beyond your wildest dreams can be yours with the sensational new method of permanent waving—Television Control Waving. \$10.50 up. . . .

Which TVI pattern gives the Toni?

— . . . —

W1FWH, of ARRL's Technical Information desk, was surprised to receive a request from a newcomer amateur for permission to build a simple item described in the *Handbook*. The lad referred to the fine print in the volume which reads, in part, "No part of this work may be reproduced in any form except by written permission of the publisher."

— . . . —

One of the causes of fading in radio communications, a wind phenomenon in the ionosphere closely resembling surface winds, is being investigated by the National Bureau of Standards. Observations on a regular monthly schedule are coordinated with similar observations made by scientists in Great Britain and Canada. Varying in complex fashion hourly and seasonally, the wind speeds average 160 miles per hour and have been "clocked" at velocities as high as 660 miles per hour.

HAMFEST CALENDAR

OHIO — Saturday, October 4th, at Gray's Armory, E. 14 and Bolivar in downtown Cleveland — the Cleveland Hamfest for '52, sponsored by the Cleveland Area Council of Amateur Radio Clubs. Plenty of excellent hamfest attractions, including an auction (bring any gear you want to sell). The program starts at noon and will end about midnight. The preregistration price is \$3.50, or \$4.10 at the door. Contact Julius Mosenics, W8PZM, 7715 Newport Ave., Parma 9, Ohio.

Quist Quiz

A ham plans to patent a narrow-band 'phone system using f.m. with limited swing. By restricting the frequency swing to only a few hundred cycles, and by using highly-selective receivers, he contemplates amateur bands where 'phones can work as close to each other without interference as c.w. stations can. Why shouldn't we all immediately use his system?

(Please turn to page 128 for the answer)



The amplifier uses a pi-network tank circuit with a variable inductance to cover a continuous frequency range from 3.5 to 29.7 Mc. without coil changing. The tube is a 4-250A, cooled by a small blower mounted underneath the chassis and forcing air through the ventilating holes shown in the top cover. A multiband tank assembly is used in the grid circuit. The panel size is 10½ by 19 inches.

Pi-Network Tank Circuits for High Power

Using Available Components in Compact, Well-Shielded Construction

BY GEORGE GRAMMER,* W1DF

SINCE publication of the article on applying the pi-network tank circuit in TVI harmonic reduction,¹ there has been a steady flow of requests for specific information on using the same principles with high power. The chief problem is one of components. To use the methods outlined in January *QST* it has been necessary to adapt parts designed for quite different applications, and to use them under conditions where no appropriate ratings are available.

The amplifier shown in the accompanying photographs was built early this year for laboratory use in making checks on TV receivers, where low harmonic radiation obviously is required. We needed a rig that would run in the vicinity of 500 watts input, and since the amplifier was going to have to be pretty well boxed up, a tube with ample plate dissipation and the ability to take the input at moderate plate voltage was indicated. The 4-250A looked like the best choice because its ratings were in the right region and its physical dimensions lent themselves well to compact construction. Building and using the amplifier offered the opportunity to find out something about how components stand up in a pi-network tank circuit.

In many respects the amplifier has, like Topsy, "just growed." Our original idea of boxing up a fairly large tube and running it below ratings, with the object of not having to make special provisions for ventilation and thus simplifying the shielding, did not work out. The filament heat alone, inside a tightly closed box, was enough to raise the filament transformer temperature to the point where the insulation started to smell. So a

fan had to be added, together with appropriate holes in the shielding to allow air to circulate. This, fortunately, did not impair the effectiveness of the shielding, and had the further benefit that the unit could be operated at a full kilowatt input without excessive heating.

The MB-40I, grid circuit, which is convenient because it permits operation on all bands from 3.5 through 30 Mc., was not originally planned to be part of the unit but was incorporated when it was discovered, after a satisfactory plate-circuit layout had been worked out, that there was just exactly enough chassis space left for mounting it in a separately shielded compartment. It saved the work that otherwise would have gone into designing and constructing a special grid coupling circuit but, like every circuit we have ever seen that attempts to cover a wide frequency range with a single fixed link coil,

• The amplifier that supplied the basis for this article has been in use in the ARRL laboratory since early this year, and considerable interest in it has been shown by the many visitors to Headquarters who have seen it. Although it should be possible to duplicate the unit without undue difficulty, the primary purpose of the article is to discuss some of the problems of adapting components to the pi-network tank circuit and the necessary precautions in their use, rather than to give a bolt-by-bolt description of the construction. The actual layout used in an amplifier can be varied over a considerable range to suit the builder's taste, provided some important principles are observed.

* Technical Editor, *QST*.

¹ Grammer, "Practical Applications of Pi-Network Tank Circuits for TVI Reduction," *QST*, January, 1952.

does not maintain anything like uniform loading on the driver stage through a coax line. However, we had far more than enough driving power available and as a result found it possible to feed sufficient driving power through a 75-ohm line about 2½ feet long by using the whole link coil on the MB-40T. It would have been inconvenient to put in a switch to change the link tap on different bands, although this is advantageous in some cases. On some bands the problem is overcoupling rather than the reverse, and the grid current has to be kept down to the operating value by detuning. Aside from the coupling variations, the only other point to which anyone might object is that the tuning is quite critical, which is to be expected in such a wide-range device, and a reduction-type dial is an operating necessity. Although other types of grid circuits can of course be used, the convenience and compactness

² Bruene, "How To Neutralize Your Single-Ended Tetrode Final," *CQ*, August, 1950. The circuit is also described in *The Radio Amateur's Handbook*, 1952 edition.

Inside the plate section. This shows the method of constructing the shield, which is made of ¼-inch aluminum. Screws and nuts are used to hold the sections together everywhere except on the top, where the metal is threaded so the cover can be readily taken off and replaced.

The over-all dimensions of the plate compartment are 11¾ inches wide, 7¼ inches high, and 10 inches deep. The grid compartment is 3½ inches wide, 5 inches high and 7 inches deep.

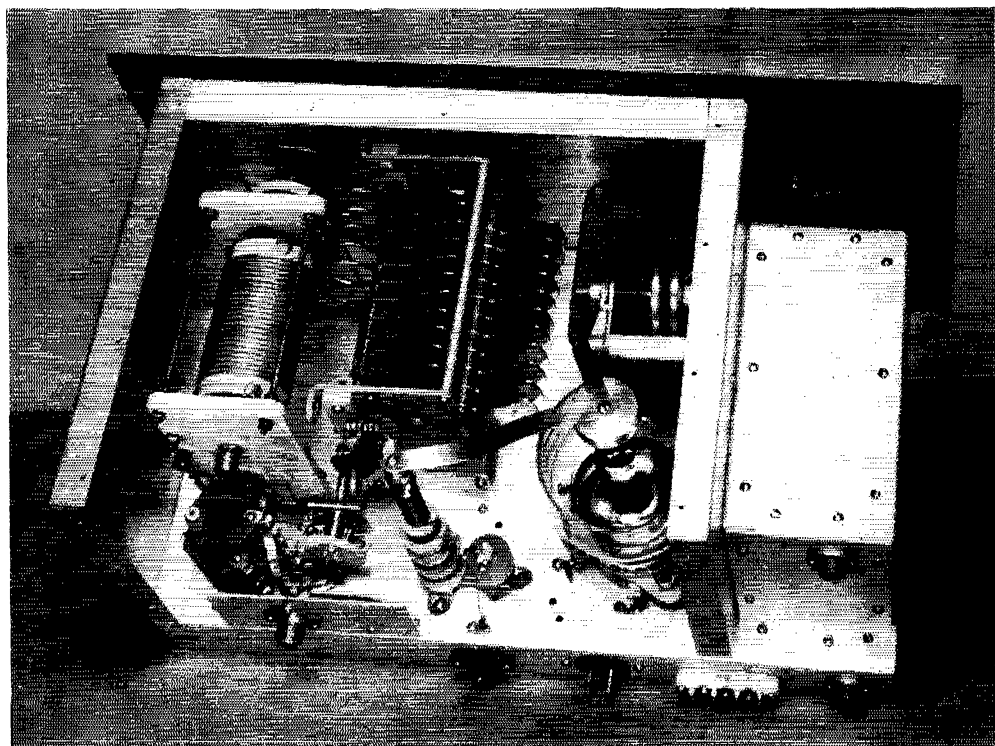
The neutralizing condenser is mounted on the righthand wall above the filament transformer, where a lead from one plate goes through the shield between the grid and plate sections to the condenser frame in the multi-band unit. Connections from this condenser to the tube plate, and from the r.f. choke to the tube plate, are made with ⅜-inch-wide copper strap, carefully fitted so there is no strain on the plate cap of the tube.

The small panel at the lower left mounts the output connector and the series-resonated output condenser (C₄) so that these units need not be disturbed when removing the rear section of the shielding. A flexible strip is used to connect the coax socket to the variable inductor, since the terminal on the latter wobbles slightly as the coil is rotated. The "safety" choke, RFC₂, is between the left wall and the coil and cannot be seen in this photograph.

Each shielded wire leaving this compartment is soldered to a ground lug where it passes through the chassis.

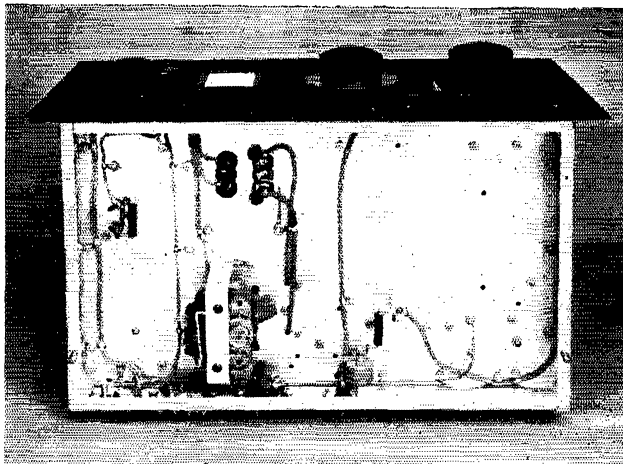
of this tuner are more than enough to outweigh the disadvantages mentioned.

Originally the 4-250A was not neutralized, although with the background thought that if neutralization turned out to be necessary the circuit arrangement was such that capacity-bridge neutralization² could be added without much difficulty. Actually, the amplifier is stable enough without neutralizing since it will not oscillate under our customary method of testing, which is to use a screen-dropping resistor of the normal value from the plate supply and then increase the plate voltage, with zero control-grid voltage, until the plate dissipation is up to the rated maximum value, no load being connected to the output circuit. Neither has it ever shown any tendency to "take off" in regular operation. However, without neutralization there is some feed-back through the grid-plate capacitance of the tube, evidenced by a considerable change in grid current, at high frequencies, when the plate circuit is tuned through resonance



D.c. and a.c. leads come out in shielded wire, using disc ceramic by-passes mounted on the ends except for the high voltage plate lead, which is by-passed with TV filter capacitors. The leads are intentionally made to follow long paths around the edge of the chassis to provide additional harmonic attenuation, and the shield braid is grounded at frequent intervals by soldering to lugs that also serve as hold-downs.

The two-terminal tie point at the left was provided for mounting a grid-leak resistor in case one was to be used. The blower is mounted on a bracket formed from a strip of aluminum, and forces air through a set of holes that duplicate, in size and arrangement, the ventilating holes in the 4-250A socket. The filament transformer terminals project through the chassis just left of center at the top in this picture.



while the amplifier is running at normal input. After some months of use without neutralizing, the neutralizing condenser was installed principally for the purpose of seeing how much difference it would make. It does represent an improvement in that the variation in grid current under the same conditions is now negligible. The neutralizing circuit adds something to the plate-to-ground capacitance, but not enough to have any important effect on the way the amplifier works at the intended operating frequencies. However, it also affects the v.h.f. resonances in the plate circuit, and this aspect should be watched when installing such a circuit.

Tank Components

One of the principal questions was whether mica condensers of the type used almost exclusively for by-passing would stand up in the output position in the network. It was pointed out in January *QST* that the voltage ratings were ample for working into flat 52- or 75-ohm lines, a conclusion based on the r.f. voltages developed across such lines in comparison with the d.c. ratings of the condensers. Experience has shown that the mica dielectric does indeed stand up satisfactorily—there have been no voltage breakdowns to date. However, little was known about the current-carrying capacity of these condensers, and the current may get up to several amperes in a single unit at the higher frequencies.

It seems to be easy to get into trouble in this respect, although under proper operating conditions we have had no failures. But in early testing using incandescent lamps as a load at the end of a short piece of coaxial line, two 100- μ fd. units behaved abnormally with the amplifier operating on 28 Mc. Checking them on a *Q* meter showed that they had lost the larger part of their original capacitance and had very low *Q*. The condensers showed no external signs of failure, but on taking them apart to see what had happened it was found that some of the foil, which is very thin, had melted to form a sort of mosaic with poor or no contact between the small pieces. Since then we have been careful always to work into a

properly matched load, and in the succeeding months there have been no failures, running at a plate input of 600 to 750 watts. Based on this experience, it seems that the foil will carry about three amperes with good reliability. This represents the current that will flow through a single 100- μ fd. unit connected across a 52-ohm resistive load carrying 500 watts of r.f. at ten meters. Hence for this power level and frequency each unit should have no more than 100- μ fd. capacitance, and if more is required for proper tube loading, as is usually the case, it should be built up to the necessary value by using two or more 100- μ fd. units in parallel. Since the condenser reactance increases with decreasing frequency, larger units can be used on the lower-frequency bands. At 7 Mc., for example, a 400- μ fd. unit will carry the same current as is carried by a 100- μ fd. unit at 28 Mc., if the power and impedance levels are the same in both cases.

To our minds an outstanding — if not the outstanding — advantage of the pi-network over the conventional plate tank is that it permits the use of a single adjustable inductance to cover the 3.5-30 Mc. range and thus makes possible a com-

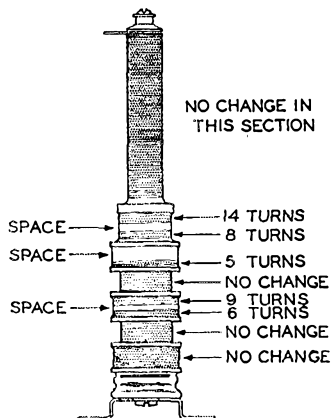


Fig. 1 — The R-175 choke as modified to work on all amateur bands in the 3.5- to 30-Mc. range, including 21 Mc.

pact, completely enclosed layout that does not require access for band changing. However, there was some question as to whether the available variable-inductance coils would stand up. We had selected a Barker & Williamson 15- μ h. unit as being about right for this amplifier, a coil having a nominal rating of 500 watts. The question of its use (or abuse) worried representatives of Barker & Williamson more than it did us, because our earlier experience with the variable inductance from the antenna circuit of the BC-375E had shown that the latter coil ran quite cool with several hundred watts input. Naturally enough, the Barker & Williamson people were concerned about the possibility of failure in the event of mishandling, an anxiety that is well founded in view of every manufacturer's experience with what happens to his product when it

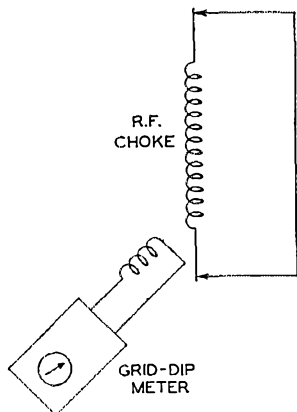


Fig. 2 — Using a grid-dip meter to check "holes" in a choke. Responses obtained with the choke terminals shorted indicate "series" resonances, at which frequencies the choke impedance is too low for satisfactory operation.

gets into the hands of an overoptimistic ham. It must be understood that the danger of damage is real, and that if one is to use such a coil successfully he must be willing to use it *properly*. In particular the coil should be adjusted, to vary the loading, *only with the plate voltage off or at very low power*. Arcing at the roller contact will wreck both the roller and the coil itself in a short time. And again, the load on the amplifier should be a properly-matched coax line; otherwise there is no telling what values the circulating current in the tank may reach. In fact, if you are not willing to take the pains necessary to get the coax line flat — which means, without exception, adjustment with an s.w.r. bridge and may mean, in many cases, that a coax-coupled antenna tuner is a necessity — you would be better advised to forget about a pi-network output circuit and stick to something that is more easily replaced when it burns up. Much the same applies to the low-pass filter that is a part of a complete installation.

Blocking and by-pass condensers constitute a third problem in any high-power amplifier. The

only conventional types that are much good as by-passes for TV harmonics are the small molded micas, but these can be found in the catalogs only in ratings up to 2500 volts working. They might stand more, since they are tested at 5000 volts, but it is taking chances. Such a rating puts a fairly severe restriction on the plate voltage that can be used with plate modulation. The condensers originally installed in this amplifier were 2500-volt micas, with the thought that the plate voltage would be limited to 1500 for plate modulation. Quite recently they were replaced with 10,000-volt units of the type used in TV receiver power supplies. These are small and of excellent construction for our purpose, but use a ceramic dielectric about whose r.f. characteristics we know very little. So far, though, they have proved to be quite satisfactory. It was anticipated that the plate blocking condenser might give some trouble with drift in tuning, since the high- K ceramics are notorious for poor temperature coefficient, but the capacitance is large enough compared with the tank-condenser capacitance so that variations so far have proved to be unobservable. Nevertheless, we can only tentatively recommend the condensers on the basis of rather limited experience, and only more extensive use can show whether they are really as much the answer to a prayer as their ratings, size, construction, and price would indicate them to be.

The fourth item is the all-important r.f. choke, since parallel feed is the only practicable method and, with a good choke, by far the most desirable. The only serious candidate known to us for high-voltage operation is the National R-175. However, this choke was designed long before there was any thought of a 21-Mc. band, and several samples we have tested had "holes" (there always have to be some in a choke working over such a wide frequency range) in or too close to 21 Mc. By cut-and-try the choke in this amplifier was modified as shown in Fig. 1, and now gives equally good performance on all amateur frequencies included in the 3.5-29.7 Mc. range. By checking both during and after modification, it was found that the effectiveness of a choke can be determined by a fairly simple method. As shown in Fig. 2, the ends of the choke are short-circuited and then the resonant frequencies are measured with a grid-dip meter. If the meter dips at a frequency in or close to a ham band, the choke will be poor on that band. Moving the grid-dip meter along the choke will show the sections that are "hottest" at a particular frequency, by the extent of the dip in grid current. Taking off a few turns in the "hot" region will move the resonance point, and it can easily be placed where it will do no harm. However, in moving the resonance out of one band a new one may appear in another, so it is necessary to check through the entire family of bands each time a change is made. Of the modifications shown in Fig. 1, the first one tried fixed up 21 Mc. satisfactorily, but the others had to be made to keep the remaining bands up to par after 21 Mc. was OK.

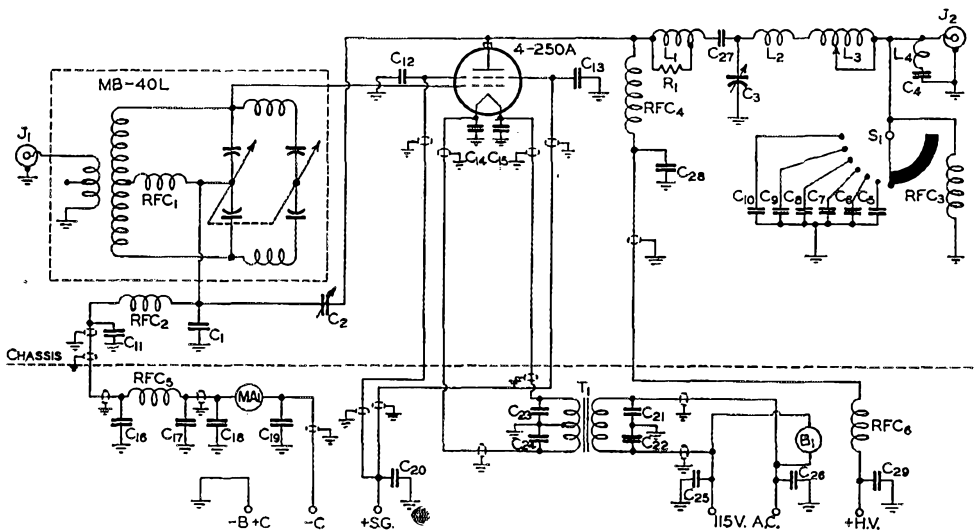


Fig. 3 — Circuit diagram of the amplifier. The broken line separates the above- and below-chassis wiring.

- C₁ — 220- μ fd. mica.
- C₂ — Disc-type neutralizing condenser, approx. 2 μ fd. with at least $\frac{1}{4}$ -inch spacing (National NC-800A).
- C₃ — 150- μ fd. variable, 6000 volts, 0.171-inch spacing (National TMA-150A).
- C₄, C₅, C₆ — 100- μ fd. mica, 2500 volts.
- C₇, C₈ — 220- μ fd. mica, 2500 volts.
- C₉, C₁₀ — 470- μ fd. mica, 2500 volts.
- C₁₁ to C₂₂, inc. — 0.001- μ fd. disc. ceramic, 600 volts.
- C₂₃, C₂₄, C₂₅, C₂₆ — 0.005- μ fd. disc ceramic, 600 volts.
- C₂₇, C₂₈, C₂₉ — 500- μ fd. ceramic, 10,000 volts (Centralab TV3-5301).
- R₁ — Five 680-ohm 1-watt carbon resistors in parallel.
- L₁ — Parasitic coil, $5\frac{1}{2}$ turns No. 14, $\frac{1}{4}$ -inch diam. R₁ tapped across 3 turns.
- L₂ — 5 turns No. 10, $2\frac{1}{2}$ inches long, $1\frac{1}{2}$ -inch diam.

- L₃ — Variable inductor, 15 μ h. max. (B & W 3852).
- L₄ — To series-resonate with C₄ at desired TV frequency.
- B₁ — Blower and motor, 115 v. a.c. (available from Allied Radio, Chicago, catalog No. 72-702 motor and 72-703 fan).
- J₁, J₂ — Coaxial connectors, chassis-mounting type.
- MA₁ — 0-50 ma. d.c. milliammeter.
- RFC₁, RFC₂, RFC₃ — 2.5-mh. r.f. choke (NOTE: RFC₁ is not supplied with the National MB-40L multiband unit).
- RFC₄ — National type R-175 choke modified as shown in Fig. 1.
- RFC₅, RFC₆ — 2- μ h. r.f. choke, 500 ma. (National R-60).
- S₁ — Single-circuit 7-position ceramic switch, progressive shorting (Centralab type P-1-S wafer).
- T₁ — Filament transformer, 5v. 13 amp. (UTC S-59).

Checking the choke with its terminals shorted approximates the conditions under which it actually works (it is shunted by the relatively low reactance of the plate tank condenser in the actual circuit) and shows up the "series" resonances. Resonance points that are indicated with the choke terminals open are "parallel" resonances and represent the frequencies at which the choke works best. It is a good idea to make a check after the choke is installed in its operating position, since proximity to shielding and other components may alter some of the resonance points.

The Circuit

The basic considerations entering into the selection of component values in the circuit of Fig. 3 have already been covered in detail.^{1, 3} Some compromises always are necessary when

³ Technical Topics, "Pi-Network Design Curves," *QST*, April, 1952.

⁴ This happens with the 25- μ h. coil from the BC-375E, for example, which has a beautiful resonance in the ten-meter band when most of its turns are shorted out. Since it is used with the turns practically all shorted for ten-meter operation, the self-resonant portion absorbs practically all the power output on that band. The resonance point can be moved by permanently shorting out about four turns at one end of the coil, at some slight reduction of the maximum inductance.

selecting actual parts. We wanted to keep the tank *Q* in the vicinity of 10 but practical considerations did not allow getting it that low at the ten-meter end of the range. Although the output capacitance of the 4-250A is quite low, the minimum capacitance of the plate tank condenser is necessarily rather high, in any unit having enough maximum capacitance to tune to 3.5 Mc. with a 15- μ h. coil. A larger coil, on the other hand, would not be desirable because it would undoubtedly show self-resonances in some amateur band.⁴

Since it takes about 150 μ fd. to tune to 3.5 Mc. with 15 μ h., there was no alternative but to take whatever tank *Q* was workable at the ends of the range. The *Q* is fairly high on ten meters, but not so high as to have an appreciable effect on the over-all efficiency. In fact, one of the pleasing things about this unit, and one which confirms the 4-250A as a happy choice, is that the efficiency as determined both by measurement of power input and output and by observation of plate temperature is exactly the same on all bands covered, within the limits of accuracy of measurement and observation. The measured over-all efficiency, d.c. plate input compared with r.f. output into a 52-ohm load, is 70 per cent, and

the plate temperature indicates a tube efficiency of about 75 per cent.

An important part of the tank circuit is the supplementary tank coil L_2 . This is the principal tank inductance at ten meters and should be adjusted so that there is just enough inductance left in the variable coil (a turn or less) to permit the loading to be adjusted under regular operating conditions. It is used not because it is any more efficient than the variable coil, but because its installation between the plate tank condenser and the variable coil puts the shunt capacitance of the latter on the output side of the network, instead of in parallel with the plate tank condenser. Since this shunt capacitance will average in the vicinity of 20 $\mu\text{fd.}$, it is imperative to prevent its being added to the input capacitance of the network and thus greatly increasing the Q at the high-frequency end of the range. It is also worth while to give some thought to mounting the tank condenser in such a way that its minimum capacitance is not increased — that is to say, the stator plates should be arranged to be as far as possible from the chassis and shielding metalwork.

The output condensers of the network are arranged in a stack close to the output terminal, with the exception of a single 100- $\mu\text{fd.}$ unit which is mounted right at the terminal and, in this case, series-resonated at 84 Mc. to reduce harmonic output in Channel 6, the only channel regularly receivable in the Hartford region at present. A better mechanical arrangement of the output-condenser stack would result if the CM-45 case style were used, but the CM-55 was the only kind we had at the time. The switch used with these condensers is the type that progressively connects all circuits in parallel, so that the capacitances are additive.

There is one safety precaution that should never be omitted with a pi-network output circuit, and that is to provide a d.c. path across the output connector. Although the antenna system may provide such a path, it is only common sense to make sure that it is built into the amplifier itself. Without it, the plate blocking condenser can break down and short-circuit, putting the full d.c. voltage on the hot r.f. output terminal, without any visible or audible evidence that anything has gone wrong. In this case a 2.5-mh. choke, RFC_3 , serves the purpose. Since the r.f. voltage is comparatively low, the choke has no effect on the regular operation of the amplifier. However, should the blocking condenser fail the plate supply will be short-circuited through the choke, and the operator can hardly

⁵ Another common-sense precaution is to use a high-voltage fuse in the positive d.c. output lead, especially when the plate meter is installed in that lead. If the meter is connected in the filament center tap, it cannot be damaged by a short circuit on the plate supply, but of course in order to determine the plate input it will be necessary to measure the grid and screen currents separately.

⁶ Grammer, "V.H.F. Parasitics in Beam Tetrodes," *QST*, August, 1952.

⁷ Grammer, "By-Passing for Harmonic Reduction," *QST*, April, 1952; see also the TVI chapter in *The Radio Amateur's Handbook*, 1952 edition.

fail to be aware that something unusual has happened.⁵

Like practically all amplifiers we have built and used with beam tetrodes, this one had a v.h.f. parasitic oscillation at the beginning. The parasitic-suppression circuit used here was recently discussed in *QST*.⁶ It uses a small coil, L_1 , and loading resistor, R_1 , and resonates the plate-to-cathode circuit at about 110 Mc. with the plate tank condenser near minimum capacitance. The resonant frequency drops to about 100 Mc. with C_3 at maximum. The five one-watt resistors in parallel have sufficient wattage rating to carry the 28-Mc. current that necessarily flows through them. On the lower-frequency bands the dissipation is considerably less.

TVI Measures

Aside from using a series-resonated output condenser, C_4L_4 , only negative measures were taken to reduce generated harmonics — that is, care was taken to see that harmonics in the TV range would not be built up by unwanted resonances, but there was otherwise no deliberate attempt to suppress harmonics by special circuits such as traps. The use of the MB-40L precluded using measures in the grid circuit such as were outlined in January *QST*.¹ We planned to get adequate suppression through reducing radiation from the transmitter by good shielding and lead filtering, and by keeping the harmonics out of the antenna circuit by using a good low-pass filter.

This unit proved to be a good test of the efficacy of the by-passing and shielded-lead techniques described earlier.⁷ Every lead (with the exception of the high-voltage lead) was provided with a 0.001- $\mu\text{fd.}$ disc ceramic condenser at each end. The tube socket is mounted just far enough above the chassis so that the ends of the shielded wire with its condenser spans the distance between the socket prong and a ground lug mounted on the chassis directly below the prong. The filament and screen leads are by-passed in this fashion, the shielded wires then running directly through small holes in the chassis to the underside. The disc condensers thus serve the double purpose of by-passing harmonics before they get into the shielded lead, and as normal circuit by-passes for the filament and screen. Below chassis, fairly long shielded leads are used to give additional attenuation of v.h.f. harmonics. The filament transformer terminals project through the chassis, and the leads to the primary are given the same treatment. The circuit diagram and bottom-view photograph show the details of the below-chassis wiring.

We have long since learned that this method of wiring, if it is backed up by adequate shielding of the r.f. circuits, will reduce harmonic currents on the external supply leads to such a low level that it is not worth while to bother with such devices as wavemeters for checking. The only useful check is with a TV receiver tuned to a signal harmonically related to the transmitter's

(Continued on page 106)

Sweepstakes Trade Secrets

How the Champs Do It

BY RICHARD L. BALDWIN,* WIKE

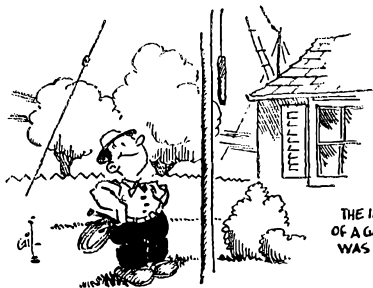
• With the Sweepstakes almost upon us again, you'll be interested in knowing how the winners do it. We asked several of them for the inside dope, and here's how they answered our questions.

What do you consider essential in the way of equipment?

A good stable receiver with plenty of band-spread was considered a must, although there was some disagreement on the use of high selectivity. Some c.w. operators feel that too much selectivity causes them to miss calls that might otherwise result in points, while others feel that the higher selectivity more than makes up for possible missed calls by the elimination of repeats. It was felt that a calibrated receiver dial was a distinct operating aid. The transmitter should preferably be bandswitching and should require a minimum of retuning within the limits of each band. Some form of break-in operation was considered a must by all the c.w. operators, although one of them also favored the use of the transmitting antenna for receiving, with a manually-operated switch which could rapidly shift the antenna from transmit to receive.

What sort of an antenna system do you favor?

First choice appeared to be stacked rotary rhombics but since few of the fellows were able to arrange for such antennas, they settled for the best antennas that their locations would permit. The type of antenna depended on the location.



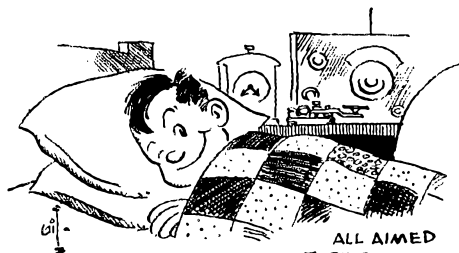
THE IMPORTANCE OF A GOOD ANTENNA WAS EMPHASIZED

In the middle of the country simple long wires were favored, with high-angle radiation and not too much directivity. On the coasts, beams were the choice for 20 and 10 meters, with doublets or long wires high and in the clear for 80 and 40. As several of the fellows emphasized, the antenna system is mighty important, and it pays to have spent plenty of time in working out a good antenna system that will give you a consistent signal throughout the country.

* Assistant Secretary, ARRL.

Do you suggest any particular physical preparation so far as the operator is concerned?

Here's where there was the greatest divergence of opinion. Some intimated that the only thing they did in preparation was to stay sober the night before the contest. Others made a deliberate effort to exhaust themselves in the days prior to the contest, so that they would be able to sleep late the day of the contest and thus go into it refreshed and rested. Others suggest regular hours during the week preceding the contest. Nearly all emphasized that excessive eating and/or smoking will slow you down. Although the methods differed, the goal was the same in each case — to be



ALL AIMED TO BE RESTED AND READY FOR ACTION

rested and ready for action when the starting time of the contest rolled around.

What about operating aids, such as check-off lists, desk arrangement, log keeping?

In general, the high-scorers were in favor of using some sort of a check-off list to reduce the possibility of "repeat" QSOs — many of them utilizing ARRL operating aid No. 6. Some of them used manila folders, ruled off in an appropriate number of columns for the various W, VE, and K call areas. Others used an indexed address book. Only one operator claimed that he didn't bother with a check-off list. Most of the fellows used the ARRL SS log sheets, keeping carbon copies for their own files. A neat operating position with plenty of elbow room, together with a comfortable chair and suitable lighting, was considered essential. The idea, of course, is to reduce fatigue as much as possible.

Do you concentrate on any particular band? How do you split your operating time?

Almost without exception the fellows favored working against an "average," with the idea being that whenever their QSOs-per-hour dropped below the goal they had set for themselves they'd either shift to another band or QRT until activity picked up a bit. The choice of bands to be used was determined largely by local conditions. One fellow reported that he monitored the bands regu-

(Continued on page 114)

The Shunt "Selectoject"

Simplified Connection to the Communications Receiver

BY OSWALD G. VILLARD, JR.,* W6QYT, AND JOSÉ MIGUEL DÍAZ,** XEIRZ

THIS article describes a new and improved version of the "Selectoject,"^{1, 2} differing from the original in that only one connecting lead to the associated receiver or audio amplifier is necessary to achieve either amplification or rejection of a particular audio frequency. Connection to the amplifier is made by wrapping a wire around the plate pin of a low-level stage, and by providing a common ground. *No modification whatever of the wiring of the amplifier is required.* Thus this model of the SOJ may be quickly connected to any existing unit — receiver, tape recorder, p.a. amplifier, or the like — without circuit change of any kind.

Here is the answer for those who had trouble connecting the original SOJ in series with the audio system of their Super Blooper Mark VIII, with its special "infinite series" noise clipper circuits following the second detector. Here, too, is the answer for the man who dares not lower the resale value of his \$500 receiver by chopping into its wiring.

The new SOJ also features "constant absolute bandwidth"^{3, 4} operation in its boost position, which is desirable in order to minimize ringing when receiving c.w. In the reject position, use is made of "constant percentage bandwidth" operation which is desirable for rejecting heterodynes or beat notes in 'phone reception because this method provides the narrowest obtainable "notch" and thereby removes as little of the desired intelligence as possible.

* Trustee, W6YX; Department of Electrical Engineering, Stanford University, Stanford, Calif.

** Musset No. 10 — Colonia Chapultepec Polanco, Mexico 5, D. F.

¹ O. G. Villard, jr., "Tunable A.F. Amplifier," *Electronics*, July 1949, p. 77.

² O. G. Villard, jr. and D. K. Weaver, "The Selectoject," *QST*, Nov. 1949, p. 11.

³ O. G. Villard, jr., "Independent Control of Selectivity and Bandwidth," *Electronics*, April 1951, p. 121.

⁴ O. G. Villard, jr., "The C. W. Man's Selectoject," *QST*, May 1951, p. 84.

⁵ O. G. Villard, jr., "A Tunable Shunt Selector-Rejector for Audio Amplifiers," *The Review of Scientific Instruments*, Vol. 22, No. 10, Oct. 1951, pp. 726-729.

Principles of Operation

The basic idea behind the operation of the shunt SOJ will be briefly set forth. Those interested in design information and further details will find a complete story in reference 5. Fig. 1 shows an ordinary one-stage *R-C* audio amplifier, which could be the first audio stage of a communications receiver, across whose output terminals the shunt SOJ is connected.

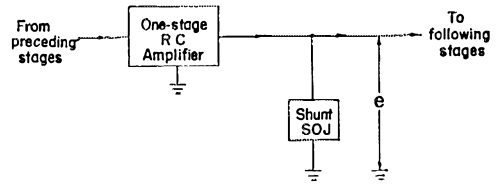


Fig. 1 — Block diagram, showing how shunt SOJ is connected to existing low-level audio amplifier.

Now it is well known that such an *R-C* amplifier can be represented, insofar as a.c. quantities are concerned, by the equivalent circuit shown in the left-hand half of Fig. 2. The input, in reality connected to a high-impedance grid and therefore

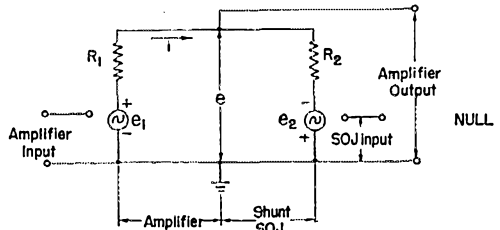
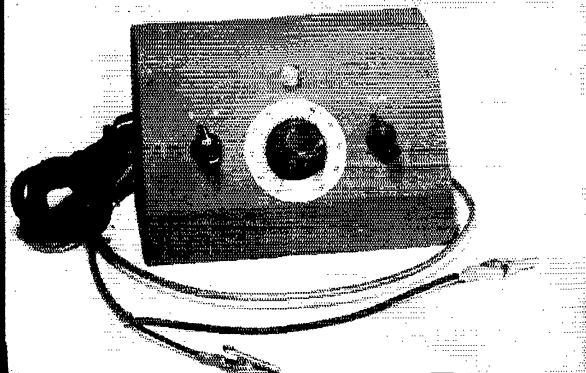


Fig. 2 — Equivalent circuit for null condition.

essentially floating above ground, is shown in the diagram as a wire terminated in midair. The action of the amplifier may be explained in terms of an equivalent generator acting in series with an equivalent plate circuit resistance. (The voltage of this generator is, of course, directly related to the voltage applied to the grid of the tube.)

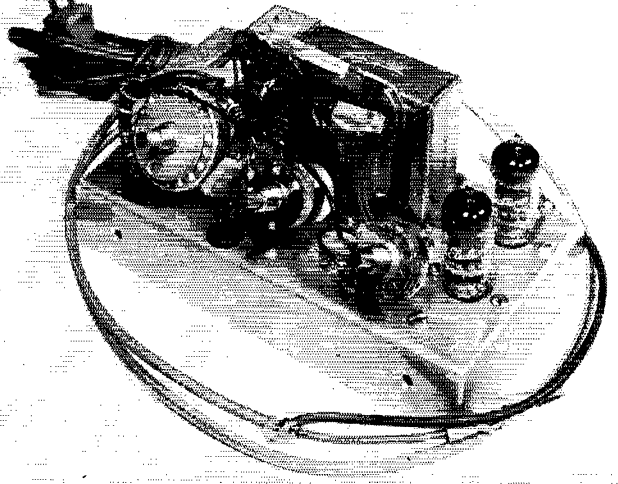
The new Selectoject requires no modifications whatsoever in the wiring of the receiver to which it is connected. This model, built in a small sloping-panel cabinet, features constant absolute bandwidth in the boost position for c.w. selectivity, and constant percentage bandwidth in the reject position for eliminating an interfering heterodyne.

QST for



Chassis view of the Selectoject model. This has a self-contained power supply with selenium rectifiers, and uses a dual potentiometer for frequency selection.

It may be desirable to insert a simple electrostatic shield between the selenium rectifier and the components mounted on the switch, to reduce hum pick-up by the latter.



The shunt SOJ essentially consists of another one-stage audio amplifier connected in parallel with the first, as shown in the right-hand half of Fig. 2. This SOJ amplifier may be represented by the same equivalent circuit. For the moment, the question of where the SOJ amplifier's grid signal comes from will be ignored. Let it be assumed that the SOJ's equivalent generator has a voltage of the same (or the opposite) phase as that of the amplifier's equivalent generator. These two situations happen to be the ones which are of importance in practice. The alternating voltages in the circuit can then be replaced for the sake of convenience by d.c. voltages, and the generators assigned polarities just as if they were d.c. generators.

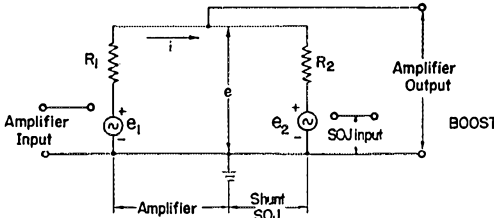


Fig. 3—Equivalent circuit for boost condition.

Suppose further that the equivalent voltages e_1 and e_2 are equal, and that the equivalent resistances R_1 and R_2 are equal. (This can always be arranged, if desired.) If the generator polarities are opposite, as indicated in the figure, a little thought will show that the output voltage e will then be zero. The generators are acting in series, and a current will be flowing through the resistors, but the two resistors taken together

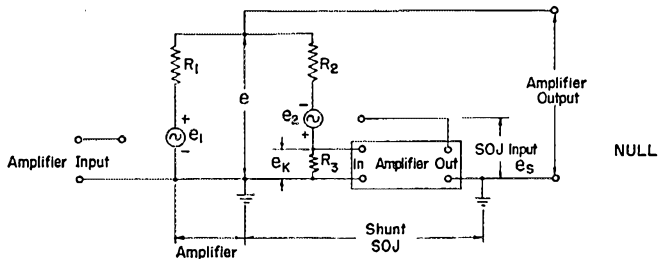
form a voltage divider, and their midpoint is at ground potential. Since there is no voltage across the amplifier's output terminals, they could be short-circuited without changing currents or voltages in any way. So far as the amplifier can tell, connection of the SOJ disposed as shown is the equivalent of placing a short circuit across the amplifier's output terminals.

If the resistors R_1 and R_2 are not equal, it is still possible to cause the net output voltage to be zero, by adjusting the relative magnitude of the two generator voltages. Thus if R_2 were twice R_1 , the output null could be restored by making e_2 twice as large as e_1 .

Fig. 3 shows the opposite situation, where the two generators are in phase with each other. If both generators and resistances are equal, the output voltage will be the same whether the SOJ is connected or not. However, if the resistances are equal and e_2 is made much larger than e_1 , the output voltage will be greater than what would exist if the SOJ were not connected.

Now comes the question of providing the SOJ tube's grid with a suitable input voltage, so that the right-hand equivalent generator of Fig. 2 will have a voltage of the correct magnitude and phase to cause a null or boost. It might at first seem hard to find a usable voltage when a null is to be produced, since the object is to cause the amplifier's output voltage e to disappear. Fortunately, even when e disappears there is still a current flowing around the loop, and a voltage proportional to this current (e_k) can be developed across resistor R_3 in Fig. 4. Note that e_k is available inside the SOJ. This voltage, properly amplified, given the correct phase, and fed back to the

Fig. 4—Equivalent circuit for null condition, showing derivation of SOJ amplifier grid voltage.



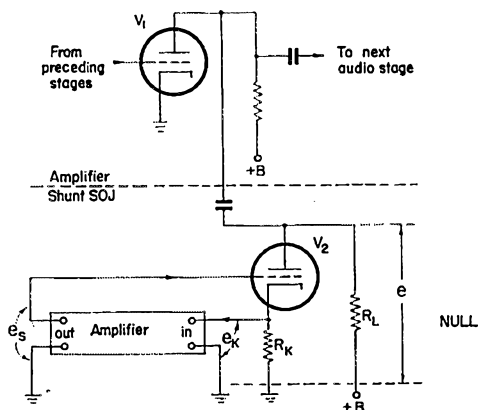


Fig. 5 — Detail of SOJ amplifier connection, null condition.

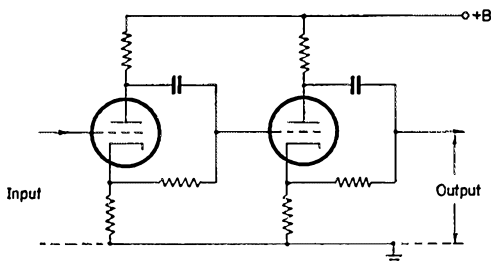


Fig. 6 — Frequency-selective adjustable R-C phase-shifting amplifier suitable for use in shunt SOJ.

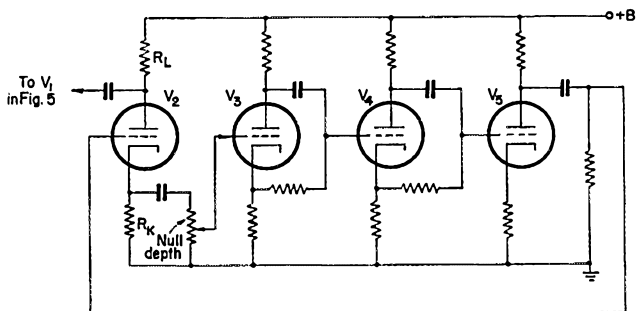


Fig. 7 — Actual circuit of shunt SOJ for null condition.

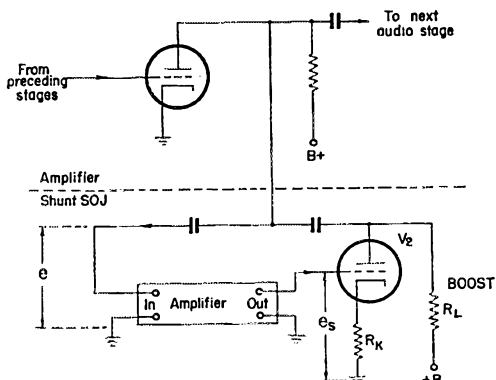


Fig. 8 — Detail of SOJ amplifier connection, boost operation.

SOJ tube's grid, will serve to make the equivalent generator voltage e_2 have just the right value to cause e to disappear and thus produce a null. Furthermore, by a simple circuit change we can make e_2 of the same phase as e_1 , as in Fig. 3, thus making possible a "boost."

Practical Circuits

Fig. 5 shows how the SOJ's tube (V_2) is connected to the amplifier in practice. To produce a null, the cathode voltage e_k in Figs. 4 and 5 is amplified without phase change and applied between the grid of V_2 and ground. This grid-to-ground voltage will be called e_a .

Since it is desired that the null occur at only one frequency, the amplifier connecting e_k and e_a must be frequency-sensitive. It is convenient to make the frequency-sensitive portion of this circuit a variable all-pass R-C phase-shifter as in the original Selectoject.^{2, 4} Fig. 6 shows the preferred arrangement. A complete schematic of the SOJ so connected as to produce a null is shown in Fig. 7. V_5 in this circuit provides isolation and phase reversal.

When the SOJ is used to produce a null, an important point is to keep its insertion loss low. This is done by making the plate resistance of V_2 in Fig. 5 high, and likewise R_L . Connecting the SOJ then affects the gain of V_1 only to a minor extent, at frequencies far from that at which the null occurs.

In order to produce a boost, the frequency-sensitive amplifier connecting e_k and e_a in Fig.

5 may be reconnected as in Fig. 8. This amplifier must now produce a 180-degree phase shift at the boost frequency; V_2 is then regenerative. A tube such as V_2 , having a selective, regenerative feed-back circuit, will impart its selective characteristic to another amplifier when connected in shunt with it as shown in Fig. 8. Only two connections need be changed to transfer from the circuit of Fig. 7, which gives a null, to that of Fig. 9, which gives a boost. The gain-controlling potentiometer changes from a "null depth" control to a "peak height" control.

A preferred circuit combining these functions, and incorporating two gain-controlling potentiometers for convenience, is shown in Fig. 10. The actual phase-shifting arrangements are not shown, because a choice is available depending on the desired function, cost considerations, etc.

Three possible choices are shown in Figs. 11, 12, and 13. In each of the three alternatives, the appropriate terminals are labeled so as to correspond to the letter terminal designations in Fig. 10.

Fig. 11 shows the simplest phase-shift circuit, using ganged 5-megohm linear potentiometers as the frequency-controlling elements. The 120K resistor is provided to limit the highest "resonant" frequency to 6600 cycles. The over-all characteristic of the shunt SOJ using this phase-shift circuit will be of the constant-percentage-bandwidth type, for both boost and reject positions. The low-frequency limit of response is 160 cycles.

When using the shunt SOJ for heterodyne elimination, a null circuit having constant percentage bandwidth is best because it takes the smallest slice out of the speech spectrum in the process of eliminating a given tone. A c.w. signal, however, has a definite bandwidth which must be passed as in ordinary a.m. if the keying intelligence is to be preserved. In boost operation, with a constant percentage bandwidth, it is found that at the lower audio frequencies (below 1000 c.p.s.) the effective bandwidth is too narrow to pass the c.w. sidebands when the selectivity is made reasonably high. Hence it is desirable to use the constant-absolute-bandwidth circuit for c.w.⁴ This circuit makes possible a considerable increase in the effective selectivity obtainable for a given amount of ringing. This method of operation is provided for in Figs. 12 and 13; by opening or closing the switches, either type of bandwidth may be had. Note that these switches may conveniently be ganged with the boost-reject switch.

Fig. 12 uses readily-available parts throughout. Closing the switches gives constant-absolute-bandwidth operation. The frequency range obtainable is then slightly reduced, being 300-6000 c.p.s. These values were arbitrarily chosen, on the theory that audio tones lower than 300 c.p.s. are seldom used for c.w. reception. The constant

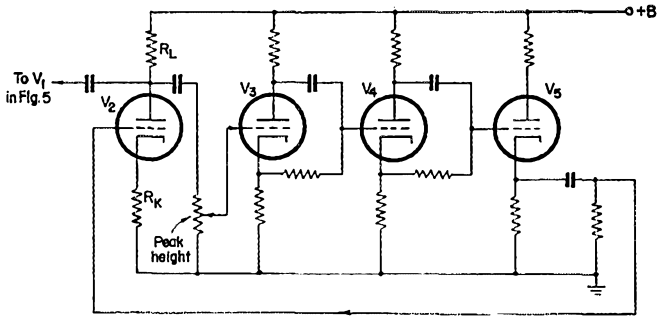


Fig. 9 — Actual circuit of shunt SOJ for boost operation.

percentage bandwidth (switches open) frequency range is identical to that of Fig. 11, namely 160-6600 c.p.s.

The use of linear potentiometers introduces some crowding at the high-frequency end of the frequency scale. This comes about because resistance is directly proportional to rotation, and frequency in turn (for constant percentage bandwidth operation) is inversely proportional to resistance. At the high end, then, a small change in resistance brings about a large change in frequency and crowding occurs. This situation can be greatly improved by the use of standard audio taper potentiometers whose resistance variation is roughly inversely proportional to rotation. The highest-resistance dual potentiometer having this taper that the authors could locate (3 megohms) is made by IRC and is available from the factory on two weeks delivery. This potentiometer gives perhaps the most satisfactory over-all performance of all. It is incorporated in Fig. 13 which is otherwise similar to Fig. 12. The frequency range is now 300 to 6000 c.p.s. for constant absolute bandwidth, and 100 to 6000 c.p.s. for constant percentage bandwidth.

The frequency range covered by each circuit depends on the element values and may be readily altered if desired.

In the circuit of Fig. 10, the component values are not critical with the exception of the 4K and 8K resistor pairs, which should be matched as

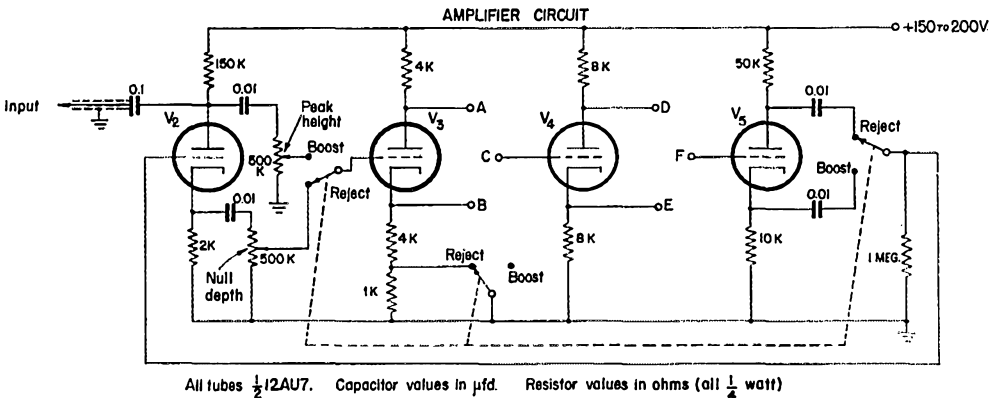


Fig. 10 — Complete schematic, shunt SOJ (see Figs. 11, 12, and 13 for choice of phase-shift circuits).

closely as possible. The 1K resistor in series with the cathode resistor of V_3 has been found to improve the constancy of gain at the higher frequencies. It is needed only for boost operation and for the circuits of Figs. 12 and 13.

Performance of Model

An experimental model was built using the phase-shift circuit of Fig. 13 and the amplifier circuit of Fig. 10. For convenience, a separate selenium-rectifier power supply (see Fig. 14) was incorporated. The shunt SOJ draws approximately 7 ma. at 150 to 200 volts, so can be powered from an existing receiver or amplifier, if desired. Whatever power supply is used *must* have a large (order of 20 μ fd.) filter condenser directly across its output terminals. This is important.

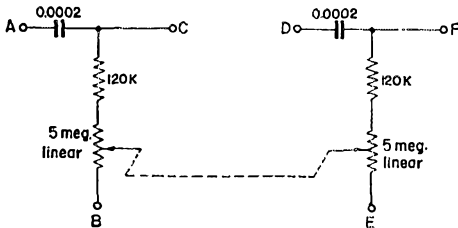


Fig. 11 — Simplest phase-shift circuit (constant percentage bandwidth, for both null and boost).

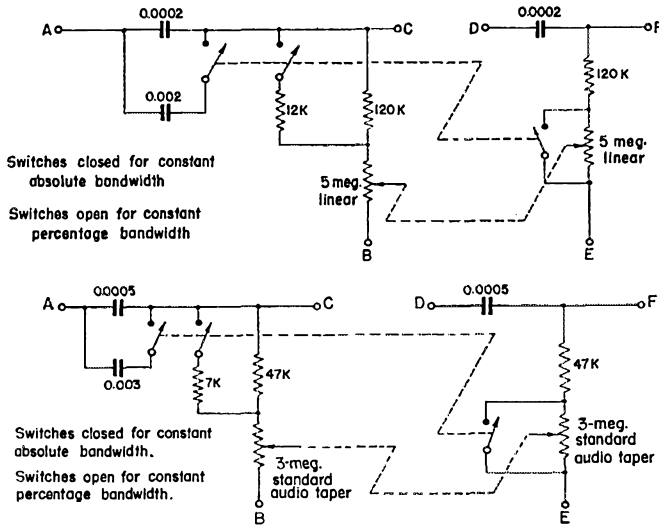


Fig. 12 — Phase-shift circuit giving choice of constant-percentage and constant-absolute bandwidth operation.

Fig. 13 — Same as Fig. 12, but using IRC standard audio-taper dual potentiometers. This gives less crowding of the frequency scale at the high end.

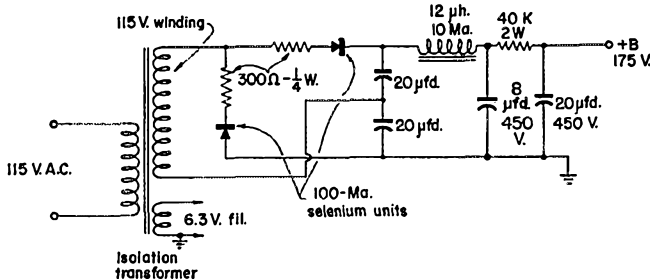


Fig. 14 — Compact power supply suitable for circuit of Fig. 10.

The performance of this model is illustrated in Figs. 15 and 16. The equivalent internal resistance of the amplifier across which the SOJ was connected was 110,000 ohms. In Fig. 16, at the particular setting of the gain control shown, the response at the resonance peak remained constant to within 0.5 db. as the resonant frequency was varied through the 300-6000 c.p.s. range. The shunt SOJ can be made to provide extra gain in the boost position, though its use on a zero-insertion-loss basis is satisfactory.

The reject position, with this circuit, entails an insertion loss of about 5 db. This loss can always be compensated for by increasing slightly the gain of the audio system of the receiver or amplifier.

The performance of the shunt SOJ will vary slightly depending on the internal impedance of the circuit to which it is connected. In the case of a typical communications receiver such as the NC-57, the equivalent internal impedance at the plate pin of the first audio tube (a 6SL7) is of the order of 82K. For most receivers this impedance will vary from 50K to about 200K. The model of Fig. 10 will give satisfactory performance, on both boost and reject, over this range of impedances.

The boost curves of Fig. 16 illustrate the fact that the absolute bandwidth of the boost characteristic is substantially constant with frequency.

Fig. 15 — Frequency response of amplifier with shunt SOJ, for three different settings of the null frequency. Equivalent internal resistance of source, 0.11 megohm; null depth control set for best rejection at 4000 c.p.s.

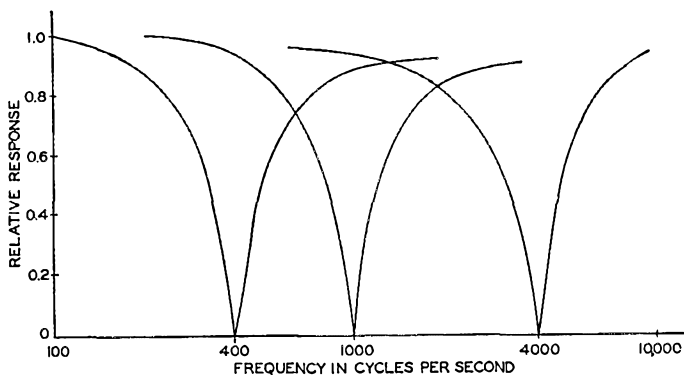
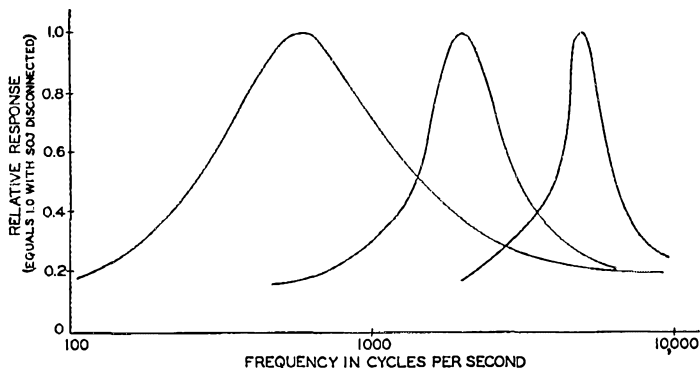


Fig. 16 — Frequency response of amplifier with shunt SOJ, for three different settings of the boost frequency. Conditions same as in Fig. 15



Should a narrower passband be desired, it can be obtained by increasing the boost gain. Excessive gain will, of course, produce oscillation. However, a gain of some 20 db. over the response with the SOJ disconnected can be obtained.

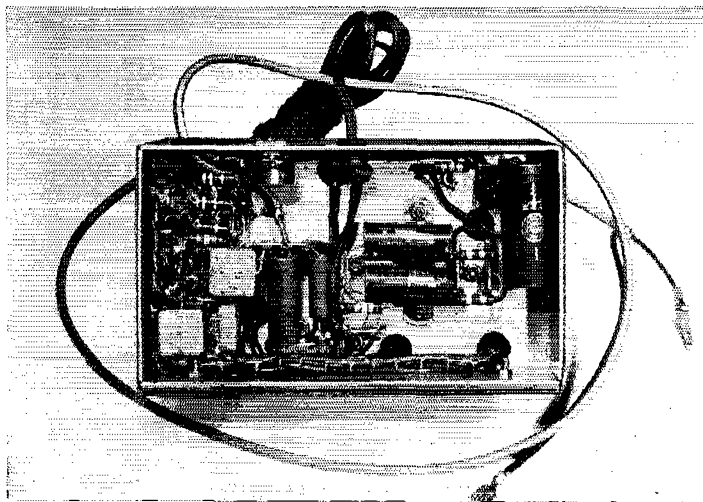
The reject gain control is located at the back of the chassis, and can be adjusted for best rejection at some convenient audio frequency with a screwdriver when the shunt SOJ is first connected to an amplifier or communications receiver. It will normally not require any further adjustment.

The boost gain is located on the front panel together with the ganged tuning potentiometers, and so can be readily adjusted to any desired value of gain and selectivity.

The switches of Fig. 13 have been incorporated in the boost-reject switch.

In constructing the unit no special precautions are necessary other than to minimize hum, both from the power supply and by direct pick-up from the filament leads, as much as possible. It is suggested that the tube types and component values shown in Figs. 10, 11, 12, and 13 be adhered to as closely as possible. It is desirable to provide good filtering in the B supply and to twist the filament leads and place them close to the chassis. When these precautions are observed, the noise and hum voltage at the plate of V_2 (see Fig. 10) of the model illustrated is in the order of 0.05 volt. With a signal voltage of 1.0 volt (which is close to the maximum that can be handled by the unit), the signal-to-noise ratio is 26 db., which is quite sufficient for ordinary purposes.

The underside view of the chassis shows that the wiring is not very complicated. The potentiometer mounted on the upper wall of the chassis is the "reject" gain control, which needs to be set only once.



A B.F.O. for Your Mobile

Extending the Capabilities of a Converter Receiving Installation

BY JOHN HUNTOON,* W1LVQ

WHEN a fellow goes mobile these days, for receiving purposes the custom seems to be purchase or construction of a converter that covers one, two, maybe three bands. Frequency coverage of the boughten jobs is obviously based on voice work, which is sound enough with perhaps 99 44/100% of mobile operation taking place in the 'phone bands. However, most converters cover the entire 20- and 10-meter bands, and some even include the whole 3500-kc. band, instead of just the 'phone segments. But the non-voice coverage doesn't do any good because the trouble is there ain't no b.f.o. Fortunately, it's a mighty simple job to add one to your installation. All you need is a small oscillator at the automobile radio intermediate frequency, which will be around 260 or 265 kc. Such a unit is described herein.

A first idea to use pies from r.f. chokes for the inductances was discarded when thumbing through a parts catalog disclosed a b.f.o. unit which seemed to be ideal for the purpose, requiring only a bit of capacity added to bring the frequency down to that desired. It consists of the two necessary coils for an oscillator with a tickler circuit, a frequency-setting padder, and a small-capacity vernier control with knob, the whole thing in a medium-sized shield can. A miniature triode such as the 6C4, a switch, and a couple of condensers and resistors complete the job.

Building a suitable sub-base assembly was the subject of several sheets of pencil doodlings until the obvious answer dawned — let the shield can be the chassis. By cutting down the length of the wood-dowel support for the pie-wound coils and mounting most of the miscellaneous components on the tie points for the coils, there is room for the tube socket at the lower end of the shield. The whole job can then be mounted right on the case of the automobile receiver, as the picture

* Assistant Secretary, ARRL.

• If your mobile installation uses the customary converter plus auto-radio set-up, the c.w. frequencies covered probably represent a complete waste of receiving potential. Regardless of intent to use voice exclusively for transmitting, with this simple little gadget you can greatly increase the receiving capabilities of your mobile job.

shows. The fixed and variable plate resistors are mounted separately on a small bracket which can be screwed to the dash or converter case for convenience in control.

Gain Control

The variable plate resistor works — like a charm — as an r.f. gain control. Normally there would be difficulty in reception of c.w. signals because the usual converter-auto receiver system runs with the front end wide open and the a.v.c. would kick the gain of the system all over the place in accordance with the keyed characters, especially on stronger signals. Of course, feeding the 262-kc. signal from the oscillator into the diode detector causes, like any other signal, a rise in the a.v.c. voltage and a consequent reduction in gain. So the variable plate resistor, by controlling delivery of oscillator power, acts as a gain control for the receiver. On weak signals the control is turned to maximum resistance, producing minimum oscillator power and minimum a.v.c. action, so that the gain of the receiving system is high; at the same time, b.f.o. injection is low. Cutting down the resistance produces more power, more a.v.c. action, and thus a reduction in gain, which is ideal for stronger signals. Only a slight change in beat note occurs over the range of the variable resistor.

Construction

The circuit is standard. The photograph shows essentials of layout and wiring. To reduce the size of the coil mounting, remove the assembly from the can and the wood dowel from the ceramic mounting for the padders. Then remove the mounting bolt from the dowel; this is done by a



The b.f.o. unit mounts at a convenient spot on the auto receiver case. Choice of location will depend on under-dash clearances and inside accessibility for fastening the nuts. The "gain" control is on a separate bracket for convenience in mounting near the converter controls.

QST for

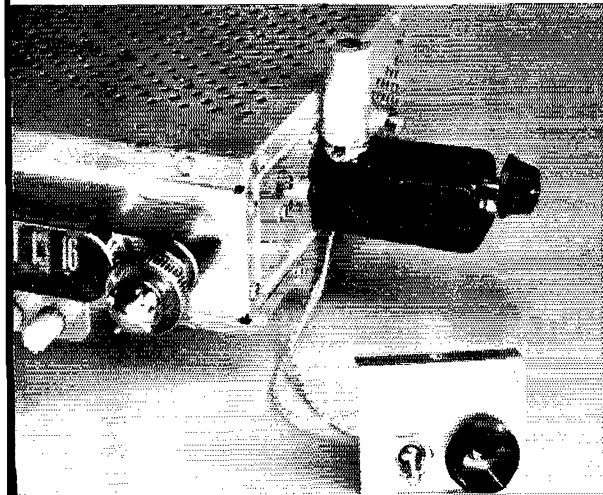
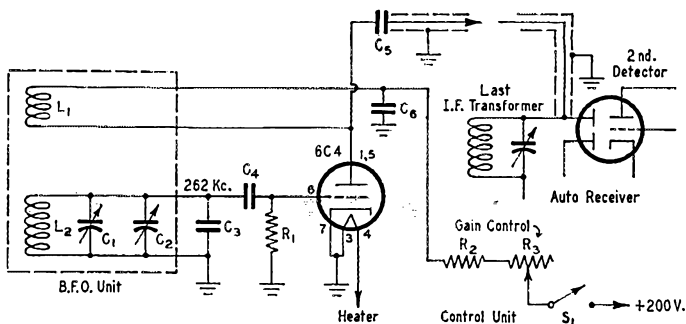


Fig. 1 — Circuit diagram of the 262-kc. b.f.o. unit.

- C₁, C₂ — Trimmer and vernier capacitors in b.f.o. unit (Meisner 17-6753).
- C₃ — 330- μ fd. silver mica.
- C₄ — 100- μ fd. mica.
- C₅ — 22- μ fd. mica.
- C₆ — 0.01- μ fd. disc-type ceramic.
- R₁, R₂ — 47,000 ohms, $\frac{1}{2}$ watt.
- R₃ — 50,000 ohms, variable carbon.
- L₁, L₂ — Pie-wound coils in b.f.o. unit.
- S₁ — S.p.s.t. toggle switch.



pair of long-nosed pliers turning against the beads on the threaded shaft, in this case a left-hand thread. Use a coping saw to cut off approximately $\frac{3}{8}$ inch of dowel; then drill the hole a bit deeper to reinsert the threaded bolt as if it were a self-tapping screw (left-hand thread, remember!). In all this operation be careful not to break the fine wire of the coil leads. After reassembly, check the travel of the screw on the end of the trimmer shaft to make certain it doesn't strike the pie windings when turned fully in; if it does, simply snip off the end with a pair of side cutters — it's too long anyway.

The grid resistor and all condensers except that for coupling are mounted on the cut-down coil assembly. Use shielded wire for the output; soldering the end of the braid to a suitable ground point in the can provides adequate support for one end of the coupling condenser — the other of course going to the plate pin of the tube. To ensure good contact with the auto receiver case for heater power, put a soldering lug on one of the can mounting bolts and solder it to the grounded heater pin.

Frequency Adjustment

The catalogs and data sheet on the b.f.o. coil say the range is 290–650 kc. Don't you believe it! By the grace of the grid-cathode capacity of a 6C4 and the trimmer condensers screwed down tight, the lowest this one could be made to reach was 410 kc. It's a simple matter, of course, to bring the frequency down by hanging across the grid circuit coil a fixed condenser of suitable capacity. It ought to be the same (330 μ fd.) on any unit, but it would be worth while to check before buttoning up the job completely. After you complete the coil assembly, wire it with temporary long leads to the tube socket so you can make frequency checks with the coils inside the can but without having to mount the tube socket. The simplest measuring system is to listen for harmonics of the unit on a communica-

tions receiver covering the broadcast band, with its b.f.o. on.

By the way, at one point in the range of the unit you'll hit the i.f. of your communications receiver, but that is easily identifiable since it is not tunable at the receiver.

Feed the unit's output, through C₅, to the antenna post of the receiver. Tuning the receiver dial will take you through a number of birdies, some loud and some weak; those weak ones are odd beats and should be disregarded. The genuine harmonics will have several times the volume of the miscellaneous birdies; the S-meter will show them up plainly. Log two adjacent loud beats; the difference in kilocycles on the b.c. receiver dial will be the fundamental frequency of the unit. Adjust the trimmer on the b.f.o. unit until the difference is 262 kc., more or less. If tightening the screw all the way down won't reach that low a frequency, of course you'll have to add a larger capacity to your grid circuit.

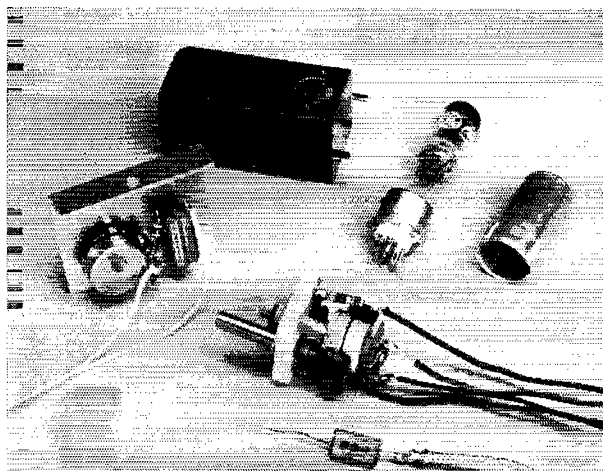
Installation

Installation is comparatively simple. This version used one of the numerous ventilation holes in the automobile radio case as one mounting, requiring the drilling of only one new hole. If you're lucky, you may not have to drill any new ones. Before you pick a location on the case, however, make certain you have inside access to the point where you have to apply the washers and nuts, and check clearances under the dash to make sure you can get the auto radio back in again!

Be especially careful in wiring the b.f.o. unit into the automobile radio. Routine methods are okay for the heater and power leads, but take care where you run the shielded wire for the output;

(Continued on page 116)

The innards, ready for temporary connection to the tube and power leads for a frequency check, which should be made with the coils in the shield can. When this is completed, the tube socket is mounted and wired. The coupling condenser and its shielded lead await their turn, last in the assembly process. The control unit is shown at the left.



What Price Precision?

The Economics of Frequency Standards In Two Parts—Part II

BY GEORGE X. M. COLLIER,* WØEG

THIS section describes the development of a standard to end all standards, and deals with the trials and tribulations encountered in getting the thing built and operating properly. The work was casually accomplished over the past three years, and the instrument produced, while composed of commercial components, is capable of day in and day out stability equal to that of WWV as received. It was felt that such a unit was worth the effort since it more or less eliminated the necessity for continuous checks against WWV—which frequently is unusable for days at a time—and allowed a degree of independence not heretofore realized. Further, ever since the author tied for second place in the first ARRL Frequency Measuring "Test," way back in 1931, he has been slightly "tetched" on

• In the second part of this article (Part I appeared last month) practical information is given on the preferred crystal oscillator circuit for frequency standard purposes. The author also describes a high-precision 100-kc. standard that should be of considerable interest to those for whom frequency measurement is a hobby within a hobby.

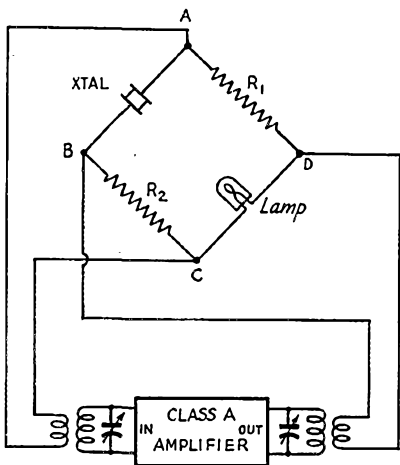


Fig. 4—The Meacham oscillator circuit in basic form. In normal operation the bridge is almost, but not quite, balanced.

the subject of frequency standards, and pride in the possession of something exceptional also contributed to the urge.

The over-all picture shapes up about so: Along about 1946, Western Electric announced their Type D-175730 frequency standard, and described its characteristics in a technical bulletin informing the reader that the unit would hold

100 kc. to between 0.08 and 0.35 part per hundred million per day, at the end of a year's operation. Also contained in this bulletin was a bibliography giving a list of publications (mostly *I.R.E. Proceedings*) dealing with the basic design of the unit. Further, along about this time, General Radio came out with a frequency standard capable of one part per hundred million, and gave fundamental information concerning it in the *General Radio Experimenter* for April, 1944 (J. K. Clapp, "A Bridge-Controlled Oscillator").

Naturally, the possibility of such accuracy couldn't be ignored, so a campaign of investigation was immediately inaugurated. The local Graybar representative advised he would be delighted to furnish the Western Electric unit at about \$1700 a throw, and how many were wanted? After a hefty double take, he was advised that this ham station couldn't afford no such item, but how much "costum" just the rock? He advised the rock wasn't for sale sans standard.

General Radio was next interrogated relative price, and they quoted in the neighborhood of \$900 for their unit, but would consent to part with a crystal, a second-harmonic X-cut bar, at about \$200 per each²—not too bad for a really precise item, but still well beyond the pocket-book here. Bliley also came out with a good standard about this time, but they apparently were not interested in selling the crystal as a separate item either.

It therefore looked as though it would be necessary to build a standard using available components, and see how it came out. A goal of one part per ten million was set as adequate, and this figure has been exceeded considerably.

The Meacham Oscillator

Perusal of available literature showed the basic circuit work as being accomplished by Meacham³ in 1938, for a GT-cut crystal, then recently developed by Bell Telephone Laboratories.⁴ A block diagram of this circuit is shown in Fig. 4, and all recent frequency standards

* 1816 Third Ave., South, Anoka, Minn.

² Now available only as a component of the General Radio primary frequency standard.

³ *Proc. I.R.E.*, October 1938, p. 1278, Meacham, "The Bridge Stabilized Oscillator."

⁴ *Proc. I.R.E.*, May 1940, p. 220, Mason, "A New Quartz-Crystal Plate Designated the GT Which Produces a Constant Frequency Over a Wide Temperature Range."

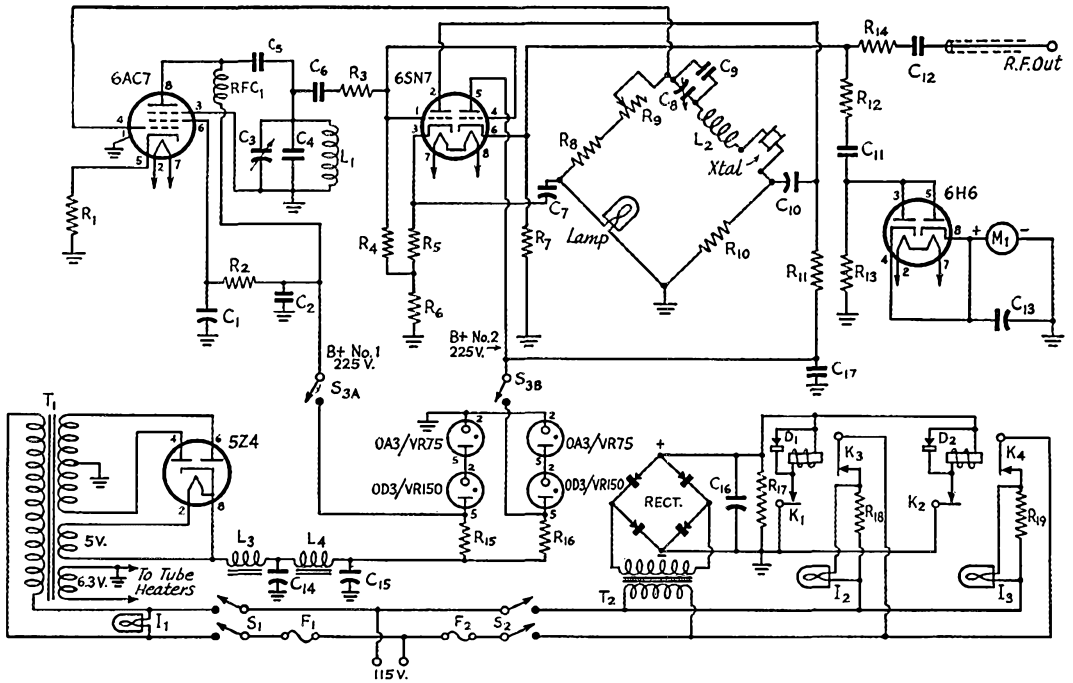


Fig. 5 — Circuit diagram of the WØEG 100-kc. frequency standard using the Meacham oscillator circuit.

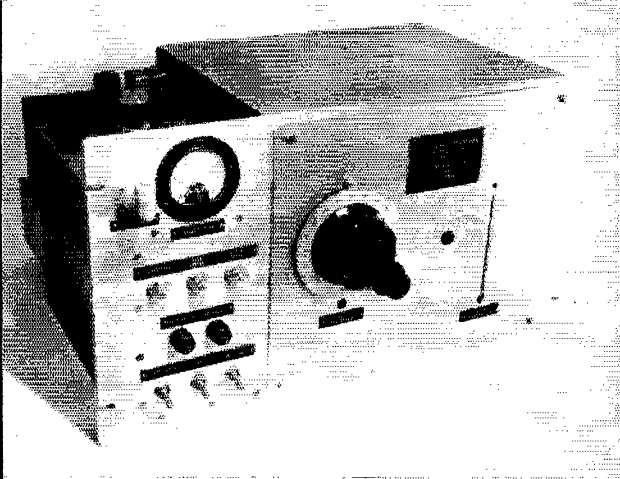
- C₁ — 1- μ fd. paper in metal can, 600 volts.
- C₂, C₁₇ — 0.5- μ fd. paper in metal can, 600 volts.
- C₃ — 250- μ fd. variable.
- C₄ — 300- μ fd. silver mica, 5 per cent tolerance.
- C₅, C₁₃ — 0.02- μ fd. mica.
- C₆, C₁₁, C₁₂ — 0.01- μ fd. mica.
- C₇, C₁₀ — 0.5- μ fd. paper tubular, molded case.
- C₈ — 320- μ fd. variable.
- C₉ — See Note 1 below.
- C₁₄, C₁₅ — 10- μ fd. oil-filled paper, 450 volts.
- C₁₆ — 50- μ fd. electrolytic, 50 volts.
- R₁ — 220 ohms, 2 watts.
- R₂ — 47,000 ohms, 2 watts.
- R₃ — 390 ohms, 2 watts.
- R₄ — 1 megohm, 2 watts.
- R₅ — 560 ohms, 2 watts.
- R₆ — 2200 ohms, 2 watts.
- R₇, R₁₁ — 2700 ohms, 2 watts.
- R₈ — 680 ohms (see text).
- R₉ — 2500-ohm carbon potentiometer (see text).
- R₁₀ — 370 ohms (see text).
- R₁₂, R₁₄ — 4700 ohms, 2 watts.
- R₁₃ — 15,000 ohms, 2 watts.
- R₁₅, R₁₆ — 5000 ohms, 25 watts.
- R₁₇ — 100 ohms, 2 watts.
- R₁₈ — 400 ohms (oven heater).

- R₁₉ — 10,000 ohms (see Note 3 below).
 - L₁ — 6.4-mh. iron-core choke.
 - L₂ — 6-mh. air-core choke (see text).
 - L₃, L₄ — 10 henrys, 200 ma.
 - D₁, D₂ — Copper-oxide instrument rectifier.
 - F₁, F₂ — 1-amp. 250-volt fuse.
 - I₁, I₂, I₃ — Neon bulb, Type NES1.
 - K₁, K₂ — 60-degree mercury thermostat.
 - K₃, K₄ — Single-pole normally-closed relay, 1000-ohm 1-ma. coil.
 - Lamp — 115-volt 6-watt lamp.
 - M₁ — 0-200 d.c. microammeter.
 - Rect. — Copper-oxide bridge.
 - RFC₁ — 65-mh. r.f. choke.
 - S₁, S₂, S₃ — Double-pole single-throw toggle.
 - T₁ — Power transformer, 600 v. c.t., 100 ma.; 5 v., 2 amp.; 6.3 v., 2 amp.
 - T₂ — Filament transformer, 5.4 v., 0.25 amp.
- NOTE 1 — C₉ composed of ten 100- μ fd. silver-mica condensers with a shorting switch that progressively connects them in parallel.
- NOTE 2 — All resistor tolerances 10 per cent.
- NOTE 3 — Crystal chamber heater; 2000 ohms on chamber proper, with 10,000-ohm slider-type resistor, adjusted to 8000 ohms, in series, mounted externally on back of oven.

utilize variations of it. The circuit works as follows:

The tube is operated as a Class A amplifier with a voltage gain of about 1000. This amplifier must be stable, and show no tendency to self-oscillation. The crystal forms one leg of a Wheatstone bridge, and operates at series resonance. The lamp forming the fourth leg of the bridge is a temperature-sensitive device, giving substantial variations in resistance as the filament temperature varies. The entire bridge is so proportioned that with 1.23 volts applied between B and D, it comes almost, but not quite, to balance.

Now, if the output of the amplifier is applied to corners B and D to drive the bridge and the input is connected to corners A and C as the bridge detector, and the phasing of these connections arranged so the amplifier will be regenerative, the thing will oscillate crystal-controlled, and the bridge will limit the amplitude of oscillation. If the resistance of the lamp becomes equal to R₂, when the circuit is oscillating, oscillation will cease because the bridge will come to balance and no excitation will be applied to the grid of the tube. However, if R₂ is made about 2 per cent higher than the resistance of the lamp, the unit



Front view of WØEG Meacham standard. The oven occupies the right-hand two-thirds of the unit. Access is through the cover plate bolted to the panel face. The dial drives C_8 . The small button immediately below is for screwdriver adjustment of the switch for C_9 . The thermometer measures temperature in the outer oven, and spreads 58–62 degrees C. over 4 inches of scale length. Graduations are 0.1 degree, and 0.01 degree is easily estimated. Radio-frequency output is on the coaxial elbow to the left of the meter.

will continue to oscillate in good shape. R_1 is made equal to the series resistance (R_s) of the crystal, and its value is something of a joker. It can be determined, however.

Crystal and Circuit Considerations

To utilize the circuit fully, it becomes necessary to go back to crystal cuts and the behavior of crystals in general. As we all know, a crystal approximates a very good tank circuit, how good being determined by the Q of each individual rock. Further, as in the case of tank circuits, a crystal possesses points of both parallel and series resonance. Most power oscillators with which amateurs are familiar operate the crystal at parallel resonance, and utilize the point of maximum impedance. The Meacham circuit, however, operates the crystal at series resonance and uses the point of lowest impedance. Parallel and series resonance in a crystal do not occur at the same frequency, so it becomes apparent that a rock for use in a Meacham circuit must be ground to give 100 kc. at the series-resonant point.

Further, at series resonance, the effective resistance, R_s , in series with the crystal reactance, can lie in a wide range of values, depending on the crystal cut, but in each case it also depends on the crystal mounting. In GT-cut crystals this R_s can run as low as 25 or 30 ohms, in a crystal having a Q of 500,000, to 400 ohms or so in lower-quality units. DT-cut crystals don't run so low, their series R_s usually falling between 500 and 3000 ohms. The Q of DTs, even the best units, is not so high as that of GT cuts either. The R_s of AT-cut crystals at 1 Mc. appears to run so low that building a bridge for them is impractical, hence we stick to the lower frequencies for Meacham circuits.⁵ From the above, it would appear that a special crystal is needed for a Meacham circuit. This is so, but crystal manufacturers produce lots of series-resonant rocks and will supply them if asked.

In getting to the practical aspects of this situation, the designer of a Meacham standard

⁵ Another consideration is that stray reactances become increasingly important as the frequency is raised, and it does not appear practical to build a bridge in which all arms are truly resistive at frequencies as high as 1000 kc.

will first have to determine the crystal cut he is going to use, and choose his circuit variation accordingly. Fig. 5 shows a very satisfactory circuit which, while best suited to DT-cut units, can be utilized with all but the best GTs provided a 6B4G or some other low-impedance tube is used as a phase inverter. Further, with GT cuts the lamp must be of quite low resistance. The standard Western Electric type A2 or K1 tungsten-filament telephone-switchboard lamps are possibilities. Also, the resistor R_{10} (corresponding to R_2 in Fig. 4) will have to be proportioned to the resistance of the lamp with approximately 0.75 volt on its filament. Assuming the lamp resistance to be 100 ohms at this point, R_1 will of course then come out at 102 ohms. In any case, the resistance of the lamp with 0.75 volt on its filament should be equal to or less than the series R_s of the crystal.

The transformers shown in Fig. 4 are a bit tricky to make, and should not be attempted unless one is content to experiment.

Regardless of the circuit used, it is imperative that stray capacities to ground be kept to a minimum, as phase displacement through the amplifier must be kept down if satisfactory operation is to result. Further, the plate tank circuit should be pretty good, with a low resistance coil being used for L_1 .

The WØEG Standard

The WØEG standard was developed from the article in the *General Radio Experimenter* and uses the circuit shown in Fig. 5. The 6AC7 tube operates Class A. One half of the 6SN7 is a phase inverter for driving the bridge, the other half being a cathode follower isolating the output of the oscillator from its load. The 6IH6 operates in conjunction with meter M_1 as a rudimentary vacuum-tube voltmeter used to indicate oscillation and output. This meter is necessary because no plate current variation occurs when oscillation takes place.

The bridge is composed of R_8 , R_9 and R_{10} , the lamp, the crystal, and its associated frequency-correcting circuit L_2 , C_8 and C_9 . The amplifier plate voltage is regulated by VR tubes, and the phase inverter and cathode follower are supplied

from separate regulator tubes. The rectifier and relay set-up, supplied from T_2 , are the control relays and thermostats associated with the oven heaters, and will be discussed later.

All r.f. resistors, except R_8 , R_9 and R_{10} , are Ohmite 2-watt Little Devils. R_8 and R_9 are temporary, and used to determine the series R_c of the crystal. Once the proper value has been found they may be replaced with fixed wire-wound units. R_9 is an Ohmite type AB 2500-ohm potentiometer, and R_8 , temporarily, can be another Little Devil.

R_{10} is a bifilar wire-wound bobbin, built from low temperature-coefficient wire. A good cracked carbon resistor could be used here, if the proper value is available. Further, any good noninductive wire-wound resistor of 370 ohms plus or minus 1 per cent will work. Physically this resistor should be as small as practical, and possessed of a low temperature coefficient. It carries very little current, so a one-watt unit is more than ample. This resistor and the lamp are the ratio arms of the bridge, and it is important that R_{10} be stable over a wide temperature range. The lamp is a standard 6-watt 115-volt tungsten-filament candelabra-base pilot light, soldered into the circuit to eliminate the possibility of high-resistance contacts.

It is important that very good condensers be used for C_7 and C_{10} , as these units feed r.f. to the bridge, and also block plate voltage from ground. They should not be metal cased, nor should they be mounted close to a chassis. Sangamo Redskin 0.5- μ fd. 600-volt units have worked out very well.

The final value of C_9 will be determined by the actual frequency of the crystal used. C_3 can be replaced by silver-mica fixed values, once the proper amount of capacity has been determined.

R.F. Coils

While comparatively few r.f. coils are used, they play an important part in proper operation of the unit. RFC_1 is an ordinary universal-wound 65-millihenry choke, the value of which is not too critical. Most any air-cored unit of 40 to 70 millihenrys will work.

L_1 , the tank coil for the amplifier, is the most important item, and it is essential that the Q of this unit be as high as is practical. The coil

used in the WØEG standard was pie-wound on a four-section wood bobbin, with 7-38 Litz wire, 383 turns of which were evenly distributed among the four winding slots in the bobbin. The bobbin was then mounted in a Lenkurt Electric type P1750-12A powdered iron core, which completely encloses the winding and produces a coil having an unloaded Q of about 300 at 100 kc.

It is believed that the r.f. chokes contained in the low-frequency tuning units for BC-375 transmitters would be satisfactory as a substitute for the powdered-iron coil. These r.f. chokes have an inductance of 6 millihenrys, are approximately $1\frac{3}{4}$ inch in diameter and $\frac{3}{8}$ of an inch thick. They are wound with No. 30 B & S gauge cotton covered wire, and should have a Q of approximately 75 at 100 kc. If this coil is used, appropriate increases in C_1 will be necessary to tune it to 100 kc. It is doubtful if the small pie-wound chokes will be good enough for use at L_1 , but 6.4-mh. units with iron dust cores might be satisfactory.

L_2 is one of the before-mentioned 6-mh. r.f. chokes, and a pie-wound unit probably will work here.

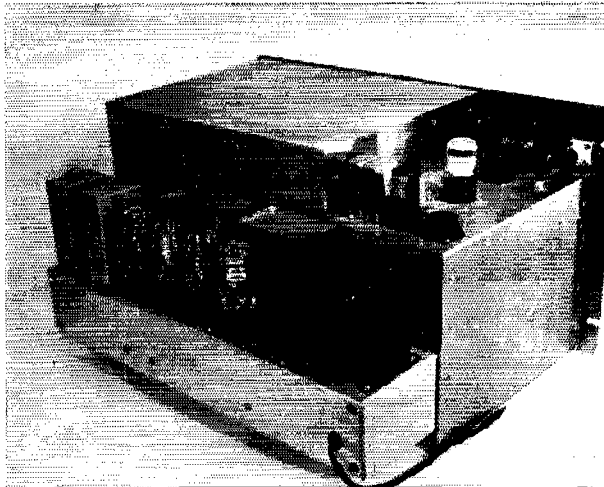
Assembly Notes

Beyond the above, nothing unusual entered the construction picture. The entire circuit was assembled on an aluminum plate 5 inches wide and 10 inches long. All resistors and condensers were mounted on lug strips placed at right angles to the plate, and all components in the amplifier and phase inverter clear all chassis metal by at least $\frac{1}{2}$ inch. Condensers C_7 and C_{10} are mounted in holes bored through one of the lug strips and are sealed to it with polystyrene cement. They clear all chassis metal by at least $\frac{3}{8}$ inch. No special precautions were taken with the by-pass condensers C_1 , C_2 and C_{17} , except to see that their metal containers were well grounded.

As in all high-gain amplifiers, considerable care was taken in the separation of input and output circuits. Even so, one crystal was wrecked by self-oscillation of the amplifier, and some juggling of components and lead placement was necessary before it became completely clean. All filament and plate leads were run in shielded wire, with the shield well bonded to the mounting plate, and extending to near the cold end of the

◆

The power-supply unit and circuit compartment are mounted on and about the outer oven. The lamp in the bridge is between the 6AC7 and 6SN7. The knob to the right of the 6AC7 controls R_9 . C_3 has been replaced with fixed silver mica units, hence no dial. The two relays are on the left-hand end of the power supply chassis, and the terminal strips immediately above them are tie points for the heater and thermostat circuits. The stickers on the 6AC7 and 6SN7 show the date on which they were installed. These tubes last about 15,000 hours, which approximates 18 months of operation. The balance of the tubes are over 3 years old.



first r.f. component. The 6AC7, it must be remembered, is highly power-sensitive, and it doesn't take much skulduggery at its grid to produce quite a rumpus at the plate. As originally set up, R_9 was fastened directly to the mounting plate, which procedure was a major contribution to self-oscillation. Insulating this unit from ground eliminated the last vestige of self-oscillation. At first glance it would seem that a clean amplifier, operating at 100 kc., would be a cinch. However, when one considers the excellent efficiency realized at this frequency, it isn't too hard to see where difficulties may arise. They did!

The crystal and its frequency correcting circuit, $L_2C_8C_9$, were all mounted in the temperature chamber. Connections to the 6AC7 grid and to C_{10} were made through leads approximately 6 inches long, spaced well away from ground and from all plate-circuit components. The vacuum-tube voltmeter, since it tells so much about the operation of the unit, was included as a permanent part of the assembly.

Adjusting the Oscillator

To set the circuit into operation, assuming everything is ready to go, the amplifier clean, and the crystal at proper operating temperature, proceed as follows:

1) Short-circuit the assembly $L_2C_8C_9$, thus running the crystal directly to the 6AC7 grid.

2) Set R_9 at the minimum-resistance position.

3) Set C_8 at approximately half scale.

4) Turn on the filaments and observe M_1 , which should soon show the contact-potential current in the 6H6, and read around 10 microamperes.

5) When the filaments are hot, turn on the plates, observing M_1 as you do. If M_1 jumps off scale and stays there, cut the plate quick. Then reduce the value of R_9 by 50 per cent and try it again. Such a jump is hardly likely with DT-cut crystals, but it can happen. If M_1 jumps off scale, falls to near minimum, and then starts to pump, waving between minimum and 180 microamperes or so, it shows intermittent oscillation, with the bridge coming to balance, starving the 6AC7 grid. If nothing happens in M_1 , everything is still normal.

6) The pumping described above is a normal function, and shows everything to be almost, but not quite, right. When it occurs, rotate C_8 slowly in both directions, looking for a setting at which the pumping is minimum. If such a setting cannot be found, increase R_9 slightly and keep rotating C_8 . Eventually proper settings of C_8 and R_9 will be found, and M_1 will come to rest at around 80 microamperes. When this condition is reached, leave R_9 alone and rotate C_8 in either direction until M_1 indicates unstable operation. Record this dial reading and repeat the process in the opposite direction. Then set C_8 midway between the two observed readings. Now, decrease R_9 till pumping barely starts, then increase its value till pumping just stops. At this point, the sum of R_9 and R_8 approximates the series R_c

of the rock. Increase R_9 till M_1 reads 85 to 95 microamperes. If pumping won't stop at 80 to 90 microamperes, keep increasing R_9 until it does stop. R_9 controls the drive to the crystal. If M_1 won't stop pumping until it reads 150 microamperes or so, a weak crystal or a defective 6AC7 or 6SN7 is indicated. If the crystal is weak, it may not be possible to go below this high-output value and still get stable operation. One rock at WØEG stopped off at 180 microamperes, and operated okay for about a year. It then gave up the ghost.

7) If, in Step 5, there is no change in M_1 , the value of R_8 and R_9 is so low that oscillation can't start. The procedure is to keep rotating C_8 as R_9 is increased. If this is done, pumping of M_1 will soon start, and adjustment is then the same as in (6) above.

8) If full-scale deflection of M_1 can't be eliminated by adjustments of R_8 and R_9 , self-oscillation is indicated, and the crystal is taking an awful beating.

9) Now cut plate voltages. M_1 should drop to the contact-potential current value. Reapply plate voltage and observe M_1 , which should first jump off scale, and then fall to near the operating value, where it will pump slightly and at a decreasing rate until the bridge reaches equilibrium, and M_1 stands still.

That's all there is to it. Let the thing run for about a month, adjusting R_9 to produce the selected operating value of M_1 as it falls off or increases due to aging of the crystal and circuit. If operation at the selected reading of M_1 becomes unstable, increase R_9 until stable operation, no pumping, again occurs. The series R_c of the rock usually increases as it ages in.

As a check on proper operation, put the output of the standard, which is about $2\frac{1}{2}$ volts, into the Y-axis amplifier of a good scope, and adjust the X-axis sweep to 25-35 kc. With this set-up a direct view of the output is obtained, and it should be a perfect sine wave. If anything else shows up, the amplifier is taking off on its own. Slight irregularities can sometimes be eliminated by adjustment of C_8 for the best waveform, disregarding the previous setting.

Now, it seems that everything good must have some drawback, and we find the biggest one in this lash-up to be lack of harmonics. If the oscillator is properly adjusted, the harmonic content of the output voltage is so low that difficulty will be experienced in hearing even the third harmonic. Since this is so, it becomes necessary to feed the standard into some kind of a harmonic generator, if it is to be used for frequency-checking purposes. This is a must.

Adjusting to Frequency

When a proper comparison between the standard and WWV can be made, proceed as follows with frequency adjustment:

1) Remove the jumper across L_2 , C_8 and C_9 , and reestablish the selected value of M_1 , with R_9 .

(Continued on page 120)

Happenings of the Month

REGULATIONS CHANGES

The FCC has modified § 12.91(b) of the regulations so that it will be in accord with the recent treaty which provides for reciprocal operating privileges between the United States and Canada. This is accomplished by changing the first sentence of § 12.91(b) to read as follows, ". . . only in the amateur band 28.0 to 29.7 Mc. except that within areas under the jurisdiction of a foreign government, operation is controlled by the laws of that government and the terms of any applicable treaty. (See Appendix 4 for such treaties or agreements as are in force and the pertinent terms thereof.)" Appendix 4 now contains Article III of the recent treaty.

Refer to the article on page 50 of September *QST* for complete details on the interpretation of this regulations change.

A.R.R.L. FILES ON DOCKET 10237

For the information of members, we publish herewith the text of filing by the American Radio Relay League of comment on FCC proposals in Docket 10237 for revision of the emergency provisions now in Rule 12.156 and for a new Rule 12.112 to create calling segments in each of the principal amateur bands.

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of
Amendment of Part 12 of
the Commission's Rules and
Regulations to designate specific
amateur calling, answering
and emergency communications
frequency bands

} DOCKET 10237

COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to Paragraph 4 of the Notice of Proposed Rule Making in Docket 10237, dated July 30, 1952, The American Radio Relay League, Inc., files these comments on behalf of the approximately 35,000 licensed amateur members of the League.

These comments were formulated after completion and analysis of an extensive study of the postwar history of practical amateur emergency communications accomplishments, a study ordered by the President of the League for consideration by its Executive Committee.

Practical Effects of the Proposals

The proposed amendment of Section 12.156 retains the principles stated in the present language concerning emergency communications operation, but greatly expands them. It is proposed to extend to all amateur bands below 420 Mc. (except that at 21 Mc.) the reservation of amateur bands or segments of bands to be restricted to emergency communications when the Commission finds and declares that a state of emergency exists. Further, the effect of the proposed language is to restrict the use of such segments on a nationwide basis, regardless of the location and size of the affected area, rather than limiting the restriction to the affected or declared area as is done in the present language. It is newly

provided that additional band segments may be restricted at the Commission's discretion, thus recognizing the practical procedure which the Commission has actually followed in past emergencies almost to the exclusion of the standard procedure specified in the present regulations.

The proposed new Section 12.112 would impose upon the amateur service an entirely new concept of routine communications procedures, in that it reserves frequency segments and spells out step-by-step procedures for calling and answering to establish contact in those segments.

Background of Amateur Emergency Communications Procedures

The necessity for and desirability of these proposed changes in the amateur rules can be best evaluated after an examination of the practical communications procedures employed by amateurs, especially in time of emergency.

A study of records and reports in the files of the American Radio Relay League indicates that since the reactivation of the amateur service at the close of World War II there have been 158 instances in which an amateur or an organized group of amateurs provided emergency communication. A tabulation of these instances is presented in Appendix A.* Below is a summary, by years, of the number of communications emergencies which might be classified as "major" or "minor" depending upon their scope and severity:

Year	Major Emergencies	Minor Emergencies	Total
1945	0	1	1
1946	1	7	8
1947	5	17	22
1948	4	12	16
1949	2	20	22
1950	5	32	37
1951	4	25	29
1952 (to Sept. 1)	4	19	23
	25	133	158

On only two occasions during the above record of performance has the Commission, according to records available to the League, found it necessary to invoke the provisions of Section 12.156 of the amateur rules, and then only in part. In only four other known instances was the Commission requested by amateurs to declare an emergency; in these four cases the request either was declined on the basis the status of the emergency was not sufficiently serious, or the matter was handled as an "informal" request from the Commission or one of its field offices for voluntary clearance of frequencies.

In no instance on the League's records has the Commission, during any of the above-cited communications emergencies, ever made use of the overall provisions in the present Section 12.156, which among other things reserve the entire 3500-4000 kc. amateur band for distress communications. Rather, the Commission has taken the much more practical approach of indicating a specific frequency or frequencies within that band, or others, to be so reserved. Neither the Commission's formal or informal action, nor the practical operation of amateurs, has made use of the overall provisions in the present language.

Such a record raises serious doubts, therefore, as to the advisability of extending and expanding the overall regulatory provisions, as contemplated by the proposal.

It is pertinent here to examine the organized activities of amateur radio operators in planning practical emergency communications procedures. Within the framework of the American Radio Relay League's field organization there is an Amateur Radio Emergency Corps. The United States and possessions are divided into 72 geographical areas called "sections." In each such area there is an appointed Section Emergency Coördinator (SEC), whose duty it is to promote and administrate the emergency-preparedness activities under his jurisdiction. Each section is subdivided, at the

* Not reproduced here because of space limitations.—Ed.

judgment of the SEC, into smaller areas of jurisdiction administered by an Emergency Coördinator (EC) appointed by the SEC. Individual amateur operators and stations register with the local Emergency Coördinator their availability, operating skills, and station equipment. There are approximately 30,000 amateurs presently enrolled in the Corps. Amateurs, under the guidance of their Emergency Coördinators, establish spot-frequency networks. Approximately 10,000 amateurs possess or have access to portable power sources independent of commercial mains. Some 10,000 amateurs in the Corps, separately, possess mobile radio equipment. This organization is maintained at peak efficiency by periodic drills and tests, some local in scope, others nationwide. In practically every case, communications are conducted on one "spot" frequency chosen for the area concerned.

The record of performance of the amateur service in time of disaster, documented in "QST" and in the files of the Commission and the League, is convincing evidence of the effectiveness of this organized planning.

Practical Operating Considerations

In considering the applicability of the proposed rules, it is especially important to note that in all 158 emergencies of record since the close of World War II, the above-described organization functioned admirably without regulatory intervention, except for two instances where the Commission believed it desirable. Yet the proposed changes and expansion in Section 12.156 contradict the practical operating experience of amateurs in past emergencies, and are not even in consonance with the Commission's own minimum actions during such times of distress. It is the view of the League that the performance of organized amateur emergency communications facilities is adequate evidence that there is no need for elaborate and detailed regulations specifying frequency bands or segments, procedures, etc. in advance. It is the view of the League that the Commission should not limit itself to specific procedures. Rather, it is the view of the League that the Commission should provide itself with broad authority to declare a state of emergency as necessary, in its discretion, and specifically at that time outline temporary regulatory provisions to expedite the progress of disaster communications as a particular situation requires. Such a plan would be in consonance both with amateur operating practices, and with the customary practices of the Commission in past actions under Section 12.156.

The proposed rule indicates specific frequency band segments, in all amateur bands up through 225 Mc. (except 21 Mc.), which would be reserved exclusively for emergency communications when the Commission so declares. This restriction would become operative regardless of whether emergency communication was being conducted on those band segments. It would, for example, limit the specified portions of the 144-Mc. band throughout the country, so that in an emergency localized in the New York area, amateurs in the rest of the country would still have to observe the restricted segments even though it is obvious no interference could possibly be caused, or useful communications provided, at distances of several hundred miles from the area. This same reasoning applies to all frequencies of short-distance effect. On the frequencies of long-distance effect, such as the segment proposed at 14 Mc., the practical advantages, if any, of "clear" channels can be completely negated by interference from foreign stations not under the jurisdiction of the Commission. The principle of attempting, in advance, to specify band segments for emergency communication is therefore unrealistic.

More important, it does not recognize the practical operating procedures used by amateurs in emergency as well as routine organized communications. Nearly all organized amateur communication activities are built around networks of stations operating on a single "spot" frequency. There are hundreds of these communications networks around the country. A list of those on record with the American Radio Relay League is shown in Appendix B.* It is these organized networks which provide the effective tools for disaster communication, and which have been the basis for practically all amateur emergency communications work in recent years.

In time of emergency or impending emergency, amateurs in any one state or local area automatically congregate to the spot frequencies long-established as the focal points of area communications. Amateurs listen on a single fre-

quency, and operate on a single frequency, in a given area or net. Liaison stations provide intercommunication between networks as necessary. As a result, segments of bands specified in advance, such as those proposed by the Commission, would in practice be largely unused inasmuch as amateurs would be operating in the most effective spots — their own area frequencies. Further, emergency calls made in such unused segments of the bands might well go unheeded, since nearly all amateur receivers would be tuned to network frequencies. Thus, again the proposal is shown to be unrealistic in not taking in account practical amateur procedures.

In this connection, it is worthy of note that first calls from a disaster area are usually made on area network frequencies rather than in any emergency calling bands.

The proposal specifies a 5-minute listening period at the start of each hour. This provision is also in the present regulation. To the best of the League's knowledge, this provision has never been observed by amateurs, simply because it is not in consonance with more effective amateur procedures. Amateur stations active but not transmitting, in effect observe 60-minute listening periods each hour, since on networks for every station transmitting at a given moment, there are dozens or hundreds of "ears" monitoring the frequencies. Disruption of smooth-flowing procedures in emergency networks even for five minutes would, it is believed, have more disadvantages in overall performance than any questionable advantage of monitoring separate "orphan" segments of the band for improbable "first calls."

Alternative Proposal

It is the alternative proposal of the League, therefore, that amendment of Section 12.156 be made to provide basic authority for the Commission to intervene, as occasionally it might be desirable so to do, with specific and temporary regulatory provisions. This authority should be written in consonance with practical amateur operating procedures. Its implementation would coincide exactly with the effective practical procedures used by the Commission itself in past emergency declarations. The League's proposal for new language of Section 12.156 is as follows:

§ 12.156 *Operation in emergencies.* In the event of an emergency disrupting normally available communication facilities in any wide-spread area or areas, the Commission, in its discretion, may declare that a general state of communications emergency exists therein, designate the area or areas concerned, and specify the amateur frequency bands, or segments of such bands for use only by amateurs participating in emergency communication within or with such affected area or areas. Amateurs desiring to request the declaration of such a state of emergency should communicate with the Commission's Regional Manager of the area concerned. Whenever such declaration has been made, operation of and with amateur stations in the area concerned shall be only in accordance with the requirements hereinafter set forth, but such requirements shall in no wise affect other normal amateur communications in unaffected areas or in the affected area when conducted on frequencies not designated for emergency operation.

(a) All transmissions within all designated amateur emergency communication bands other than communications relating directly to relief work, emergency service, or the establishment and maintenance of efficient amateur radio networks for the handling of such communications, shall be suspended. Incidental calling, answering, testing or working (including casual conversation, remarks or messages) not pertinent to constructive handling of the emergency situation shall be prohibited within those bands.

(b) The Commission may designate certain amateur stations to assist in the promulgation of information relating to the declaration of a general state of communications emergency, to monitor the designated amateur emergency communications bands, and to warn non-complying stations observed to be operating in those bands. Such station, when so designated, may transmit for that purpose on any frequency or frequencies authorized to be used by that station, provided such transmissions do not interfere with essential emergency communications in progress; however, such transmissions shall preferably be made on authorized frequencies immediately adjacent to those segments of the amateur bands being cleared for the emergency. Individual transmissions for the purpose of advising other stations of the existence of the communications emergency shall refer to this section by number (§ 12.156) and shall specify, briefly

and concisely, the date of the Commission's declaration, the area and nature of the emergency, and the amateur frequency bands or segments of such band which constitute the amateur emergency communications bands at the time. The designated stations shall not enter into discussions with other stations beyond furnishing essential facts relative to the emergency, or acting as advisors to stations desiring to assist in the emergency, and the operators of such designated stations shall report fully to the Commission the identity of any stations failing to comply after notice, with any of the pertinent provisions of this section.

(c) The special conditions imposed under the provisions of this section shall cease to apply only after the Commission, or its authorized representative, shall have declared such general state of communications emergency to be terminated; however, nothing in this paragraph shall be deemed to prevent the Commission from modifying the terms of its declaration from time to time as may be necessary during the period of a communications emergency, or from removing those conditions with respect to any amateur frequency band or segment of such band which no longer appears essential to the conduct of the emergency communications.

Calling and Answering Frequencies

The proposed new Section 12.112 reserves segments of each amateur band up through 225 Mc. (except 21 Mc.) exclusively for calling and answering purposes, and specifies detailed procedures for their employment.

This is an entirely new concept in the conduct of amateur communications and needs careful examination.

In an example case, it is contemplated that an amateur station in one of the named segments would initiate a general call, CQ, not more than the specified length. A second station, hearing the inquiry call and desiring to establish communication, would respond on or near the same frequency, again observing the limits as to length of call. Assuming contact established, the two stations would then negotiate for a mutually satisfactory frequency or frequencies in the unrestricted portions of the band on which to continue and complete the contact. Each station would then shift frequency, re-establish contact, and continue the communication.

A careful examination of the practical application of this procedure, in the light of established amateur operating practices, shows the proposal to be unrealistic, inefficient, and wasteful of precious frequencies.

In the example case, the amateurs concerned would be plagued with difficulty right from the start. First, they must agree on a working frequency or frequencies. This discussion might take several forms, depending upon whether each station was crystal-controlled, with a choice of several specific frequencies, or whether it was operable in any part of the band. Once these differences in station capabilities were ironed out, probably along with differences of opinion on a suitable working frequency, the stations could then attempt the frequency change.

The agreed frequencies would of necessity be chosen on speculation. The operators would have no way of knowing, short of having a second communications receiver in operation, what conditions of interference existed on the chosen working frequency or frequencies. Occupancy of the frequency by others might make contact impossible, thus completely wasting the time and frequencies in the calling band.

The proposal assumes ability of every amateur to set his transmitting or receiving frequency at will within very close tolerances, an ability which does not exist in most cases because there has been no necessity for it. Equipment available to the amateur service simply is not built within such tolerances for the most part; the cost would be prohibitive. Thus even if there were agreement on choice of working frequencies, there probably would be time expended in multiple calling until the chosen frequencies, or their approximations, were logged.

Even granting, for purposes of the example, ability to set frequency closely, in order to reestablish contact the stations must repeat on the working frequencies exactly the same calling and answering procedures they used in the restricted band segments. Obviously, this is sheer waste of frequencies, not to mention time, since the calling and answering procedure must be duplicated on the working frequency.

Moreover, there is a practical engineering problem in frequency shifts of any magnitude. Changing to a working

frequency within the remainder of the band would in many cases require retuning of the amateur transmitter, taking more time and effort and reducing efficiency. More important, since, from a practical standpoint, tuning would be done under key-down conditions, it would increase interference to other stations. The combined effect of this problem, plus that of frequency-setting, would be to require of amateurs the purchase or construction of elaborate and precise receiving and transmitting equipment, with costs which would be prohibitive.

Additionally, an impossible situation would be created in the many bands of international usage. It is virtually certain that few, if any, foreign stations would understand what was being attempted by the U. S. amateur in a frequency shift, and sufficient confusion would result that the band segment would for practical purposes be rendered useless to American amateurs.

It is recognized that an objective of the proposal is to assist operation in emergencies, especially for "first calls." But under the conditions imposed there is only one conceivable result — U. S. amateurs simply would not use the impractical procedures specified, in their day-to-day operations, so that the frequencies would not be in general use. The emergency-use potentialities of the band segments would therefore be reduced, not enhanced. Also, foreign stations not under the jurisdiction of the Commission would have free access to such channels and, once becoming aware of their being cleared by American amateurs, would flock to use the restricted segments, further decreasing their potential emergency effectiveness. Even were the plan workable in other respects, international coordination would be required to make it a success.

The net effect of the proposal would be, in the League's view, to withdraw from domestic amateur use the frequency segments listed in the proposal, and would be a far greater loss to the amateur service than any recent international radio conference has imposed in its allocation table.

The League does not believe that such a result is in accord with the Commission's usual policy of fostering the amateur service, and urges the deletion of the proposed Section 12.112.

THE AMERICAN RADIO RELAY LEAGUE, INC.

By:

PAUL M. SEGAL
Its General Counsel

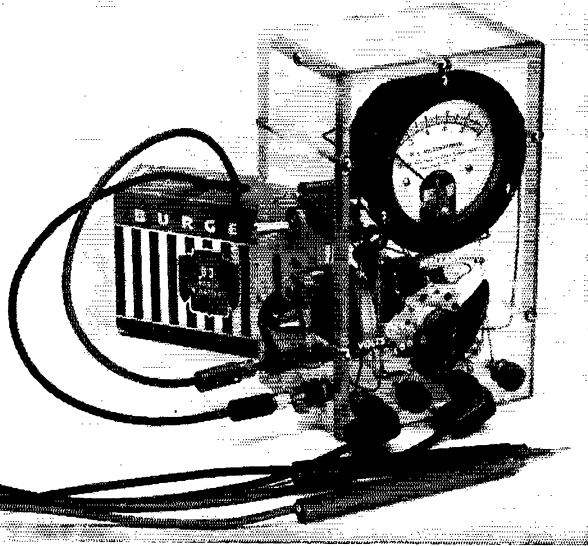
A. J. BUDLONG
General Manager

A.R.R.L. ACTIVITIES CALENDAR

Oct. 4th: CP Qualifying Run — W6OWP
Oct. 11th-12th: Simulated Emergency Test
Oct. 15th: CP Qualifying Run — W1AW
Oct. 18th-19th: CD QSO Party (c.w.)
Oct. 25th-26th: CD QSO Party ('phone)
Nov. 9th: CP Qualifying Run — W6OWP
Nov. 13th: CP Qualifying Run — W1AW
Nov. 15th-16th, 22nd-23rd: Sweepstakes
Dec. 5th: CP Qualifying Run — W6OWP
Dec. 5th-7th, 12th-14th: 10-Meter WAS Party
Dec. 19th: CP Qualifying Run — W1AW
Jan. 3rd: CP Qualifying Run — W6OWP
Jan. 10th-11th: V.H.F. Sweepstakes
Jan. 10th-25th: Novice Round-up
Jan. 17th-18th: CD QSO Party (c.w.)
Jan. 19th: CP Qualifying Run — W1AW
Jan. 24th-25th: CD QSO Party ('phone)

ARE YOU LICENSED?

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



A volt-ohm-milliammeter built in a plastic case. Terminal pin jacks across the bottom from left to right are: common, volts, milliamperes, ohms. The zero-adjust rheostat, polarity-reversing switch and battery terminals are on the side.

A Novice-Built Test Meter

BY JOHN P. RAMSEY,* WNIUJG

There are two instruments that should be in the shack of every Novice who plans to stay within FCC regulations. One of these — some means, independent of the transmitter, for checking the frequency of the emitted signal — is specifically required. The other is a meter for checking the power input to the final stage of the transmitter. A volt-ohm-milliammeter is very useful for many other purposes and is almost essential for tuning up the home-grown rig.

The unit shown in the photographs is based primarily on the one described in the last several editions of *The Radio Amateur's Handbook*. The somewhat modified circuit is shown in Fig. 1. Having seen the pretty smoke that rises when an ammeter is inadvertently hooked up as a

voltmeter, I decided to use separate terminals for each of the three functions of the meter — volts, ohms and milliamperes. This, I thought, might at least minimize the possibility of having to buy a new meter as a result of trying to read voltage with the switch set in the milliammeter position.

When the rotary switch is set at the low-resistance position, there is a constant drain of 1 ma. on the battery. Of course an oldtimer would never go off and leave the meter switched to this position. But a Novice might not be so careful and a constant drain of even 1 ma. would run the battery down in a short time. With the battery on leads outside the case, he is more likely to disconnect it before putting the instrument away, thus perhaps saving the cost of a new battery.

Switching from one range to another is accomplished by the two-gang rotary switch, S_1 . However, in switching between high- and low-resistance ranges, it is necessary to reverse the polarity of the battery. While this could be done by adding another wafer to the rotary switch, I preferred to use a separate toggle switch, S_2 , for the purpose. R_8 is for adjusting the meter to zero-resistance reading with the test prods shorted, prior to making resistance measurements.

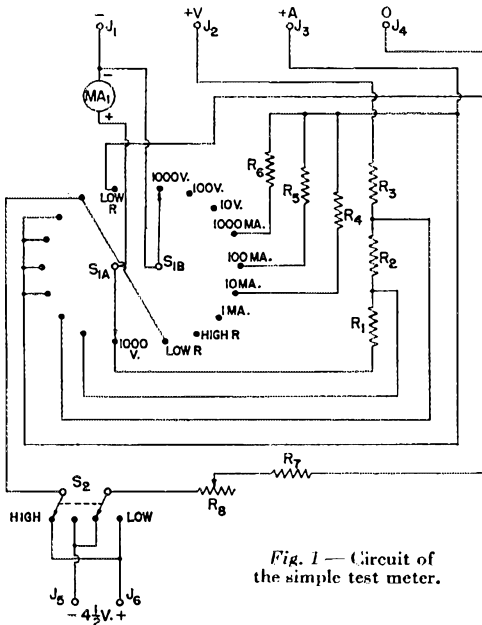


Fig. 1 — Circuit of the simple test meter.

- R_1 — 0.9 megohm, $\frac{1}{2}$ watt, 5% or less.
- R_2 — 90,000 ohms, $\frac{1}{2}$ watt, 5% or less.
- R_3 — 10,000 ohms, $\frac{1}{2}$ watt, 5% or less.
- R_4, R_5, R_6 — Copper-wire shunts (see text).
- R_7 — 3300 ohms, $\frac{1}{2}$ watt.
- R_8 — 2000 ohms, wire-wound (Clarostat 43-2000 or equivalent).
- $J_1, J_2, J_3, J_4, J_5, J_6$ — Phone-tip jack.
- MA_1 — 0-1 milliammeter.
- S_1 — 2-gang 9-position rotary switch (Mallory 1321L or equivalent).
- S_2 — D.p.d.t. toggle.

Construction

While the case might be made out of almost any material available, it happens that W2KBH gave me a sheet of $\frac{1}{4}$ -inch lucite at about the time I was getting ready to build the unit. It is easy to work and makes a very attractive-looking job. The front and back are pieces 4 inches wide and $6\frac{1}{2}$ inches high. The sides are $2\frac{1}{2}$ inches wide and $6\frac{1}{2}$ inches high, while the top and bottom are pieces $2\frac{1}{2}$ by $3\frac{1}{2}$ inches. The pieces are assembled with 6-32 machine screws by drilling and tapping holes in the edges of the material. Lucite splits or chips quite easily, so care should be used in this operation. Use a No. 28 drill for clearance holes and No. 34 for the tapped holes. Wet the end of the drill frequently with water to reduce heating that tends to soften the lucite. Don't try to drill the holes too close to the corners. I kept them $1\frac{1}{2}$ inches away. Get a square-end tap if possible, and back it up whenever it shows a tendency to stick. If a regular tapered tap is used the holes must be deep enough so the screw will not hit the taper. Use water as a lubricant.

The large hole for the meter in front should be cut so that the flange of the meter comes about $\frac{5}{16}$ inch below the top edge. A circle cutter is used to make the hole. Be sure to adjust the cutter carefully so that you will end up with a hole that fits the meter nicely. Try the cutter first on a piece of $\frac{1}{4}$ -inch scrap wood. It is better to cut halfway through from one side and then turn the piece over and finish from the other side. As a matter of fact, it is advisable to follow this procedure in drilling any of the holes.

The center of the rotary-switch shaft comes $1\frac{3}{4}$ inches up from the bottom edge and the four output terminals are lined up across the bottom 1 inch apart, center to center, and $\frac{9}{16}$ inch up.

On the left side, the shaft of the zero-adjust rheostat, R_8 , is level with the rotary-switch shaft. If the back end of the rheostat comes too close to the switch, the switch can be turned slightly to give more room. The polarity-reversing switch, S_2 , should be placed above the rheostat in a position that clears the case of the meter. The two battery-terminal jacks are mounted below. Be sure to mount the one toward the front so that it will not interfere with the adjacent one in the front panel.

◆
Interior view of the volt-ohm-milliammeter. The coil in the foreground is the 1000-ma. shunt. The other two shunts are above the rotary switch.
◆

Multiplier Resistors

Before wiring the unit up, the various multiplying resistors should be adjusted following the suggestions given in the *Handbook*. The current shunts, R_4 , R_5 and R_6 , are made of copper wire as described there. The resistance values should be $\frac{1}{9}$, $\frac{1}{99}$ and $\frac{1}{999}$, respectively, of the meter resistance.

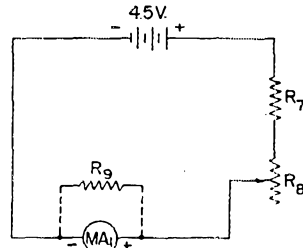


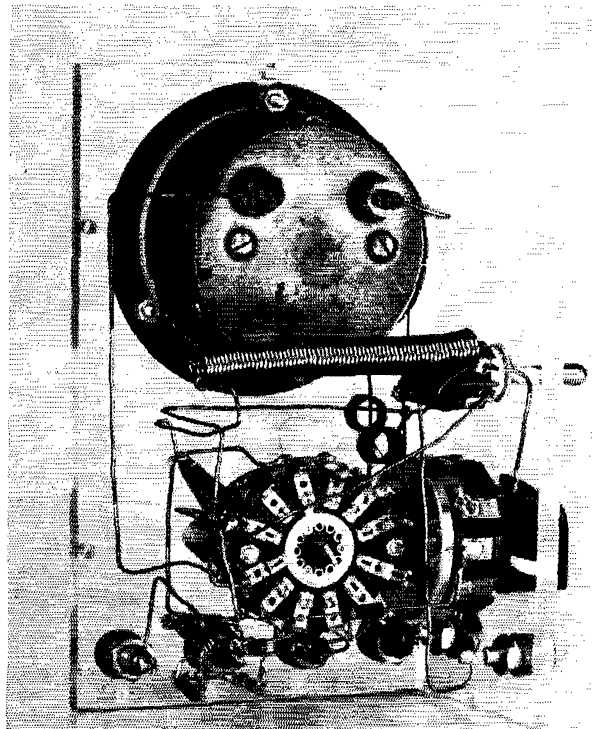
Fig. 2 — Test circuit for checking meter resistance.
 R_7 , R_8 — See Fig. 1.
 R_9 — 100 ohms (see text).
MA1 — See Fig. 1.

If you don't know the resistance of your meter and can't find it out from a catalog, its approximate value can be determined by connecting the 4.5-volt battery, the fixed 3300-ohm resistor, R_7 , the 2000-ohm zero-set rheostat, R_8 , and the meter in series, as shown in Fig. 2. Adjust the rheostat until the meter reads full scale (1 ma.). Then connect a 100-ohm resistor across the terminals of the meter. The meter reading will fall to a new value. The meter resistance can then be calculated by

$$R_m = 100 \frac{1 - I}{I}$$

where I is the new meter reading. For instance, if the new reading is 0.75 ma., then the meter

(Continued on page 124)



Codan Elimination of Intersignal Noise

An Outboard "Squelch" System for Communication Receivers

BY RONALD L. IVES*

THE background noise produced by a modern "high-powered" communications receiver, when no signal is tuned in, may be almost as loud as the preferred listening volume. This unwanted noise causes auditory and other fatigue to the operator, and sundry objections from others in the vicinity of the receiver. In a well-designed and properly maintained receiver, much of this noise is caused by electron motion within the input circuits; most of the remainder is static of various sorts.

Almost a generation ago, equipment for silencing a receiver when no signal was incoming was developed and put into commercial operation by various communications companies. This device, usually known as a "codan" (carrier-operated device, anti-noise), takes many forms, but is basically a switch which cuts off the a.f. channel when no a.v.c. voltage is developed by the receiver.^{1, 2} One of the simplest forms, consisting of a pentode-controlled triode amplifier, is shown in Fig. 1, complete with its own power supply. The basic circuit is not new, and is not original with this writer, but it is one of the smoothest-operating of a large number of codans tested.

Circuit Operation

Operation of this codan is quite simple and straightforward. When the a.v.c. voltage is low or zero, the pentode draws plate current. Voltage drop across the plate load resistor, R_3 , biases the triode to and beyond cut-off, so that it will not pass signals. When the a.v.c. voltage rises to the cut-off value for the pentode, it no longer draws plate current, and the bias on the triode grid is now only the operating bias, supplied by

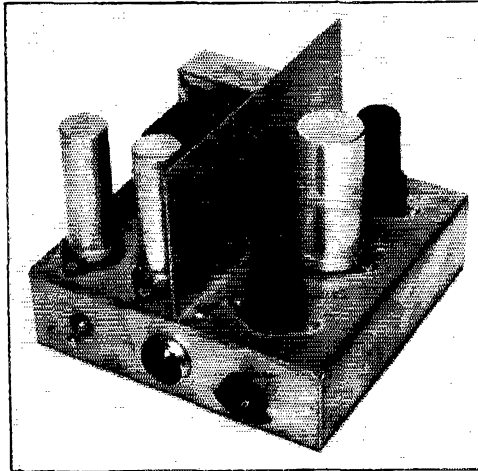
the cathode resistor. The triode now functions as an ordinary amplifier, passing signals. By varying the screen voltage of the pentode, its cut-off voltage can also be varied, so that the relation between a.v.c. voltage and signal cut-off point of the amplifier is adjustable. Alternatively,

the a.v.c. voltage could be varied manually, by use of a potentiometer across the a.v.c. input to the pentode. This attains the same result, but loads the a.v.c. system in the process.

Using this circuit, a codan suitable for use by the average amateur or short-wave listener can be constructed easily, at low cost and in small bulk. Because of lack of unused space inside the average communications receiver cabinet, the design is "outboard." Since the accessory socket on most receivers may already be occupied by a Selectoject or other auxiliary device, this codan contains its own power

supply. As shown in Fig. 1, connections to the receiver consist of two a.f. lines (which should be shielded), an a.v.c. line, and ground. The codan is normally inserted between detector output and the audio volume control in the receiver.

Using standard tubes, with careful planning, this codan can be built on a $7 \times 7 \times 2$ -inch chassis without crowding. Layout and constructional features are shown in the photographs. The vertical shield partition of steel confines the leakage field of the power transformer to the power side of the chassis. A similar shield under the chassis protects the signal circuits from the



The outboard "squelch" unit. The power transformer, selenium rectifiers and filter condensers, C_6 and C_{10} , are to the left of the shielding barrier. At right are the two tubes (6J5 to the rear) and a dual condenser unit containing C_7 and C_8 . Along the front are the power switch, panel lamp and the threshold control, R_7 .

• Although squelch circuits have been commonplace for a long time in military and commercial equipment, they are not so familiar to hams. This article describes a simple codan unit that can be connected to almost any existing communications or other short-wave receiver to suppress background noise in the absence of a signal.

* Principal Physicist, Cornell Aeronautical Laboratory; 5415 Main St., Williamsville 21, N. Y.

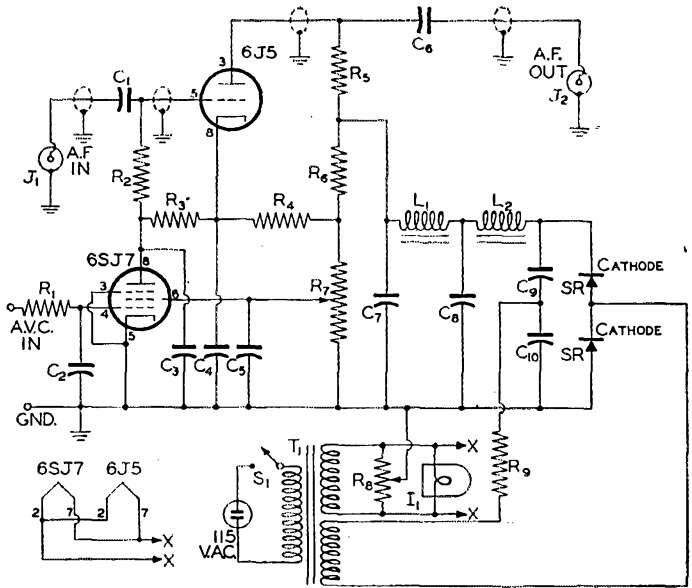
¹ Heising, "Radio Extension Links to the Telephone System," *Bell System Technical Journal*, Vol. 19, 1940, 611-646, or *Bell Telephone System Monograph B-1255*, 1940, 36 pp.

² Terman, *Radio Engineers' Handbook*, 1943, p. 653.

³ Ives, "Practical Codan Circuits," *Radio-Electronics*, Feb., 1952, pp. 32-33.

Fig. 1 — Circuit of the outboard squelch unit.

- C₁, C₈ — 0.1- μ fd. paper.
- C₂ — 0.01- μ fd. paper.
- C₃ — 0.25- μ fd. paper.
- C₄, C₅ — 20- μ fd. electrolytic.
- C₇, C₈ — 30- to 40- μ fd. electrolytic (dual unit used).
- C₉, C₁₀ — 40- μ fd. electrolytic.
- R₁ — 1 megohm, $\frac{1}{2}$ watt.
- R₂ — 0.47 megohm, $\frac{1}{2}$ watt.
- R₃, R₅ — 47,000 ohms, 1 watt.
- R₄ — 1000 ohms, 1 watt.
- R₆ — 22,000 ohms, 1 watt.
- R₇ — 10,000-ohm potentiometer.
- R₈ — 50-ohm potentiometer.
- R₉ — 10,000 ohms, 5 watts.
- L₁, L₂ — 8-hy. filter choke.
- I₁ — 6.3-volt panel indicator lamp.
- J₁, J₂ — Shielded microphone connector.
- SR — 65-ma. 130-volt selenium rectifier.
- S₁ — S.p.s.t. toggle switch.
- T₁ — Half-wave power transformer: 120 volts, 50 ma.; 6.3 volts, 1.5 amp. (Merit P-3045).



leakage field of the filter chokes. Component values are not critical; a ten per cent deviation from those given makes no difference in circuit operation. In contrast, arrangement of components is quite critical, or the codan will act as a hum injector. Hum-producing components must be kept as far as possible from signal components, and shielded from them. For this reason, the triode is placed at the rear of the chassis, permitting very short leads to the input and output connectors at the rear.

The power supply is a more-or-less conventional voltage doubler, with considerably more than average filtering of the B supply. The resistor R₉, between transformer and condenser interconnection, is to protect the rectifiers and filter condensers from warm-up surges. This may be omitted, giving a plate-supply potential of about 20 more volts, saving about 20 cents, and reducing the life of the rectifiers and condensers by a factor of more than two. If no protective cover is placed over the chassis, an insulated cover should be put over the "hot" condenser, C₉, of the voltage doubler, to prevent shocks from inadvertent contact. The case of this condenser is about 130 volts above ground.

Adjustment

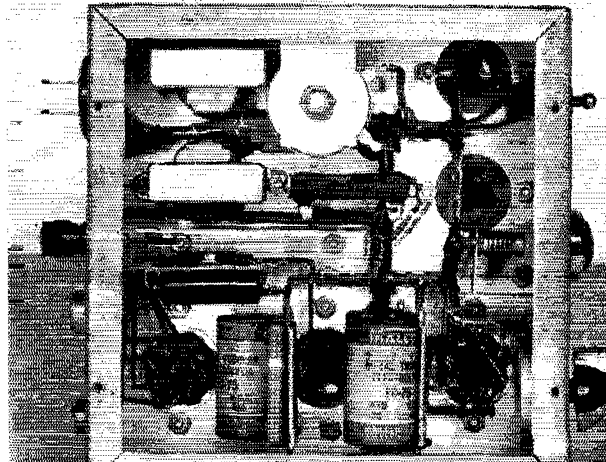
To put the codan into operation, after all internal connections are made and checked and tubes inserted in the proper sockets, connect the a.c. and let the filaments warm up. Connect the input terminal to the detector output, and the output terminal to the "high" side of the

volume control ahead of the first a.f. tube. Turn the level control on the codan to maximum (maximum voltage on screen of 6SJ7). The codan should now pass no signal. Note, or preferably measure, the hum level in this condition.

Now connect about 20 volts d.c. between the a.v.c. input terminal and ground, with the a.v.c. terminal negative. This should cut off the pentode, so that the triode will pass signals. Tune to a "dead" part of the band, and note the hum level. This will be somewhat higher than the first value noted, since all hum produced ahead of the codan is amplified by the triode. Now adjust the filament potentiometer for minimum hum. Usually a zone of apparently minimum hum will be found. Set the potentiometer arm at the center of this. Use of an oscilloscope will permit a more accurate setting. When hum is minimized, put the bottom on the chassis. If the bottom plate does not have "anti-scuff" impressions, use small rubber bumpers under the bottom-plate screws.

Now connect ground of the codan to ground
(Continued on page 120)

Bottom view of the codan unit. The filter chokes in the upper left-hand corner are shielded from the audio circuit by a small baffle shield. C₄ and C₅ are at the bottom and R₅, mounted on a bracket, is at the top. Audio and power connectors are at the rear of the chassis.



Sugar-Coated Single Sideband

(S.S.S.S.† or A.M. I Blue?)

BY RICHARD B. BLANCHARD,* W6UYG, EX-WILDI, EX-W2OIQ

PHONE operation as we have known it is NOT on the way out. It is already out, if you will take the word of literally hundreds of hams the world over who have had the chance to see for themselves the relative merits of single sideband. With that flat statement, let us now take a short ride through this mysterious subject and break it down into everyday ham lingo. We promise you there will be not one formula . . . not one — j factor, whatever that is . . . nothing mysterious at all.

The first thing you run into in s.s.b. articles is a new language, composed mostly of words like "balanced modulator," "phase-shift network," "carrier suppression," and so on. These words are the ones that cause a majority of hams to pass up "sideband," as we call it for simplicity.

* 816 Kathryn Ave., San Mateo, Calif.
† Single Sideband Subtly Simplified.

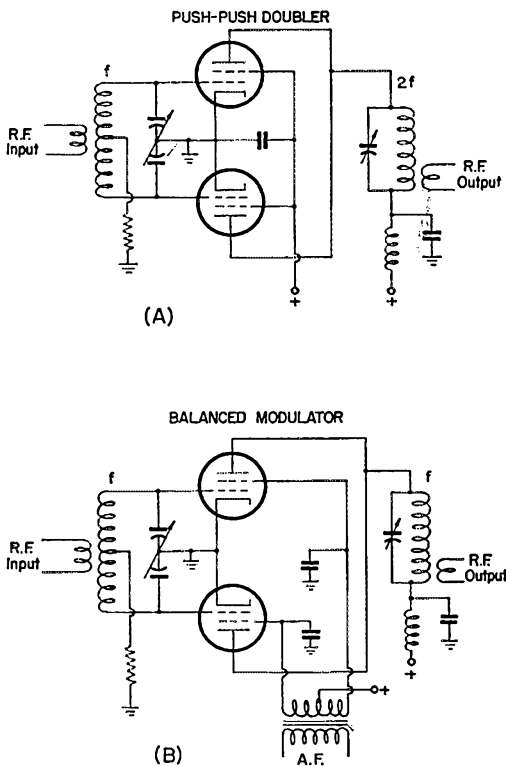


Fig. 1 — The familiar push-push doubler is shown at A — the plate circuit is tuned to twice the excitation frequency for useful output, because the excitation frequency is cancelled out in the plate circuit.

By modulating the tubes in push-pull and tuning the output circuit to the excitation frequency, as at B, a "balanced modulator" is obtained.

The Balanced Modulator

Let us therefore take a few of these and translate them into ham talk. "Balanced Modulator" . . . now there is a wicked-sounding device. What is it? Ever hear of a push-push stage? (See Fig. 1, if your memory needs refreshing.) Good doubler, isn't it? But it won't work on the fundamental. Well, just for fun, let's hook it up "straight-through" anyway and see what happens. Well, well, what do you know? *No carrier!!!* OK, add some modulation to the push-push stage and you wind up with modulated output, but no carrier. However, at this point we still have two sidebands. Even so, we have a far more efficient system of communication than standard horse-drawn a.m. 'phone.

In the push-push amplifier we have just mentioned, the r.f. is fed to the grids in push-pull, and the plates are connected in parallel. This, of course, causes the output at the fundamental frequency to cancel out. If the audio is applied to the screens of the stage in push-pull, it upsets the balance at the audio rate and the sidebands (products of modulation) appear in the output. See how simple it is. Carrier cancels out . . . sidebands come through. At this point, we have a double-sideband suppressed-carrier signal. All your power in the amplifier is going into talk power, or sidebands. This amplifier, with 300 watts peak output, puts a signal in the other fellow's receiver equivalent to an 800- to 900-watt input carrier-type rig. Notice we didn't say "A 900-watt a.m. rig." Single or double sideband, carrier or not, it is still a.m. So we'll call it "carrier-type."

Now then, let's review this as far as we've gone. We have built a push-push amplifier,¹ applied some push-pull audio to modulate the screens, and have the thing putting out a pretty efficient signal with two sidebands, and no carrier.

Sidebands

So, the next step. We have an effective 900-watt signal split into two parts, or sidebands. Why not put it all in one part? The guy with the distant receiver can't tell the difference. He can copy one sideband as easily as two.

One thing, though — how do we get rid of that other sideband? We agree that killing the carrier wasn't hard at all, but this audio business is getting rough. After all, we have never messed around with "phase-shift" networks before. And here enters the villain of the entire plot.

One way to eliminate the other sideband is

¹ Another type of balanced modulator, seen in many of the rigs described in *QST* and elsewhere, connects the r.f. excitation in parallel and the r.f. output and audio in push-pull. It works the same way, but it is a less familiar connection than the push-push doubler.

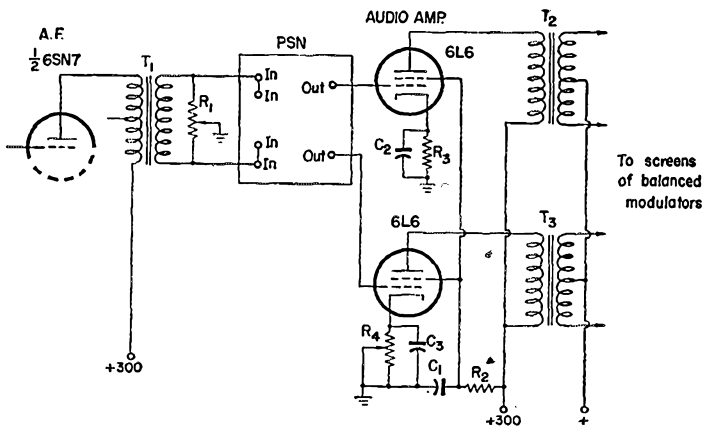


Fig. 2—Showing how the commercial phase-shift network is used in the *Handbook* s.s.b. exciter (pages 297-301, 1952 edition).

- C₁ — 1- μ d. 600-volt paper.
- C₂, C₃ — 10- μ d. 150-volt electrolytic.
- R₁ — 3000-ohm potentiometer.
- R₂ — 10,000 ohms, 10 watts.
- R₃ — 680 ohms, 1 watt.
- R₄ — 1000-ohm wire-wound potentiometer.
- T₁ — 10,000-to-4000-ohm coupling transformer (Stancoor A-3812).
- T₂, T₃ — T₁ and T₂ in original exciter.
- PSN — 90-degree audio phase-shift network (Millen 75012).

to shift the r.f. phase through one phase shift network, and shift the audio through another. Now *don't* go 'way. Here is where most of the articles get rough. What actually happens is that the audio is split into two parts, 90 degrees apart in phase, and the same with the r.f. However, we will not go into that now. Just accept that as fact, and let's consider "How to do it?"

The Millen Company has solved the most difficult part of our problem with their No. 70152 Audio Phase-Shift Network. This unit looks like an i.f. can and contains the entire phase-shift network for the audio. It is all aligned and tuned at the factory, and can be just wired into your rig, and "presto" . . . there's your phase shift.

The r.f. phase shift is very easy. You just follow the simple directions in the *Handbook* s.s.b. exciter.

Now, you remember we mentioned this push-push amplifier to cancel out the carrier. Well, now we have the entire signal split into *four* parts, two parts of r.f. and two parts of audio. Therefore, we need a different kind of amplifier to mix all this stuff up and get out a single-sideband signal. To make a long story short, we merely wind up with four tubes connected in push-pull parallel. This is the "balanced modulator" of the ARRL *Handbook* rig. "Balanced modulator" sounds tough, doesn't it? But when you call it "push-pull parallel" it brings it down to earth. Now, with the four tubes in p.p.-parallel, we have four grids to drive with the r.f. And we have two chunks of r.f., 90 degrees out of phase with each other. So we connect two grids together and feed in one half the r.f., and the other half into the other two grids in parallel. Likewise, we feed in half the audio to two of the tubes, and the other half to the other two.

Now, by properly connecting the plates of the four tubes in pairs to a common tank circuit, we finally have the thing set up to cancel the carrier out, and also shift one sideband over to the other side of where the carrier would be, if there were one.

Then a few controls, to balance everything up, which are explained in various articles, and you are ready for action.

In this article, we have tried to leave out all the theory which many hams are not interested in. However, there is one point on which it is necessary to get down to details, in order that your sideband rig will work. That is the use of the Millen Audio Phase-Shift Network in the *Handbook* rig.

The diagram of Fig. 2 shows the necessary changes to make use of this unit. Incidentally, the unit is so modestly priced as to be almost as cheap as the parts alone purchased separately. The changes shown allow for the feeding of more voltage into one half of the network than the other side gets.

By using 6V6s as modulator tubes — and there we mean regular modulators — we get sufficient audio to kick up easily the 6L6 balanced modulators in the push-pull parallel stage. The 6L6s should easily kick any pair of triodes in a Class B linear to 1-kw. input.

Tuning

After the rig is made up, using the changes shown, the tuning-up process begins. This process, in most articles in the past, has been made to look laborious, if not impossible, to the average ham. However, if two pieces of equipment are available, the process shouldn't take more than a few minutes.

First, tune up the audio. Connect the horizontal plates of a 'scope to the output of one modulation transformer, and the vertical plates to the other transformer. Adjust the phasing trimmer, R₁ in Fig. 2, to form a circle — a perfect circle in the 'scope when a tone is fed to the microphone input. After that, you can forget the phase shift indefinitely.

Now, connect the vertical plates to one pair of r.f. grids on the 6L6s and the horizontal plates to the other pair of grids. Apply r.f. excitation, and tune the r.f. phase-shift network for a circle. I have never seen this procedure described in any article, but it is as simple as this writer has yet been shown. Then apply an audio tone to the microphone input, and with r.f. excitation on, trim all controls for minimum ripple on the band which should appear on the 'scope. At this point

(Continued on page 128)

Amateurs Provide Communications for Women's Transcontinental Air Race

EARLY this year, Marjorie B. Davis, East Coast chairman of the Sixth Annual Women's Transcontinental Air Race, contacted ARRL for assistance in providing a cross-country communications net to report the progress of the famed "Ninety-Nines" flyers. Race headquarters and terminus being in New York City, the League turned the project over to SCM W20BU, who recruited the services of W2JZX and W2YBT in formulating plans for a net covering the stopover cities. Tentatively, W2JZX was to operate 75-meter 'phone and W2YBT 40-meter c.w. to accept incoming traffic for QSP by landline to Race headquarters. Daisy Coleman, XYL of W2YBT, handled all secretarial duties incidental to making preliminary arrangements with radio clubs in the stopover cities. As a trial run, test messages were sent to W2JZX and W2YBT on June 23th, a week before the start of the race. Conditions were poor, however, and delivery did not materialize. It then became evident that it would be desirable to line up a net consisting of stations who were heard operating on the air regularly. With the assistance of members of the Transcontinental 'Phone Net (TCPN) and others a working team was set up.

Monitoring was started on July 4th at 6 P.M., W2YBT on 40 meters and W2JZX on 75. Conditions were poor on 40 but excellent on 75. The 3980-kc. net met on schedule at 9 P.M. and first reports came through in good order from W5BKH. He later reported a crash of one of the contesting planes, stating that the pilots had been shaken up and were hospitalized. By 11 P.M. we were able to advise Race Hq. that all planes were accounted for. This first night's operation moved reports several hours ahead of the commercial services.

Each evening thereafter complete bulletins came in on the 9 P.M. schedule on 3980 kc. (after the first evening of monitoring on 40 meters that band was given up). Traffic was thorough and accurate, containing the following information: (1) assigned number of the contestant; (2) names of pilot and co-pilot; (3) time of arrival at evening stopover; (4) weather report for the following morning; (5) estimated time of departure next morning. For the duration of the competition reports continued to arrive hours ahead of the commercial lines.

This operation was not without human interest

and anxious moments. We were all most concerned when we heard of the first mishap on July 4th. That same night three other planes had to drop out because of engine difficulties. During the race two important phone calls came to New York for the pilots in planes Nos. 4 and 22. One plane was located in Vandalia, Ohio, and our outlet there, W8HIB, contacted the pilot with the information (the other plane had already arrived at New York). On July 8th a great number of planes were grounded at Wheeling, W. Va. Weather was bad, but two planes thought they could make Harrisburg, Penna., by nightfall and in the attempt were



lost. Our net got busy and every station near an airport called that airport to endeavor to locate the missing craft. By 11:15 P.M. the two planes were located back at Wheeling, safe and sound. We called Race Hq. and then went to sleep, very much relieved.

It was a rare privilege to serve the "Ninety-Nines" in their annual race. Their words of commendation for ham radio were many, and the contestants told of their feeling of security as a result of our communications effort.

Stations in the net were always prompt and dependable, many putting in long hours at their rigs. The roster of those participating includes W1s EMF LBH NQ ODW PU QON SJO SS;; W2s ABT AAE AD BTB CLG DYP EEO GNP GIC LST QXS TPN VEP YOU YBT WFY ZOL ZQC; W3s BFK BRC CTN CVT GXQ JXQ NXU PYF QKP VRZ; W4PFP; W5s BKH GZK PA SLS; W8s HB KIH OAT PHY ZGT; W9s EDQ LRT OSO/5 ZHL; K9FAE; W0s EXN HUI MXI; and Daisy Coleman.

— W2JZX



YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

THESE are some very young YLs on the bands these days. We know about the following girls who are sixteen or under, but we wonder how many others there are. (Only ages we're sure of are given.)

- W1UBL — Doria Newcomb, 14
- W2KAE — Lynne Lyra, 15 (licensed when 14)
- W2TEF — Jean Hudson (licensed when 9)
- W3OVV — Jane Bieberman (licensed when 10)
- W4TAV — Susan Martin, 13
- W4UNO — Jane Hunt, 15
- W6JPI — Margaret Martley, 12 (licensed when 10)
- W7PEF — Clio Marie Hood, 14 (licensed when younger)
- W9PHH — Nancy Durst, 9
- W9BIC — Sandra Jakes, 16
- KZ5GQ — Carol Combs, 13
- Barbara Jordan, 14 (of G3FYN-G2ATM)
- VE7AYL — Juanita Wood, 15 (licensed when 12)
- WN1VTA — Judy Volpe, 9
- WN1WDX — Nancy Lillpopp, 13
- WN3TTR — Eileen Jokanic, 13
- WN5WCG — Helen Martin, 9
- WN7QWX — Mary Klock, 12
- WN7PWy — Cheri Ann Westcott, 10
- WN7RRM — Janet Poulson
- WN7TAQ — Ann Blackburn, 10
- WN8HPP — Reta Bryan, 13
- WN9UDG — Joanne Schacht, 9
- WN9UDH — Marie Rantanen, 9
- WN9UEG — Elinor Scharnagl, 13
- WN9UEW — Mary Milbauer, 11

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



One way of insuring that traffic is delivered directly and promptly to a relative is to make said relative a ham herself. And that briefly is the tale of the two sisters shown above. Jane Fischesser, WN4TOG (left), of Montgomery, Alabama, now has a consistent traffic outlet in her old home town, Lexington, Kentucky, in her sister, Betty Peters, WN4WKI (right). Betty passed the Novice exam after three weeks of coaching while she visited Jane and her OM Charlie, W4FMW.

Keeping Up with the Girls

Of the 199 countries W1MCW has worked, 183 are confirmed. Among Lou's latest QSLs are 4W1MY (Yemen) and FL8MY (Djibouti, Fr. Somaliland). . . . W9JTX made perfect copy of the Armed Forces Day Message. Louise now has all three certificates which have been issued. . . . W1 YLs who attended the Portland, Maine, hamfest were pleased to meet W2OWL, Ruth; W3OQF, Barbie; W4UDI, Lenette; W4UDQ, Dorothy; and KH6TI, Dell. W3OQF, OM W3MAX and jr. op visited a number of YLs between Maryland and Canada while on their vacation. . . . Several W6 YLs handled traffic in emergency nets set up following the Tehachapi earthquake. . . . Sorry to report the passing of the OM of W8UDA, Dottie. . . . W1UFT, Martha, has been licensed for a comparatively short time, but she is NCS for the Vt. SS Net, ground operator for the CAP, Secy. of the Rutland C.W. Club and is registered with the Vt. State GD and RACES. . . . YLs who attended the Corpus Christi ARRL Convention

(Continued on page 118)

W6 YLs who attended the June installation meeting of the Los Angeles YLRC are shown below. (Seated, l. to r.:) May England, ex-VE3QL; Mildred, WN6PJU; Vada, W6CEE; Beulah, W6NLM; Mary, W6AVF; Gilda, W6KER; Beulah's daughter Margaret is peeking through the center. (Standing:) Founder and past-President Clara, W6TDL; Betty, WN6JCA; Vada's niece, Donna; Joyce, XYL of W6HTT; Annie, WN7RBA; Elsie, WN6QEG; Dorothy, WN6QDG; past-President Evilyn, W6NZP; Vici, WN6JBB; Ruby, W6WRT; Mary Kay, W6JMC; Lucille, W6JMS; Joan, WN6OBZ; Agnes, W6MFP; Barbara Dobson, sister of W6OBZ and daughter of W6CVO; Lillian, XYL of W6KVR; May, W6CQV; and past-President Maxine, W6UHA. Outgoing officers were W6CEE, Pres.; W6AVF, Secy.; and ex-VE3QL, Treas. Officers installed were W6NLM, Pres.; W6KER, Secy.; and WN6PJU, Treas. WN7RBA is the XYL of JA2OL and awaits port call to join him.



How Rectifiers Work

Simple Theory for the Novice

BY GABRIEL P. RUMBLE,* EX-W5BBB

By broad definition, an electric rectifier is a circuit device that conducts better in one direction than in the other. Such a device makes it possible to "change" alternating current to direct current; that is, to obtain unidirectional current from an alternating source. The ideal rectifier, of course, would be one having zero resistance in the conducting direction and constituting an open circuit in the nonconducting direction.

Most rectifiers in current use in amateur radio fall into one of two general classes. In one group are the mineral rectifiers, such as the selenium, copper-oxide and crystal rectifiers. Those in the second group are the vacuum-tube rectifiers. The principal difference between the two is that the operation of the latter type usually depends upon a heated filament, or cathode. While the mineral rectifier requires no such heated element, the voltage that it will stand without breaking down when in the nonconducting state is limited.

Fig. 1 shows standard circuit symbols for the two types of rectifiers. The arrow in the case of (A), and the line in the case of (B) are usually called the *anode* or *plate*, while the other element is termed the *cathode*. The diagrams also indicate the relative polarity of the applied voltage that must exist for current to flow through the rectifier. When this polarity is reversed, the rectifier does not conduct. In other words, in order to conduct, the anode must always have a potential more positive than the cathode.

Half-Wave Rectifier Circuit

Fig. 2A shows the elements of a half-wave rectifier circuit. At (B) are graphic pictures of the a.c. input voltage and the rectified voltage appearing across the load resistance. (This load resistance represents any equipment that may be operated from the supply.) Current flows through the load resistance only during the time that the polarity of the a.c. input voltage corresponds to the rectifier polarity shown in the diagram. When the polarity of the input voltage reverses on the other half of the cycle, the circuit is open and no current flows. If the connections to the rectifier were to be reversed, then conduction would take place on the opposite half of the cycle and the polarity of the voltage across the load would be reversed.

Bridge Rectifier Circuit

From the half-wave rectifier, a logical step forward is a circuit that makes use of both

halves of the cycle to fill in the gaps between the d.c. pulses in the rectified output of Fig. 2B. A circuit that does this is shown in Fig. 3A. It is known as the *full-wave bridge-type rectifier*. On the first half of the input cycle shown, D_1 and D_2 conduct, while D_3 and D_4 conduct on the other half of the cycle. The resulting voltage across the load is represented in Fig. 3B. It is seen that the gaps between the pulses of Fig. 2B have been filled in. Because of this the *average* d.c. voltage output of the full-wave rectifier will be twice that of the half-wave rectifier for the same value of a.c. input voltage.

Simple Full-Wave Rectifier Circuit

Only half the number of rectifiers used in the bridge circuit are required if two of them are replaced by resistances of equal value, as shown in Fig. 4A. Although full-wave rectification is retained, the maximum no-load voltage obtainable is only half the maximum provided by the bridge circuit, because the source voltage applied to the conducting rectifier and load is halved by the voltage divider formed by the two resistors shunting the source. The circuit as shown in Fig. 4A is impractical because of the d.c. voltage drop and a.c. power loss in the resistors. If the two shunting resistances are of low value, the d.c. voltage drop across them is reduced, but the a.c. power loss is increased. Increasing the resistances has the opposite effect.

Most of these losses can be eliminated by substituting chokes of large inductance and low d.c. resistance for the resistors, as shown in Fig. 4B. The reactance of the choke windings minimizes the a.c. power loss, while the low d.c. resistance eliminates most of the d.c. voltage drop. The a.c. input voltage to the rectifier, however, is still only half of the source voltage.

If an increase of input voltage is desired, a step-up transformer may be substituted for the chokes, as shown in Fig. 5. The input voltage is half the total secondary voltage of the transformer. The use of the transformer has the further advantage that the d.c. load circuit is isolated from the a.c. line so that either side of the load may be grounded irrespective of the primary grounding. A transformer may, of course, be used similarly with the bridge circuit. In this case, the input voltage is the same as the secondary voltage, rather than half.

Vacuum-Type Rectifiers

Vacuum-tube rectifiers are made in both full-wave and half-wave types. The full-wave

(Continued on page 128)

*8309th AU, Post Signal, APO 958, 5/8 PM, San Francisco, Calif.

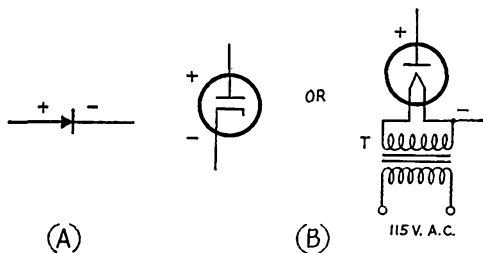


Fig. 1 — Standard rectifier symbols. (A) — Mineral rectifier. (B) — Vacuum-tube rectifier. The signs indicate the polarities that must exist for the rectifier to conduct.

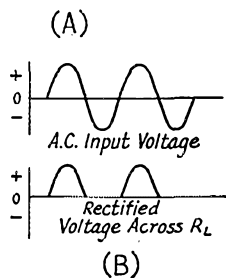
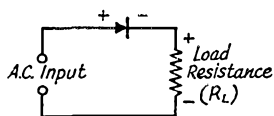


Fig. 2 — Simple half-wave rectifier circuit and graph showing comparison between applied a.c. voltage and the rectified voltage appearing across the load resistance.

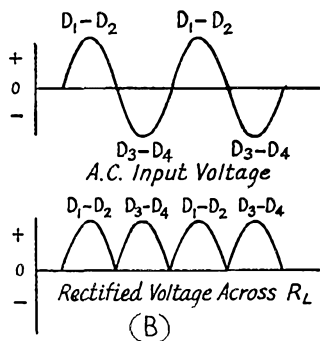
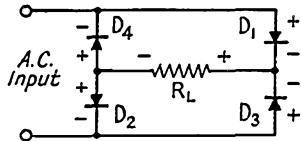


Fig. 3 — Full-wave bridge rectifier circuit. (B) shows that the gaps of Fig 2B have been filled in.

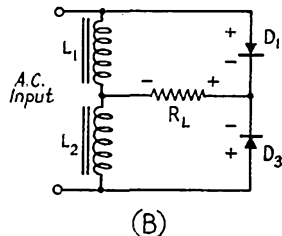
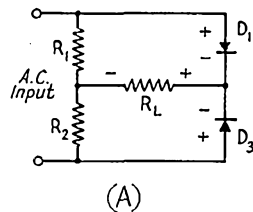


Fig. 4 — Circuits illustrating the development of the simple full-wave rectifier circuit. These circuits are seldom used in practice, as explained in the text.

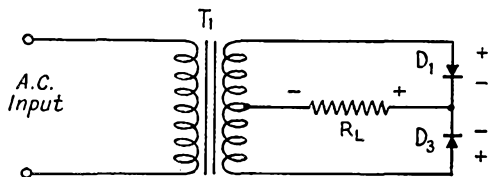


Fig. 5 — Usual form of simple full-wave rectifier circuit. The transformer, T_1 , usually has a step-up ratio, primary to secondary, to obtain higher voltage than that obtainable from the line.

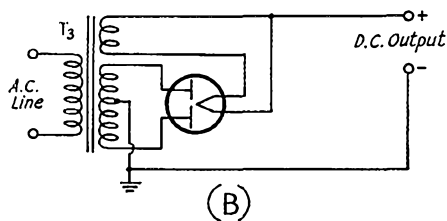
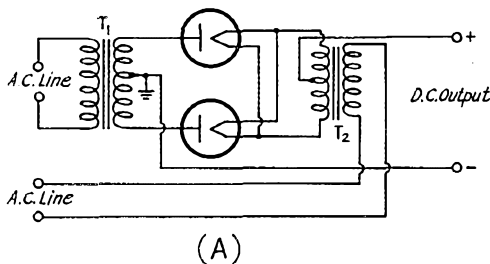


Fig. 6 — Full-wave rectifier circuits using vacuum-tube rectifiers. Half-wave rectifier tubes with a separate filament transformer are used in (A). In the circuit of (B) the rectifier is the full-wave type with its filament supplied from an additional step-down winding on the transformer.



U. S. N. R.



Earthquake

Following the earthquake at Tehachapi, Calif., in July, the Naval Reserve Training Center, Fresno, Calif., of the Twelfth Naval District, assisted in providing emergency communications to the quake-stricken town. At the request of the American Red Cross Kern County Disaster Relief Chairman, the Training Center dispatched an SCR-299 mobile radio station, complete with gasoline generator, to the scene 145 miles away. The station (see photo below) used the call K6NBZ/6 and was the main link between Tehachapi and northern California. Numerous messages for injured residents of the community were handled. Operations were carried on with the assistance of the American Legion Amateur Radio Network and W6OT, the Red Cross station in Oakland.

ARRL Field Day

Naval Reserve activities of the Eighth Naval District took a very active part in the annual ARRL Field Day, June 21st-22nd. In some locations, Reserve activities combined operations with local amateur organizations. The following stations participated:

Call	Location	Operators
K5NAW	New Orleans, La.	W4AEF, W5s BUK HQ, W6STO
K5NBL	Camden, Ark.	W5s GPV DWJ ICE PZC THX VRS VUF
K5NBW	Beaumont, Texas	W5s BRR GRY LQO MCB PYU RYU STP VEH VFF
K5NRD	Dallas, Texas	W5s KJA ORV OTH RKB TUE VLE W5s GCJ HBZ SYE
K5NRE	El Paso, Texas	
K5NRI	Oklahoma City, Okla.	
K5NRJ	Stillwater, Okla.	W5PCL
K5NRS	Shreveport, La.	W5s DMK JTR KGZ MJC NBL NFT NXM OMG PVR QCZ QNB SSW SUM
W5HTK	Enid, Okla.	W5s KFN MFX NGE REC SNG UCE UCG VBQ
W5IAS	Tulsa, Okla.	W5MFB and local club



K6NBZ, mobile radio unit from the Naval Reserve Training Center, Fresno, Calif., at Tehachapi. L. to r.: R. M. Egleman, BMI, USNR (W6IQS); H. Carl Holt, RM2, USNR (W6UVN); and W. E. Hoover, ET2, USN (W6ZYM).

K5NAZ	Lubbock, Texas	W5s EFW HDX KPJ
K5NR	San Antonio, Texas	W5s LZR SOM
W5QA	Abilene, Texas	W5s GFL SDB and local amateur club members
W5USN	New Orleans, La.	W5s EGX HNW LNU PLQ SPZ TMF UNP
WN5UEP	New Orleans, La.	WN5s UEP UTX and VKS (XYL of W5NHV)

1201 29th Ave.,
Meridian, Miss.

Editor, QST:

It is with deep regret that I write you regarding the passing of Charles Marvin Hatchett, W5FPZ, at Jackson, Mississippi, on August 16th, 1952. His death was caused by shock received while working on his 1-kw. transmitter.

W5FPZ's log indicated a QSO with an LU, beginning at 5:05 P.M. and ending at 5:15 P.M. A crash was heard by a neighbor about 5:35 P.M. but no investigation was made since Marvin had been making considerable noise in the shack where the rig was located. Upon arriving home from work, another neighbor observed Marvin lying on his back with his feet near the base of the transmitter, his body partly outside the room's entrance door. This was at 5:45 P.M., ten or fifteen minutes after the crash was heard. The noise had been caused by Marvin's body striking a small end table, breaking it into several pieces.

Artificial respiration was administered and an ambulance was called. Upon arrival at the hospital, oxygen was given without beneficial results. There were two burns from high voltage, one between the right forefinger and thumb and another on the inner side of the right arm near the elbow. There was also evidence of contact between his leg and the cabinet, for a plug inserted in the a.c. receptacle at this point had been bent sharply to one side. Marvin was wearing only trunks; his body was wet with perspiration when discovered.

The transmitter side door was found open, the interlocking safety switch released. The filaments of the final amplifier were off but a low hum indicated that transformers were energized. These may have included the plate supply transformer of the final.

What seems to have happened—though no one will ever know positively—was that he had attempted to do some work on the final, not knowing there was high voltage present. An attempt to compress the final tank coil in order to increase the inductance would have resulted in such burns. The fact that he sought to take a firm grasp of something in the tank circuit indicated that shock was unexpected. If the filaments of the final were not energized there was practically no load on the high voltage supply and an estimated 3500 volts was present.

Marvin Hatchett was employed by the American Telephone and Telegraph Co. as a supervisor in the Jackson office. He was a valuable and talented individual, having served at various locations throughout the country in the operation and maintenance of transoceanic radio-telephone equipment.

W5FPZ will be sadly missed by the many friends and relatives he leaves behind.

— T. J. Thibodaux, W5DNW

SWITCH TO SAFETY!



QST for

A Broad-Band 40-Meter Vertical

Feeding a Quarter-Wavelength Antenna with 300-Ohm Line

BY JAMES A. FRIEND,* W6ECJ

PERHAPS the title of this article doesn't do justice to the subject, for not only does the antenna work like a charm across the whole band but is by far the best for 7 Mc. I have ever had. Although there is nothing original in it, it is a very interesting and efficient version of the time-honored Marconi.

The evolution of the broad-band vertical began when I was fortunate enough to fall heir to what I thought was enough 1-inch 24ST aluminum tubing for a 3-element 20-meter beam. To my dismay, I lacked one length of having enough. However, this small setback, coupled with a few conditions announced by the XYL in the esthetic defense of our new home, instigated one of the most satisfying pieces of ham gear I have ever built.

The first thought was to construct a simple vertical fed with RG-8/U coaxial cable, but this was discarded through lack of sufficient cable to reach the rear of my 140-foot lot. After glancing through the *Handbook*, it appeared that a 3-wire vertical might be the solution, since it could be fed with the less-expensive 300-ohm Twin-Lead. Accordingly, and after a few false starts, a supporting structure was built and the tubing mounted on it, spaced 15 inches on centers. The top was bolted together with a 1-inch strip of aluminum and, with the help of W6YMH, the antenna went up.

The antenna had been cut to length as per the formula found in the *Handbook*. When the 300-ohm feed line and the final amplifier were connected, a few tests indicated that something was very wrong.

Upon investigation with a grid-dip meter, the resonant frequency of the antenna was found to be around 6.4 Mc. After figuring roughly how much of the antenna should be removed to bring the frequency to 7.1 Mc., a hacksaw was used in one hand and the fingers were crossed in the other. The resultant length was 30 feet 4 inches and, lo and behold, the grid-dip meter showed 7.1 Mc.!

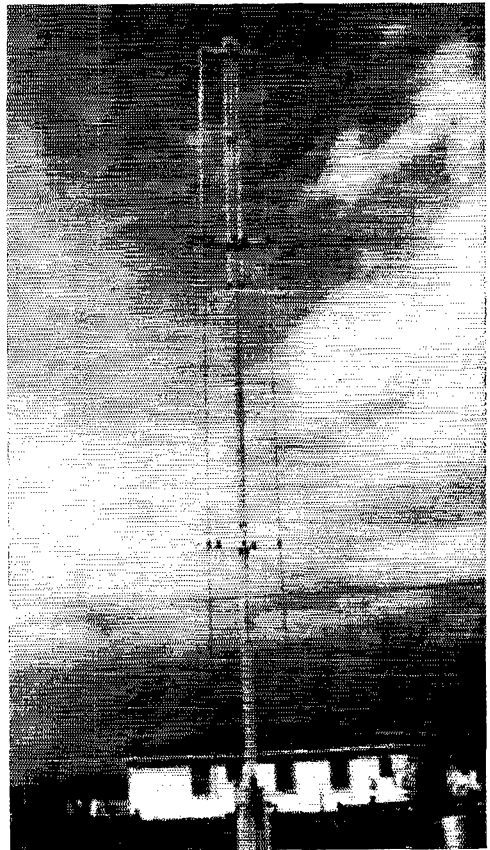
With high hopes, the line and final were again connected, but something was still wrong. After a little investigation with an r.f. ammeter in either side of the line, it was found that there was a current unbalance in the feeders, and this was attributed to insufficient or poor ground. A conference with the XYL developed the mandate that any radials associated with this antenna were going to be buried radials, and so buried they were. Four 35-foot radials were sunk one foot deep, in the form of an "X," and soldered at the cross-over to the ground.

Once again the final was coupled, and this time there was joy in the shack at W6ECJ. The antenna loaded nicely, and the line was well balanced. Measurement with a Micromatch showed the s.w.r. to be less than 1.5 everywhere in the entire 7-Mc. band, and considerably lower over the major portion.

From the above measurements, and subsequent on-the-air usage, there is only one conclusion that can be reached: here is a really good antenna, a vertical that "gets out" and has complete coverage of the 7 Mc. band. Running 600 watts to the final, signal reports are as good as anyone is getting and in most cases they are considerably better. Needless to say, I'm sold.

After tests and measurements were concluded, the Twin-Lead feeder was inserted in a length of old garden hose and that, too, was buried with no change in any of the characteristics.

(Continued on page 150)



The 3-wire 7-Mc. vertical at W6ECJ is supported by a T-beam made from 2 by 4s.

* 247 Harrison St., Coalinga, Calif.

October 1927

W3GH, assisted by W3s MFD and MLY, organized a team of twenty amateur mobiles for liaison communication in the July auto races held at Brynfan Tyddyn course near Harvey's Lake, Penna. Hams participating were W3s CPL ETB EUD GH HPK HVL IGW KFQ MFD MLY PIF PUZ QOR WGD TCC TOD ZS and W2NM.

When normal telephone communications broke down this amateur radio network was heavily relied upon. It functioned so smoothly that the boys have a "command performance" request to be on hand for next year's races!

Brigadier General Ivan L. Farman, USAF, Deputy Director of Communications, USAF, has been elected chairman of the Military Amateur Radio System (MARS) Advisory Committee for a one-year term. The committee, at its quarterly meeting in the Pentagon, also named Colonel William D. Hamlin, Signal Corps, acting chief of the Army Communications Service Division, vice-chairman of the committee.

The MARS Advisory Committee is composed of military and civilian members representing the Armed Forces, Federal Civil Defense Administration, Federal Communications Commission, American National Red Cross, American Radio Relay League and others. Its chief duties are to advise the Chief Signal Officer, USA, and the Director of Communications, USAF, on MARS operations and to recommend policy pertaining to coordination of civilian and military amateur radio activities.

While the oil-laden *Fort Mercer* battled the seas off Cape Cod during a March, 1952, gale, Radio Officer John V. O'Reilly, jr., W2CWW, set rescue operations in motion with an SOS. As the vessel split in two in the rising fury of the storm he was swept overboard to his death. O'Reilly had signed on the ship just eleven days earlier. W2CWW was a member of the Staten Island Amateur Radio Association and an on-the-air acquaintance of another intrepid mariner, Captain Henrik Kurt Carlsen.

We regretfully note the passing of old-time *QST* author James Cecil Johnson, W5LS, in August at his home in Bellaire, Texas.

Our pages were regularly brightened by the yarns of homespun flavor contributed by W5LS under the *nom de plume* "Felix" during the early Thirties. One, "Hams Are Born — Not Made," appeared in 1930's January *QST*. Another, "It's In the Blood!" graced the January, 1934, issue.

At the close of a colorful career, W5LS was Senior Research Physicist for the Humble Oil and Refining Company. A recent outlet for his spare time and energy was the promotion of the increasingly popular Little League baseball.

... Preparations and studies for the forthcoming international radiotelegraph conference are being accelerated in ARRL's effort to solidify the amateur position.

... Carefully adjusted regeneration in his final amplifier enables Ralph Pierce, 1AXA, to crystal-control 300 watts of output with a minimum of components.

... That perennial problem — construction of effective radio-frequency choke coils — is discussed in the Experimenters' Section by F. A. Lidbury, SBAG.

... Notes on experiments to secure maximum selectivity in receiver circuits using no more than three tubes are recorded by Allan T. Hanscom.

... Alexander Nyman contributes an article analyzing factors to be considered in the designing of fixed condensers for high-frequency applications.

... "Calibrating S/W Receivers and Wavemeters from Broadcasting Stations," by F. S. Huddy, 1II-1ZS, makes clever use of a regenerative b.c. receiver's harmonics.

... Fergus Sunshine McKeever, 9DNG, summarizes international amateur radio's fast-moving last three years of progress in the field of DX communication.

... International Test results clearly indicate the 1927 DX hounds' high esteem for 40 meters — 73 per cent of all activity took place on that band.

... "An Arctic Adventure," tale of amateur radio and aviation in perilous Alaskan wilds, is recounted entertainingly by Howard F. Mason, 7BU.

... Amateur radio's effective participation in recent Atlantic Coast military maneuvers is detailed by Fred C. Best, 1BIG, famed traffic handler.

... A new line of 80-meter crystals is announced by General Radio Company of Cambridge, Mass., recommended for use in 20- and 5-meter transmitters.

... Crystal-controlled nu9CM, L'Anse, Mich., station of Edward N. Fridgen, has several of its clean-cut features described and illustrated.

Silent Keys

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

WICEA, Arthur P. Heath, Hampton, N. H.
W2CWW, John V. O'Reilly, jr, Staten Island, N.Y.
W2JLN, Joseph T. Michaels, Roselle Park, N. J.
W2UGQ, Herman L. Klingenberg, Jackson Heights, N. Y.

W2UL, Harold E. Smith, New Milford, N. J.
W2UNG, Arthur A. Neher, Jackson Heights, N. Y.
W5FPZ, Charles Marvin Hatchett, Jackson, Miss.
W5LS, James C. Johnson, Bellaire, Texas
W6GTU, Donald C. Lynn, Compton, Calif.

W6OMO, John R. DeYoung, Los Angeles, Calif.
W6UVE, Ralph Hedson, Los Angeles, Calif.
W7NIN, Jack D. Coyner, Phoenix, Ariz.
W8CII, Charles L. Melancon, Cheboygan, Mich.

W8INL, Victor L. Roberts, Elyria, Ohio
W8TAC, Stanley T. Kuduk, Youngstown, Ohio
W8YAL, Frederic D. Sands, University Heights, Ohio

ex-W9OES, Otto Kramer, Emporia, Kans.
W9OFR, R. Melvin Whitaker, New Lenox, Ill.
W0AED, Arthur E. Rydberg, Mitchellville, Ia.
VE3RI, S. J. Ellis, Toronto
VS1AX, John Ford, Singapore
Leroy Holtzclaw (of VP4LZ staff), Trinidad

Results, 18th ARRL DX Contest

YOU can't keep a DX man down! After the contests held during the lush years of the sunspot cycle when propagation conditions were at their best and DX signals found their way around our globe with ease, the months of February and March seemed quite a letdown to participants in the 18th ARRL International DX Competition. Less hardy souls would have given up the ghost and settled down to local ragchewing. Not so with the DX brethren! In spite of relatively poor band conditions, with 10 and 11 meters useless at times for long-distance contacts, participants in the 1952 contest showed they could take the good with the bad and produced a crop of many noteworthy 'phone and c.w. scores.

Competition for awards was confined to participants within each ARRL mainland section and in each country outside the W/VE/VO area submitting qualifying entries. Special certificates are being awarded to 68 c.w. operators and 55 'phone operators in the U. S.-Canada area. Outside W/VE/VO, 64 c.w. and 39 'phone awards are being made. Three multiple-operator stations, all in the U. S. area, will also receive certificate awards. The calls of all winners are listed in the accompanying score tabulations. Hearty congratulations to the victors!

The C. W. Section

For many years the top c.w. score reported in the W/VE area has come from an eastern U. S. station. From the first post-World War II contest in 1947 until 1951, the highest totals came from W2, W2, W8, W3 and W3, in that order. Ben Holloman, W5ENE, of Dallas, Texas, apparently set out in 1952 to show that it can be done from other areas. His multiplier of 202 and 422 contacts earned a final score of 255,732 points and a comfortable lead on the rest of the field. During 81 hours of contest operation, W5ENE worked 97 countries. Ben used the following array of gear: separate finals and 4E27 buffers on each band, working out of an HT-18 VFO, p.p. 250THs on 27, 28 and 14 Mc., single 450THs on 3.5 and 7 Mc. Antennas were three-element rotaries on 14, 27 and 28 Mc. and ground planes on 3.5 and 7 Mc. His receiver was an HRO.

Another contestant who has been chalking up some fancy scores in DX contests the last few years was next in line. Jim Ringland, W8JIN, tallied 410 contacts with 85 countries, a multiplier of 193 and 237,390 points in 84 hours of operation. His contest rig consisted of a 310-B exciter driving an 813 and p.p. 250THs. A plenti-

ful assortment of antennas was used: wide-spaced rotary arrays, with three elements on 14 Mc. and four on 28 Mc., a ground plane and a doublet on 3.5 Mc., vertical SJK beam and doublets on 7 Mc.

A total of 220,458 points, from 406 contacts and 181 multiplier, gave W3DHM the third highest c.w. score in the W/VE area. Credit for this fine performance goes to Mel Wardell, W3DGM, the operator of W3DHM during the contest. The transmitting layout at DHM utilized p.p. 806s and three-element rotaries on 14, 27 and 28 Mc., p.p. 833As and doublets on 3.5 and 7 Mc.

Following the first three high scorers, each with a score over 100,000 points, were W2WZ 205,740, W4KFC 196,116, W8WZ 194,940, W3LTU 184,214, W9LM 162,771, W8BTI 158,100, W4ESK 156,006, W4BGO 155,925, W6MVQ 150,174, W4BRB 142,749, W4CEN 138,600, W3GHD 137,259, W3PDX 134,505, W5ZD 127,458, W1LOP 123,954, W3GHS 120,555, W5CKY 118,854, W1NMP 117,612, W0DAE 110,970, W9RQM 106,524, W1AXA 104,895, W3GRF 104,538, W6TT 103,752, W3FGB 101,010.

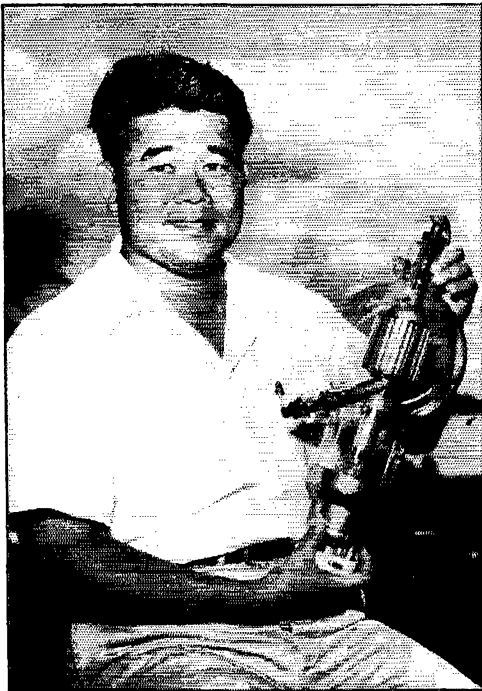
The following tabulation lists the high scorer in each U. S. and Canadian licensing area:

W1LOP	123,954	W0DAE	110,970
W2WZ	205,740	VE1PA	29,784
W3DHM	220,458	VE2WW	88,893
W4KFC	196,116	VE3ZW	80,678
W5ENE	255,732	VE4RO	92,400
W6MVQ	150,174	VE5QZ	10,200
W7PGS	94,065	VE6MN	7128
W8JIN	237,390	VE7VO	41,904
W9LM	162,771	VO2G	64

Leaders in number of contacts were W5ENE 422, W8JIN 410, W3DHM 406, W2WZ 381, W4KFC 371, W8WZ 361, W3LTU 357, W9LM 337, W4ESK 321, W4BGO 315, W4BRB 311, W6MVQ 310, W4CEN 308, W3PDX 305, W3GHD 303, W8BTI 300, W1NMP 297, W5ZD 291, W3GHS 285, W1LOP 283, VE4RO 282, W5CKY 279, W0DAE 274, W1BFT 270, W9RQM 269, W3GRF 266, W6TT 262, W1AXA 259, W3FGB 259, W8DX 256, W3IYE 251, W7PGS 251, W6FSJ 250, W9DUY 250.

Ben Holloman, W5ENE, walked off with top c.w. honors in the U. S.-Canada area and won the Northern Texas c.w. award for the fifth consecutive year.





Katashi Nose, KH6IJ, outstanding c.w. and 'phone scorer, didn't use this bottle during the contest, although his rotary might have made it sound that way.

Highest multipliers (sum of countries worked totals for each band) in W/VE/VO: W5ENF 202, W8JIN 193, W3DHM 181, W2WZ 180, W8WZ 180, W4KFC 177, W3LTU 172, W4BGO 165, W4ESK 162, W6MVQ 162, W9LM 161, W8BTI 155, W4BRB 153, W3GHD 151, W4CEN 150, W3PDX 147, W1LOP 146, W5ZD 146, W5CKY 142, W3GHS 141, W1AXA 135, W8GHW 135, W0DAE 135, W1NMP 132, W6TT 132, W9RQM 132, W3GRF 131, W3FGB 130, W3ALB 129, W4HQN 139, W3IYE 128, W7PGS 125, W6FSJ 124, W3BVN 123, W1BFT 121, W2GGL 120.

The top score among participants outside the United States and Canada came from Dick Spenceley, KV4AA. Dick racked up 2015 QSOs, multiplier of 90 and 541,890 points. KV4AA poured a potent signal into W/VE with only 300 watts to four 4D22s on 3.5, 7, 14, 27 and 28 Mc.; on 160 meters input ran 175 and 50 watts to a pair of 4D22s. The ever-popular three-element rotaries were used on 14, 27 and 28 Mc., a 7-Mc. Zepp for 3.5 and 7 Mc., and a 240-foot wire on 150. Receiving was handled by two HQ-129s.

Especially outstanding from the standpoint of contacts per hour was the contest performance of Gordon Fisher, KG4AF, second high scorer outside W/VE/VO. Gordon logged more contacts than any other participant: 2085, at the average rate of 32.6 per hour. A close contender for the top score, he tallied 518,833 points and a multiplier of 83. His station layout: 75A2 receiver; p.p. 4-250As on 3.5, 7 and 14 Mc., Johnson Viking for 27-28 Mc. and 160; three-element wide-spaced beam on 14 Mc., 280-foot center-fed for 3.5, 7, 14, 27, 28 Mc. and 160 meters.

Veteran DX contest participant Katashi Nose, KH6IJ, came through next in line with 333,918 points, 1427 QSOs and 78 multiplier. If the number of 589 and 599 reports in Katashi's log is any indication, KH6IJ was really jarring plenty of receivers in the U.S.-Canada area!

Other high scores outside W/VE/VO: KH6AEX 275,724, KH6MG 260,996, VP7NM 193,546, CO2BC 177,954, ZL1MB 171,920, KP4KD 169,443, KV4AQ 141,375, XE2OK 131,376, KH6PM 124,551, KH6DK 110,925, KZ5LY 108,918.

Outside the U.S.-Canada area, the top scorers in each continental area were: *Africa* — ZS6OW 97,392; *Asia* — JA2IM 6818; *Europe* — GW3ZV 77,996; *North America* — KV4AA 541,890; *Oceania* — KH6IJ 333,918; *South America* — PY1ADA 46,968.

Leaders in number of contacts: KG4AF 2085, KV4AA 2015, KH6IJ 1427, KH6AEX 1242, KH6MG 1228, VP9NM 1114, CO2BC 1043, ZL1MB 1028, KP4KD 843, GW3ZV 842, XE2OK 789, KH6WU 768, KH6DK 725, KV4AQ 725, FA8BG 713.

Highest multipliers following KV4AA's 90 were KG4AF 83, KH6IJ 78, KH6AEX 74, KH6MG 71, KP4KD 65, KV4AQ 65, KH6PM 63, XE1SA 63, VP7NM 58, CO2BC 57, KP4JE 57, XE2OK 56, ZL1MB 56, VK2RA 55, KZ5LY 54, VK2GW 52, KH6DK 51, ZL1MQ 50.

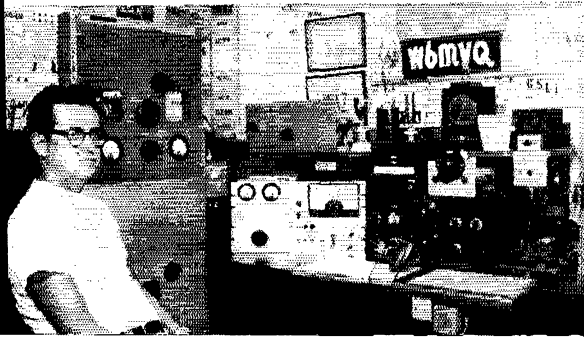
The 'Phone Section

Outstanding operator in the W/VE/VO 'phone category was Rush Drake, W4ESK, whose score of 149,517 points, obtained from 449 contacts and 111 multiplier, gave him a healthy lead on all other contestants. Push-pull 450THs, rotaries on 14, 27 and 28 Mc., and a ground plane on 3.85 Mc. pushed W4ESK's signal to the far corners of the earth; a 75A-1 handled the receiving end.

Joe Johnson, W6NIG, finished up with 102,951 points and was the only other 'phone entrant to top the 100,000 mark. He talked his way through 370 contacts for a multiplier of 93. Equipment line-up at W6NIG: single 450THs on 14 and 28 Mc., 304TL on 3.85 Mc., 14-Mc. three-element rotary, 28-Mc. four-element rotary; 75A-1 receiver.

Rich Lawton, W6MVQ, chalked up 310 contacts, a multiplier of 162 and 150,174 points to lead all c.w. contestants in the W6 area.

QST for



With a healthy lead on his competitors, Rush Drake, W4ESK, scored 149,517 points to take the top 'phone position in the W/VE/VO area.



Third-place 'phone participant was Don Phillips, W3LTU, with 86,940 points (315 QSOs, 92 multiplier), followed by W1AFZ 84,252, W9RBI 75,558, W8JIN 75,423, W8BHW 49,922, W5JVF 45,975, W7DL 41,406, W7HIA 39,480, W3GHS 39,039, W3PWR 38,520, W4VAN 37,233, VE7VO 37,062, W6PYH 36,642, VE3AUJ 36,018, W5BGP 35,112, W2APU 34,452, W1CND 33,055, VE4RO 31,212, W8LIO 30,888, W3FGB 30,690.

Top score in each U. S. and Canadian licensing area:

W1AFZ	84,252	WØPRZ	58,400.
W2APU	34,452	VE1CU	144
W3LTU	86,940	VE2BD	3782
W4ESK	149,517	VE3AUJ	36,018
W5JVF	45,975	VE4RO	31,212
W6NIG	102,951	VE5CX	54
W7DL	41,406	VE7VO	37,062
W8JIN	75,423		
W9RBI	75,558		

Leaders in number of 'phone contacts: W4ESK 449, W6NIG 370, W1AFZ 341, W3LTU 315, W6AM 276, W8JIN 274, W4DQH 265, W9RBI 256, W6VVZ 247, WØPRZ 246, W4OM 237, W8BHW 223, W3PWR 214, W5JVF 211, W9EWC 210, W7DL 206, W1CND 203, W4VAN 201.

Top 'phone multiplier were those of W4ESK 111, W9RBI 98, W6NIG 93, W8JIN 93, W3LTU 92, W9EWC 87, W1AFZ 84, W4OM 84, W4DQH 81, WØPRZ 80, W6AM 78, W3GHS 77, W8BHW 76, W5JVF 75, W8LIO 72, VE7VO 71, W7HIA 70, W4GBO 69, W6VBZ 69, VE3AUJ 69, VE4RO 68, W7VVL 67, W5BGP 66, W4VAN 63, W3FGB 62, W3PYH 62, W3PWR 60.

The talents of Katashi Nose, KH6IJ, third highest c.w. entrant outside W/VE/VO, are not confined just to brasspounding. A top-notch with a key, he also knows how to handle a mike, as attested by his 'phone log, which showed 1022 contacts, multiplier of 52, 159,432 points. On the air for only 44 hours during the contest, KH6IJ knocked off contacts at a merry clip, averaged 23.2 per hour!

Following KH6IJ's top score was that of Syd Lashley, VP6SD, 157,990 points, a result of 884 contacts and 61 multiplier. VP6SD ran 500 watts to an 813, used beams throughout, four elements on 27 and 28 Mc., three elements on 14 Mc. and a Vee on 3.5 Mc.

Another Hawaiian, KH6AEX, cinched third place with 135,576 points. Other high-scoring

'phones: KH6MG 120,612, XE2W 93,869, TG9AD 66,861, VP6WR 57,772, ZS6DW 51,948, KP4DU 21,141, KV4AQ 20,352, TI2TG 18,381, I1BDV 15,776, KG4AF 15,148, G2PU 15,000, ZL1HY 14,976, F8SK 14,841, ZL1MQ 11,625, PY2CK 10,780, KT1DD 10,556.

Top scorers in each continental area were: *Africa* — ZS6DW 51,948; *Asia* — JA8AB 441; *Europe* — I1BDV 15,776; *North America* — VP6SD 157,990; *Oceania* — KH6IJ 159,432; *South America* — PY2CK 10,780.

Leaders in number of W/VE/VO 'phone contacts: KH6IJ 1022, VP6SD 884, KH6AEX 807, KH6MG 708, XE2W 539, ZS6DW 481, VP6WR 448, TG9AD 393, KG4AF 364, I1BDV 311, F8SK 291, KT1DD 257, KP4DU 243, KV4AQ 212, ZL1HY 208, G2PU 200.

High multipliers: VP6SD 61, XE2W 59, KH6MG 57, TG9AD 57, KH6AEX 56, KH6IJ 52, VP6WR 44, ZS6DW 36, TI2TG 33, KV4AQ 32, KP4DU 29, G2PU 25, ZL1MQ 25, KH6DK 24, ZL1HY 24, PY2CK 22.

Club Scores

As in the 17th ARRL DX Contest, the competition this year for the special gavel award, offered to the radio club whose members submitted the highest aggregate score, resulted in a close race between the Frankford Radio Club of Philadelphia and the Potomac Valley Radio Club. Frankford succeeded in gaining the lead and wins its fifth DX Contest club award. The Northern California DX Club, fifth in the previous affair, pulled up to third and will bear watching next year. A tabulation showing the scores of the twenty-nine other clubs that entered the competition accompanies this report. Special certificates are being awarded to the leading 'phone and c.w. operators in each club that submitted the minimum number of entries required by the rules for individual awards.

Highest W7 score, 94,065 points, was made from this very efficient-looking station layout by Warren Malory, W7PGS.



Sidelights

"Conditions spotty—7 Mc. wonderful on second week end — heard five continents rolling in at one time." — *W2FBA*. . . . "Conditions were the worst yet since the war, but despite that and a power cut here the first week end it was another good contest with a high standard of operating on the part of the Ws and VEs. Many thanks for the party." — *ZE3JP*. . . . "Sure was a good contest. Got seven new ones with my 20/30 watts. Both 20 and 40 had good openings on at least one week end. Worked KG4AF and KV4AA on three bands." — *W8EXZ*. . . . "It was the first time I took part in the contest, even though I have been licensed for many years, but it will not be the last time." — *OZ8F*. . . . "Had lots of fun as usual. It's still as big a thrill as ever and the best contest for my money." — *W2JME*. . . . "I am always amazed at how the Ws and VEs pick out my 20-watt signal when conditions and QRM are so bad!" — *HB9CI*. . . . "Many DX stations have better signals than they think. Matters could be speeded up considerably if they called and signed less. DX stations should always give W or VE a call for check after the serial number. Many times we can't hear the comeback in a heavy line-up until the QRM dies down. These contests get better every year." — *W1ODW*. . . . "I was certainly pleased at the way the W operators conducted themselves. Only at the beginning of the contest did I encounter any confusion, that is, stations calling me while I was transmitting to another station." — *VP9AL*. . . . "Had fun. Bet I was the only participant running 40 watts input in the U. S. who called ZL1MB once, signed once, and worked him in a pile-up!" — *W7CWN*. . . . "It was a fine contest. The low frequencies really came into their own this year." — *W6GAL*. . . . "This annual event is certainly the tops so far as we are concerned and let us hope it will continue for many years to come." — *VE3DT*. . . . "Lots of fun. Your choice of times and splitting the contest into consecutive week ends for 'phone and c.w. with time break between was F.B." — *W6PYH*.

Disqualifications

The following entrants are deemed ineligible for contest listings or awards in the 18th ARRL International DX Competition. In each case disqualification is for off-frequency operation as confirmed by one or more FCC citations or ad-

visory notices or two accredited ARRL Official Observer measurements: *C.w.*: W4BPD, W4EEO, W4FKA, W6MUF, W6YRA, W9GIL, LU4CE, LU4ZI, ZS6OS. 'Phone: W1ATE, W1JFG, W2SKE, W3ALB, W3DHM, W4KQY, W6CYL, W6YRA.

— . . . —

The dates of the 19th ARRL International DX Competition will be announced in November *QST*. It isn't too early to start making your preparations for taking part. Get those antennas and rigs tuned up now!

SCORES

Eighteenth International DX Competition

Operator of the station first-listed in each section and country is winner for that area, unless otherwise indicated. . . . The multiplier used by each station in determining score is given with the score — in the case of U. S.—Canada this is the total of the countries worked on each frequency band used; in the case of non-W/VE/VO entries it is the total of the U. S.—Canada districts worked on each band. . . . The number of contacts established is next listed. . . . The letters A, B, and C approximate the input to the final stage at each station; A indicates power up to and including 100 watts; B indicates over 100 watts, up to and including 500 watts; C indicates over 500 watts. . . . The total operating time to the nearest hour is given for each station and is the last figure following the score. . . . Example of listings: W3DHM 220,458-181-406-C-74, or final score 220,458; multiplier 181; 406 contacts; power over 500 watts; total operating time 74 hours. . . . Stations manned by more than one operator are grouped in order of score following single-operator station listings in each section or country tabulation; calls of participants at multioperator stations are listed in parentheses. . . . Where three or more multioperator entries are listed, the top-scoring station is being awarded a certificate. . . . The scores of 'phone entrants whose work was exclusively in the 10- and/or 11-meter bands are listed with an asterisk.

C. W. SCORES

ATLANTIC DIVISION			
<i>E. Pennsylvania</i>			
W3DHM	220,458-181-406-C-74	W3EIS	48,267-93-173-B-43
W3LTU*	184,212-172-357-C-76	W3WV	3,516-76-147-C-
W3GHD	137,259-151-303-B-	W3SPJ	24,354-64-129-B-43
W3GHS	120,555-141-285-B-57	W3MFI	24,072-68-118-B-42
W3ALB	92,880-129-240-C-50	W3JYS	22,940-62-124-C-
W3MFW	42,722-82-175-C-48	W3Z0	21,390-62-115-B-45
W3CCS	37,422-77-162-C-35	W3CDZ	20,670-65-106-A-33
W3EQA	30,420-73-130-C-24	W3FQB	17,226-58-99-A-35
W3ALX	29,394-71-138-B-10	W3AYS	15,345-55-93-B-20
W3MNV	22,860-60-130-B-49	W3EPR	13,585-55-83-B-38
W3ADZ	21,240-60-118-C-25	W3JTK	10,656-48-74-C-12
W3MDE	15,300-51-100-B-35	W3ALE	9,585-45-71-B-15
W3IMV	14,580-45-108-B-30	W3CDG	3,780-28-45-B-22
W3EVW	12,513-43-97-C-13	W3LVJ	3,612-28-43-A-10
W3CPS	11,745-45-87-B-30	W3VES	1,192-8-8-A-1
W3NA	10,920-40-91-B-17	W3PEV	27-3-3-A-4
W3HER	10,032-44-76-B-20	W3JTC (W6AVM)	186,732-171-364-C-86
W3QLW	8,778-38-77-B-24	W3FQZ (W3VES)	109,693,132-277-C-65
W3RFI	5,460-35-52-B-15	<i>So. New Jersey</i>	
W3CHH	3,321-27-41-B-	W2GGL	81,720-120-227-C-65
W3O09	1,843-19-33-B-8	W2QKJ	4,004-28-48-B-20
W3BES (W3EKK, LVF)	223,984-188-406-C-96	W2HAZ	297-9-11-A-3
W3CTH (W3BXE)	136,335-149-305-C-87	W2SAP (W2PWP)	153,615-165-387-C-3
W3KTC (W3OVV)	94,815-129-245-C-	<i>W. New York</i>	
W3ITW (W3BP1)	29,182-74-131-B-40	W2DSB	67,536-112-201-C-57
<i>Md.—Del.—D. C.</i>			
W3PDX	134,505-147-305-B-76	W2UWD	59,220-94-210-C-50
W3GRF	104,538-131-266-B-75	W2FBA	31,590-78-135-B-17
W3IYE	96,384-128-251-C-47	W2TVR	22,680-63-120-B-40
W3BVN	86,346-123-234-B-48	W2BHH	20,312-61-11-B-51
W3MSK	66,144-104-212-C-40	W2RWE	17,543-53-111-C-
W3A00	54,684-98-186-B-31	W2AW	16,524-54-102-B-23
W3DRD	51,381-99-173-B-46	W2PZM	7,548-37-68-B-20
		W2ICE	7,155-45-57-C-
		W2QJM	7,215-37-65-B-23
		W2TXB	6,090-35-58-C-

Dick Morse, W1AFZ, logged 341 'phone contacts and tallied 81,252 points for the leading W1 score and the fourth highest in the W/VE area.

QST for



CLUB SCORES

Club	Score	C. W. Winner	'Phone Winner
Frankford Radio Club	1,846,572	W3DTHM	W31TU
Potomac Valley Radio Club	1,502,427	W4KFCQ	W4ESK
Northern California DX Club	1,226,620	W6MVCQ	W6NIG
Maul Amateur Radio Club	1,121,939	K8BAEX	K8BAEX
Southern California DX Club	903,943	W6FSJ	W6AM
Ohio Valley Amateur Radio Assn.	506,876	W8JIN	W3GHR
The DX Club	275,154	W3GHS	W8BRA
Westpark Radios	212,566	W8BWC	
Greater Cincinnati Amateur Radio Assn.	202,506		
Hidrewood Amateur Radio Club	133,647	W9GNQ	W2GNQ
Connecticut Wireless Assn.	169,340	W1TX	
Chicago Suburban Radio Assn.	163,779		
West Seattle Amateur Radio Club	154,808		
Four Lakes Amateur Radio Club	144,012	W9LNM	
Dayton Amateur Radio Assn.	142,920		
Union de Radiosaficionados Espanoles	129,023	PAIAB	
Dade Radio Club	124,385	W4LV	
Winnipeg Amateur Radio Club	123,612		
Providence Radio Assn.	140,013		
Niles Amateur Radio Club	98,559		
Rochester DX Assn.	94,143	W2FBA	
San Antonio Radio Club	71,409		
Rassemblement des Amateurs Francais	65,911	PSVJ	
Butte Amateur Radio Club	56,850		
Montreal Amateur Radio Club	39,723		
Deutscher Amateur Radio Club	28,926		
Tri-County Amateur Radio Club	20,730		
Milwaukee Radio Amateurs Club	18,084		
Sturges Standard Amateur	16,795		
South Shore Amateur Radio Club	10,917	SM3AKM	
South Lyme Beer, Chowder & Propagation Society	2895	W1DDO	
Jamestown Amateur Radio Club	625	W1VQ	

W2SAW	6042-38-53-B-28	W0TKX	58,176-96-202-B-50	W8CEG	18,762-59-106-B-36	W2CWK	4725-35-45-A-
W2MA	5355-35-51-C-10	W0YJR	24,300-60-135-C-	W8AJW	17,472-56-104-A-	W2ADP	3393-29-39-A-19
W2RJJ	4704-28-56-B-21	W0JSN	17,856-62-96-B-48	W8FJR	7686-42-61-A-21	W2JMC	3168-24-44-B-10
W2DOD	27,117-24-34-A-19	W0RXL	16,008-58-94-C-	W8DOC	6612-38-58-B-20	W2EIK	1560-20-27-A-9
W2VXA	1326-17-26-B-	W0WIP	6300-35-60-B-22	W8EBZ	5394-31-35-C-22		
W2TKA	240-8-10-A-7	W0GDH	2457-21-39-B-8	W8DAE	3564-27-44-B-11		
W2FXA	45-3-A-5-			W8ZJO	1843-19-33-C-9		

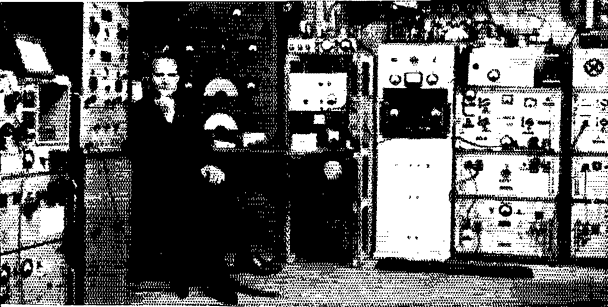
W. Pennsylvania		Minnesota		New York		Midwest Division	
W3LPZ	30,552-76-134-B-48	W0TKX	58,176-96-202-B-50	W2AUF	53,262-99-180-C-54	W6FZO	4650-31-50-B-15
W3AA	27,117-24-34-A-19	W0YJR	24,300-60-135-C-	W2BYP	47,502-91-174-C-42	W0NWX	4030-31-44-B-
W3LXE	26,130-65-134-A-36	W0JSN	17,856-62-96-B-48	W2HO	31,959-67-159-B-52	W0DQN	450-10-15-B-28
W3APQ	8892-54-55-A-30	W0RXL	16,008-58-94-C-	W2CJM	19,620-60-109-B-36	W0HL	108-6-B-6-
W3NCF	7881-37-71-B-35	W0WIP	6300-35-60-B-22	W2GLM	8510-37-79-C-10	W0EIB	3-1-A-5
W3RNO	5376-23-14-B-26	W0GDH	2457-21-39-B-8	W2NRD	546-13-14-A-8		
W3NCS	432-12-6-B-						
W3JSH	192-8-B-5-						

Central Division		Delta Division		Hudson Division		New England Division	
W9LM	162,771-161-337-C-83	W4NHH	69,960-106-220-B-38	W2WZ	205,740-180-381-C-75	W1LOP	123,954-146-283-C-65
W9NII	69,336-107-216-C-73	W4DQH	61,490-110-222-C-53	W2WC	54,075-103-175-B-48	W1NMP	117,612-132-239-C-71
W9TB	47,724-82-194-C-	W4KTC	12,720-53-80-B-22	W2AZS	39,933-81-141-C-47	W1TX	74,015-113-210-C-50
W9EXY	25,056-58-144-B-50			W2ACTO	27,813-73-127-B-30	W1FTA	50,904-101-168-B-30
W9FKC	18,762-53-118-C-32			W2KTF	23,460-68-116-B-27	W1DWD	47,748-92-173-B-64
W9HTZ	17,271-57-101-B-46			W2ARE	14,382-51-94-B-28	W1BIB	37,062-87-142-C-30
W9TGB	16,074-47-114-B-26			W2GTL	13,008-48-91-B-38	W1DIT	20,032-64-105-C-27
W9ESD	15,345-35-91-C-21			W2DNZ	7452-36-69-C-25	W1ATO	14,025-55-85-B-29
W9GMZ	14,352-52-92-B-27			W2AHC	3132-29-36-B-13	W1DPC	8660-40-74-B-23
W9ALI	8892-39-76-B-20			W2JB	2394-21-38-C-7	W1DHO	5376-32-56-B-64
W9PNE/9	7872-41-64-B-30			W2BVN	1501-18-27-A-14	W1WJW	3393-29-39-B-5
W9WIO	3240-27-40-B-15			W2ZOT	1275-17-25-B-12	W1RWS	3219-29-37-A-12
W9WCV	1008-14-24-C-11						
W9HFD	612-12-17-C-5						

North Dakota		South Dakota		Ohio		New Jersey	
W0E0Z	12,015-45-89-C-29	W8JIN	237,390-193-410-C-84	W2JME	65,296-106-212-B-47	W2JME	65,296-106-212-B-47
W0DBN	540-10-18-B-	W8WZ	194,940-180-361-C-76	W2CNO	47,250-90-175-C-30	W2CNO	47,250-90-175-C-30
W0BPO	15-3-3-A-3	W8BTI	158,100-155-300-C-66	W2EOS	45,066-87-176-B-80	W2EOS	45,066-87-176-B-80
		W8BHW	87,210-135-216-C-35	W2ATE	39,060-84-155-B-22	W2ATE	39,060-84-155-B-22
		W8ACE	84,870-115-246-C-54	W2CGJ	33,033-77-143-B-80	W2CGJ	33,033-77-143-B-80
		W8ZJM	56,070-105-178-B-51	W2HFP	26,880-64-140-C-30	W2HFP	26,880-64-140-C-30
		W8BWC	42,066-82-171-C-50	W2TTH	25,134-59-142-B-32	W2TTH	25,134-59-142-B-32
		W8HFE	40,014-78-171-C-30	W2DIT	22,848-68-112-B-39	W2DIT	22,848-68-112-B-39
		W8DDS	37,040-80-155-C-	W2JKH	13,083-48-89-B-19	W2JKH	13,083-48-89-B-19
		W8SMC	26,625-71-125-B-31	W2CDP	5,994-37-54-B-	W2CDP	5,994-37-54-B-
		W8PUD	24,476-58-142-C-55	W2N1Y	5508-36-51-A-25	W2N1Y	5508-36-51-A-25
		W8B0J	22,311-67-111-C-16				
		W8PM	21,504-64-112-B-38				
		W8RSP	20,522-62-111-B-25				

One of two 'phone operators to go over the 100,000-point mark, Joe Johnson, W6NIG, earned honors as the second highest 'phone scorer in the U. S.-Canada area.





No shortage of gear here! J. Banner, GW3ZV, used much of it to good advantage, scored 77,996 points to lead in the European area.

WIVG.....2025-25-27-A-
 WIRY.....1932-23-28-B-4
 WIKK.....867-17-17-B-
 WIOIS.....720-15-16-A-5
 WIBUD.....3-1-1-A-

Maine

WIDPJ.....46,440-86-180-C-78
 WIAPU.....23,664-58-136-B-40
 WIDFO.....8400-35-80-B-32
 WIEIO.....7740-36-72-B-48

E. Massachusetts

WIAXA.....104,895-135-259-C-78
 WIBOD.....64,872-106-204-B-42
 WIMX.....59,590-101-198-C-
 WITW.....29,400-70-140-C-24
 WIDSF.....5487-31-59-B-27
 WIDDO.....4128-32-43-A-16
 WIJNY.....4125-25-55-C-4
 WIONP.....3102-22-47-A-30
 WIONV.....2448-24-34-B-50
 WICA.....588-14-14-A-14
 WISFW.....216-8-9-A-4
 WIPLJ.....75-5-5-A-4

W. Massachusetts

WIJLT.....45,924-86-178-B-56
 WIJYH.....7500-50-50-A-

New Hampshire

WIBFT.....98,010-121-270-A-
 WIFZ.....47,250-90-175-B-1
 WIAOQ.....18,900-50-126-B-17
 WINHJ.....9120-40-76-B-10
 WIJTY.....2706-22-41-B-12

Rhode Island

WIBIL.....64,890-105-206-C-51
 WICJH.....47,250-90-175-B-1
 WIMIJ.....39,123-81-161-B-50
 WIAWE.....12,285-45-95-B-5

Vermont

WIRWP.....11,610-45-85-B-35
 WIBJP.....3075-25-41-B-12

NORTHWESTERN DIVISION

Idaho

WIYI.....312-8-13-B-16

Montana

W7KVU.....54,144-94-192-C-52
 W7FLB.....2708-22-41-B-25

Oregon

W7HXG.....69,642-106-219-C-65
 W7AHX.....25,728-67-128-B-40
 W7DAA.....18,144-54-122-C-42
 W7EAW.....6120-34-60-B-11
 W7LNG.....3568-32-58-B-30
 W7JLU.....1683-17-33-A-2

Washington

W7PQE.....41,998-83-170-B-54
 W7CMM.....21,240-59-120-B-48
 W7AJN.....20,862-57-122-C-28
 W7NLI.....11,985-47-85-C-50
 W7LEW.....10,209-41-83-A-19
 W7BDW.....9389-41-77-C-28
 W7KIL.....8019-33-81-B-25
 W7JIC.....3672-24-51-A-18
 W7OPO.....3375-25-45-B-14
 W7ESM.....1767-19-35-B-23
 W7CWN.....135-5-9-A-4
 W7DLD (W7s FS, RT).....113,400-135-280-C-92
 W7FYN (W7DXQ, W7TBA/7).....26,130-65-134-C-72

PACIFIC DIVISION

Nevada

W7KEV.....14,256-54-88-B-27
 W7KIO.....5472-32-57-B-19

Santa Clara Valley

W6SR.....35,112-77-152-B-55
 W6HOC.....21,804-69-108-B-60
 W6VDG.....19,668-66-100-C-28
 W6PBV.....63-3-7-C-1
 W6VE (W6DZZ).....59,500-100-199-C-56
 W6EAE (W6VDG).....19,964-62-108-C-33

East Bay

W6MVQ.....150,174-162-310-C-79
 W6TTI.....103,752-132-262-C-62
 W6PBB.....73,776-116-212-C-79
 W6LDD.....42,585-85-167-C-80
 W6QDE.....18,315-55-111-C-25
 W6IDY.....12,348-49-84-C-17
 W6EJA.....8190-39-70-B-22
 W6TTI.....6344-33-66-C-20
 W6LMZ.....6528-34-64-B-10
 W6FLT.....5490-30-61-B-21
 W6KEK.....3525-25-47-B-9
 W6MHB.....1944-18-36-B-14
 W6NIG (W6s CTL, KKK, RRG, UZX).....134,505-147-305-C-92
 W6PYH (W6s GLZ, MEK).....85,668-118-242-C-38
 W6CTL (W6JK).....432-8-13-A-

San Francisco

W6WB.....85,323-119-239-C-
 W6RBO.....68,860-110-209-C-
 W6ATO.....45,494-86-177-C-79
 W6GPB.....18,981-57-111-B-43
 W6HQN.....6237-33-63-B-21
 W6FRS.....312-8-13-A-

Sacramento Valley

W6EFM.....39,525-85-155-C-57
 W6OCQ.....20,679-61-113-B-72
 W6BIL.....855-15-19-B-18
 W6VBI.....75-5-5-B-22

San Joaquin Valley

W6LCX.....31,098-73-142-B-40
 W6GWO.....27,216-72-126-C-38
 W6BYH.....12,006-46-87-C-17

ROANOKE DIVISION

North Carolina

W4CEN.....138,600-150-308-B-52
 W4KE.....69,264-104-222-C-58
 W4GBX.....26,880-70-128-B-21
 W4MZP.....14,580-54-90-B-40
 W4OC.....6660-37-60-C-18
 W4IZR.....4131-27-51-B-10
 W4REZ.....2325-25-31-A-12

South Carolina

W4DNR.....2346-23-34-B-11

Virginia

W4KFC.....196,116-177-371-C-71
 W4ESK.....156,006-162-321-C-
 W4HQN.....87,462-129-226-C-60
 W4OM.....54,924-92-199-C74
 W4VE.....54,144-94-192-C-35
 W4S7Y.....54,054-99-182-B-70
 W4WCC.....14,025-55-85-C-12
 W4RSS.....10,384-44-83-C-80
 W4RNP.....1136-16-25-B-15
 W4QCL.....540-12-15-B-6

West Virginia

W8CDU.....2068-22-32-A-29
 W8FVU.....1520-20-26-B-37

ROCKY MOUNTAIN DIVISION

Colorado

W0AZT.....32,604-76-143-C-
 W0FSJ.....1395-15-31-B-28

Utah

W7NCO.....2247-21-37-B-23

Wyoming

W7PGS.....94,065-125-251-C-53

SOUTHEASTERN DIVISION

Alabama

W4HA.....144-6-8-B-1

E. Florida

W4BRB.....142,749-153-311-C-75
 W4LVY.....43,789-89-166-B-60
 W4FPK.....39,516-89-148-B-26
 W4AZK.....22,968-66-116-C-24
 W4SAT.....10,857-47-77-B-60
 W4DRK.....3726-27-46-B-35
 W4TRP.....3530-28-38-C-

W. Florida
 W4BGO.....155,925-165-315-C-80
 W4NN.....20,988-66-106-B-43

Georgia

W4BRP.....52,164-92-189-B-
 W4CYA.....3189-26-41-B-28

SOUTHWESTERN DIVISION

Los Angeles

W6FSJ.....93,000-124-250-C-63
 W6EPT.....81,396-119-228-C-60
 W6DFY.....64,842-107-202-C-34
 W6RW.....53,253-97-183-C-80
 W6IBD.....32,604-76-143-C-88
 W6VPK.....27,380-74-124-A-41
 W6LER.....26,937-73-123-C-51
 W6BPD.....20,352-64-106-A-25
 W6ALO.....4959-29-57-C-2
 W6HPB.....4096-24-43-B-20
 W6NTR.....2583-21-41-B-7
 W6HJ.....2331-21-37-C-15
 W6IQQ.....1134-14-27-B-10
 W6ID.....1071-17-21-A-
 W6KNE.....135-5-9-A-
 W6GAL (W6GHU) 201,066-166-363-C-84
 W6AM (W6s ADP, BXL).....167,562-174-321-C-88
 W6BJU (W6CUF) 121,407-143-283-C-70
 W6LDJ (W6LHN) 119,328-132-302-C-

Arizona

W7PCX.....54,300-100-131-C-58
 W7YJU.....12,474-54-77-C-35
 W7KXS/6.....12,144-45-88-B-30
 W7ENA.....7020-36-65-A-

San Diego

W6KYG.....14,406-49-98-C-32
 W6CAE.....3300-25-52-C-10
 W6TZR.....3171-23-46-A-

WEST GULF DIVISION

Northern Texas

WSENE.....255,732-202-422-C-81
 WSRNO.....12,852-51-82-B-10
 WSAWT.....9288-43-74-B-39
 WSKUJ.....5100-34-50-C-30
 WSOLG.....2244-22-54-B-16
 WSPXT.....360-8-15-B-3
 WSIWX.....270-6-15-B-28

Oklahoma

WSDOV.....12,816-48-89-C-30
 W5FFW.....7800-40-65-C-16
 W6TYE/5.....2376-22-36-A-
 WSLJI.....1728-18-32-B-9

Southern Texas

W5FNA.....64,629-111-193-C-40
 W5KCR.....12,558-46-91-B-38
 W5LGG.....6804-36-63-A-8

New Mexico

W5LFLH (W5s PHO, RLY, UOC).....13,536-47-96-C-56

CANADA

Maritime

VE1PA.....29,784-68-146-B-46
 VE1ZZ.....25,938-66-131-B-48
 VE1HG.....17,136-48-119-B-24
 VE1EA.....10,542-42-85-A-24
 VE1RY.....10,374-38-91-B-26
 VE1DB.....4374-27-54-B-22
 VE1CU.....4212-26-54-B-22
 VE1BK.....60-4-5-B-5

Ontario

VE3ZV.....80,678-107-252-C-63
 VE3CCK.....51,168-82-208-B-64
 VE3ACX.....25,289-69-127-B-70
 VE3SR.....13,630-54-115-C-31
 VE3BR.....16,416-57-96-A-39
 VE3DT.....15,600-50-104-B-50
 VE3IJ.....4536-28-54-B-15
 VE3API.....3429-27-43-B-22
 VE3MB.....10098-14-24-A-30
 VE3YV.....756-14-18-A-4

Quebec

VE2ZW.....88,893-119-249-C-48
 VE2ZB.....38,868-79-164-B-28
 VE2VA.....20,706-58-119-B-33
 VE2CK.....10,530-39-90-B-
 VE2OL.....10,428-44-79-A-25
 VE2AIE.....7056-36-66-A-15

Alberta
 VE6MN.....7128-33-72-C-25

British Columbia

VE7VO.....41,904-72-194-C-58
 VE7QP.....20,020-52-129-B-29
 VE7KC.....19,666-51-130-B-80
 VE7VP.....13,365-45-99-C-56
 VE7AIT.....729-9-27-B-

Manitoba

VE4RO.....92,400-110-282-C-64

Saskatchewan

VE5OZ.....10,200-40-85-A-31
 VE5OC.....3321-27-41-B-
 VE5CX.....972-12-18-A-21
 VE5EH.....702-13-17-A-10

AFRICA

Algeria

FA8BG.....85,520-40-713-A-65
 FA9RZ.....32,085-31-345-A-6

Belgian Congo

OQGRA.....51,726-37-467-A-20

Canary Islands

EA8BF.....41,985-27-527-A-31

Eritrea

MI3DD.....3528-18-67-B-9

French Equatorial Africa

FQ8AE.....9280-20-160-A-20

French Morocco

CN8AG.....5076-12-141-A-
 CN8EX (CN8ES) 100,758-42-805-A-96

French West Africa

FF8AG.....26,400-30-294-A-
 EL2A.....19,026-21-306-B-
 Madeira Island
 CT3AA.....8879-13-232-B-20

Southern Rhodesia

ZE3JP.....63,640-43-501-A-44

Southwest Africa

ZS3K.....24,102-39-206-A-13

Spanish Morocco

EA9AP.....15,100-25-203-A-13

Tangier

KTIUX.....13,264-16-277-A-27

Union of South Africa

ZS6OW.....97,392-48-679-A-4
 ZSU.....49,784-43-556-A-46
 ZS6HM.....68-4-6-A-

ASIA

Hong Kong

VS6CG.....2466-9-92-A-12

Japan

JA2IM.....6818-14-166-B-22
 JA2AB.....6214-13-160-C-7

Okinawa

KR6DT.....676-4-57-B-6

Turkey

TA2EFA.....3324-16-74-C-

EUROPE

Azores

CT2BO.....12,950-25-175-A-14

Belgium

ON4OF.....69,042-37-662-A-
 ONMRT.....864-9-33-A-

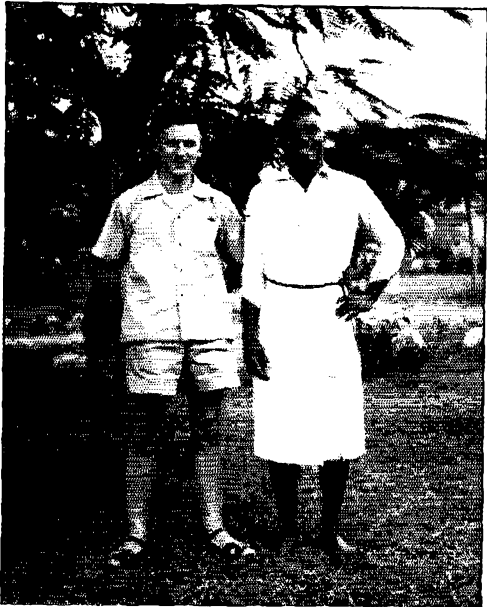
Channel Islands

GC4LI.....31,948-28-383-B-10

Czechoslovakia

OK1MB.....37,950-30-424-A-

Denmark		SMESCO 1963-13-51-B-		Brazil		Peru	
OZ1W	28,672-28-347-A-	SM4UJ	1023-11-31-4	PY1ADA	46,968-38-412-B-25	O44BR	8424-27-104-A-7
OZ4KX	24,344-26-315-A-49	SM6AOU	996-12-28-B-	PY7NS	34,238-38-301-B-	O4SA	8316-14-200-A-5
OZ7PH	18,821-21-269-A-42	SM5UJU	224-7-11-B-10	PY2OE	26,520-34-260-B-	Venezuela	
OZ2BC	16,821-21-269-A-42	SM4BEC	132-4-11-A-3	PY4AJD	19,530-31-212-B-20	YV5DE	
OZ27B	15,387-23-223-A-31	SM7AUH	105-5-7-A-	PY2AJ	9,780-30-111-B-12	31,552-32-331-A-52	
OZ7G	9882-18-185-A-26	SM51Z	100-5-7-A-	PY7LJ	9,200-16-192-A-17	Uruguay	
OZ78	5040-14-120-B-	SM7YTO	3-1-1-B-	PY1HF	6474-13-166-A-	CX6AD	
OZ3PO	2716-14-66-A-	Switzerland		PY1AXP	870-10-29-A-	1890-10-63-A-	
OZ5LN	252-6-14-A-	HB9DB	6858-18-127-A-22	PY1AIF	768-16-48-B-		
Eire		HB9MU	6517-19-115-A-22				
EI9J	20,352-24-285-B-13	HB9EU	3878-14-95-B-4	Chile			
EI9G	6825-13-178-B-18	HB9CI	3248-14-78-A-7	CF4AD	28,148-31-303-B-	1 W3NOH operator.	
EI9F	3315-13-87-B-16	Trieste		2 W3PZC operator.			
EI9P	895-7-39-A-	AG2AV	2748-12-77-B-14	3 W6CS operator.			
EI8D	195-5-13-A-	Wales		4 W6EG operator.			
EI9F	27-3-3-B-2	GW3ZV	77,996-31-842-B-38	5 W5LIU operator.			
EI5C (E. D. Doyle, W. Gallinan, B. J. Tulle)	44,544-24-637-B-53	GW3JI	12,663-21-201-A-43				
England		NORTH AMERICA		PHONE SCORES			
GSRI	65,268-39-558-B-60	Alaska		ATLANTIC DIVISION			
G3CRL	18,414-22-281-B-	KL7ANJ	34,452-33-348-B-12	E. Pennsylvania			
G3FKB	7352-19-131-B-40	KL7WV	33,390-30-372-B-27	W3LTU	86,940-92-315-A-	W. Pennsylvania	
G3APX	4275-19-77-B-19	KL7NXL	26,100-25-353-A-33	W3GHS	39,039-77-169-B-37	W3LXE	9240-40-77-A-36
G8OZ	3189-13-83-A-17	W7PLO/KL7	2232-12-62-B-	W3FGB	30,690-62-165-B-37	W3AER	1620-20-27-B-12
G2MI	217-7-11-B-1	Bahamas		W3CTJ	24,072-59-136-C-50	CENTRAL DIVISION	
Finland		VP7NM	193,546-58-1114-B-	W3IMV	11,070-41-90-B-30	Illinois	
OH6NR	16,701-19-288-B-30	Bermuda		W3GHD	10,395-45-77-B-	W9LOG	3420-30-38-B-19
OH3OU	120-10-24-A-	VP9AL	54,694-41-452-A-20	W3JEV	9,960-40-83-C-17	W9ZUL	1835-18-34-B-11
OH3NY	459-9-17-A-	VP900	35,800-25-478-A-25	W3EQA	7,956-39-68-C-22	W9TPA	1170-15-26-B-25
France		Canal Zone		W3NA	6138-33-62-B-12	W9DOR	72-4-6-A-3
F8VG	40,424-31-440-A-37	KZ5LY	109,918-54-677-B-29	W3LXL	2,912-26-38-B-10	Indiana	
F3MS	17,388-28-208-A-20	KZ5BC	17,430-14-415-C-22	W3COS	2,376-22-38-B-20	W9IUN	16,335-55-99-B-46
F8TO	4620-15-104-A-16	KZ5CW	17,358-33-177-A-8	W3P20	972-12-27-C-12	W9LZP	3480-29-41-C-31
F8NY	13-15-A-	Cuba		W3RVM*	720-12-22-B-	Wisconsin	
F8PM	2782-13-73-A-	CO2BC	177,954-57-1043-A-35	W3DWA	360-8-15-B-6	W9RBI	75,558-98-256-C-9
F9DW	1469-13-38-A-12	Greenland		W3QLW	162-6-9-B-7	W9EWC	54,114-87-210-C-49
F9DN	1290-10-43-A-	OX3BI	10,432-16-218-B-12	W3BES (W3LVP)	100,688-97-346-C-85	W9DUB	26,544-56-160-B-
F8WK	301-9-30-A-3	OX3AP	2982-14-71-A-	W3KT (W3VOV)	15,120-48-105-C-	W9DCU	7035-35-67-C-20
F9BB	56-4-5-A-	Guantanamo Bay, Cuba		Md.-Del.-D. C.			
Germany		KG4AF	518,833-83-2085-C-64	W3PWR	38,520-60-214-C-	DAKOTA DIVISION	
DL4EF	71,558-37-651-B-90	Mexico		W3IYE	18,375-49-25-B-40	No. Dakota	
DL1DX	28,179-31-303-B-19	XE2OK	131,376-56-789-B-40	W3ZQ	6020-35-58-C-42	W0VSK	
DL2RO	22,794-29-262-B-	XEISA	99,414-63-535-A-	W3MNX	275-25-38-B-	W0BPO*	
DL1BR	21,300-25-284-A-	XE2G	1320-11-40-A-	W3IYS	2475-25-33-B-20	1860-20-31-B-	
DL1JN	14,352-26-184-A-15	Newfoundland		W3DRD	2475-25-33-B-20	610-10-21-A-14	
DL1XF	10,395-27-129-B-	VO2G	64-4-6-A-1	W3GR*	2352-16-51-B-25	So. Dakota	
DL6GB	747-9-25-A-	Puerto Rico		W3EIS	1914-22-29-B-10	W0PRZ	
Iceland		KP4KD	169,443-67-843-B-36	W. New York			
TF3SF	43,225-35-418-A-57	KP4JE	80,370-57-470-B-23	WZTXB	27-3-3-C-	55,400-80-246-C-55	
TF3MB	12,784-16-269-A-	KP4OD	43,560-36-411-B-21	<i>(Continued on page 152)</i>			
TF3AB	9056-16-191-A-	KP4PK	10,374-14-247-B-6				
TF3SG	13-13-109-A-7	Virgin Islands					
TF3NA	3111-17-63-A-7	KV4AA	541,890-90-2015-B-72				
Italy		KV4AQ	141,375-65-725-B-60				
I1ER	4020-15-91-A-30	OCEANIA					
I1LP	1320-11-40-A-	Australia					
Netherlands		VK2GW	82,576-52-530-A-54				
PA0GN	18,564-28-221-A-40	VK2RA	74,195-55-450-A-30				
PA0KW	16,984-22-259-A-45	VK2AWU	17,746-38-156-A-30				
PA0VB	15,900-25-212-A-32	VK5FO	14,607-27-181-A-31				
PA0DA	4500-15-100-A-13	VK9XK	9129-17-179-A-11				
PA0WAC	3346-14-80-A-	VK3AHH	2023-17-40-A-14				
PA0FLX	1728-12-48-A-45	Fiji Islands					
PA0LDZ	150-5-10-A-	VR2CG	30,393-33-307-B-				
PA0LY	24-2-4-A-1	Hawaii					
Norway		KH6JJ	333,918-78-1427-C-67				
LA6U	11,066-22-170-A-	KH6AEX	275,724-74-1242-C-				
LA8RB	6096-16-127-B-10	KH6MG	260,996-71-1228-C-				
LA3HA	5782-14-139-A-18	KH6PM	124,551-63-659-B-				
LA4K	1968-12-55-A-	KH6DK	110,925-51-725-C-27				
LA9T	1160-10-39-A-30	KH6FX	59,643-47-427-B-43				
Portugal		KH6ER	57,684-46-418-C-41				
CT1SQ	33,592-34-330-B-23	KH6WU	11,202-18-768-C-34				
CT1AL	16,692-26-217-A-19	KH6ARF	9039-23-133-A-15				
CT1DJ	11,201-23-168-B-20	KH6OL	630-10-21-A-				
CT1CR	2180-10-73-A-6	KH6PX	138-6-8-A-				
Saarland		New Zealand					
9S4AX	8610-14-207-A-46	ZL1MB	171,920-56-1028-A-				
Sardinia		ZL1MQ	76,200-50-508-A-46				
SI1HK	7287-21-119-A-8	ZL3AB	11,502-18-213-A-				
Scotland		Niue Island					
GM2FHH	11,022-22-169-B-24	ZK2AA	57,480-40-481-A-32				
GM6IZ	7992-24-111-B-48	Marshall Islands					
Spain		KX6AL	33,170-31-360-B-31				
E11AB	52,839-27-655-A-42	SOUTH AMERICA					
E13HE	39,933-29-463-A-26	Argentina					
E15CS	13,750-22-213-A-26	LIUAX	40,280-38-355-B-24				
E14AV	7776-18-144-B-7	LUIJO	12,675-25-169-C-				
E13GF	6812-13-184-B-13						
E15DF	4511-13-116-B-17						
Sweden							
SM3AKM	14,418-18-268-B-30						
SM1AQV	4716-18-88-B-						
SM2RF	2293-13-111-B-17						
SM6ID	2145-13-55-A-10						



Multipliers of many W/VE entrants got a welcome boost from contacts with Wyn McGee, VR2CG, shown here with a native Fiji Islander. Wyn reported conditions somewhat different from those in other areas: "28 Mc. was perfect and 14 Mc. almost as good. However, I had extreme difficulty reading weak signals on 7 Mc., due to the high QRN level."

Annual Simulated Emergency Test

(October 11th - 12th)

Your local Emergency Coordinator, as well as your SEC, SCM and affiliated club secretary, has or soon will have complete details and advance instructions concerning the 1952 Simulated Emergency Test. If you are registered in the AREC, you probably already know what plans are being made by your local group for participation. If not, get in touch with your EC, offer your services, register your facilities, and plan to get in on this annual activity, one of the most important of the year from the standpoint of justification of amateur privileges.

If there is no EC in your community, the local club should take action to see that one is appointed so that you can be counted in on the nationwide amateur demonstration of emergency communication preparedness and versatility. Select a qualified ARRL member and recommend him to your SEC or SCM for appointment, but do not wait for the appointment to be made before going ahead with your plans for the SET, and your post-SET plans for emergency coverage in your community. Let us know your plans so that we can rush you a copy of the SET bulletin before the October 11th-12th deadline. Even if you do not get the bulletin prior to the test, go ahead with it anyway. Last year we had reports of participation by 214 amateur groups. The potential is at least seven times that many.

The spontaneity of local organizations for emergency communications is most important. While in some cases it may be necessary to indicate the time of the test rather closely in order to assure participation by local amateurs, individual amateurs generally will have no inkling of their exact part in the test until the day of the exercise. Some ECs who have really live-wire organizations will work out details only with a few top assistants, indicating to others only that the exercise will occur sometime during the week end of October 11th-12th.

This is an ARRL-sponsored exercise, and the dates for it are set by the League. However, if local groups find that they can do a better job of demonstrating and testing with local agencies to be served (Civil Defense, Red Cross, etc.) by choosing the week end before or after (or sometime during the week instead of a week end), this can be considered part of the SET provided it is duly reported as such. We hope that all groups will try to observe the October 11th-12th dates to effect a more emphatic national publicity angle.

Each participating station should originate a message to his Emergency Coordinator, to be sent over the air as part of the local network drill. The EC, at the end of the exercise, will prepare a message to be sent to ARRL Headquarters indicating the calls of every local station who participated, and briefly summarizing the results of the test. Messages from individual participants to Headquarters are not solicited, although the local EC may set the policy in this respect in accordance with his group's wishes.

Emergency Coordinators should also solicit message originations from disaster chairmen of local Red Cross chapters (who will receive prior notification that such a message will be solicited), directors or communications officers of local Civil Defense, and other such officials, to their respective headquarters. That is, ECs will report to ARRL Headquarters, Red Cross people to American National Red Cross in Washington, Civil Defense people to state or FCDA regional offices, etc. Addresses of all FCDA regional and state civil defense offices are listed in the SET Bulletin. ARRL will also be happy to receive messages from public officials such as mayors, governors, police chiefs, etc., if this seems indicated. A liberal exchange of traffic at both local and national level will thus be effected.

It is most important to our reputation as communicators that these long-haul messages be handled promptly and accurately, especially those destined to Red Cross and Federal Government agencies. A simulated emergency message delivered several days after its origination (or not at all) can do more damage than good to the reputation of amateur radio. We therefore call on all amateurs when not occupied in their local test to "turn to" in rendering assistance in seeing that these messages are promptly and efficiently handled, just as we would in a national emergency.

Red Cross stations W3PZA, W6CXO and W9DUA, assisted by numerous local amateurs in their localities, will

be activated and will be considered delivery points to any message to the American National Red Cross. As in previous years, these stations will also assist in relaying or delivering other types of traffic. W6CXO will also originate and solicit replies to and from all West Coast American Red Cross chapters by amateur radio, in a special activity. Stations of volunteer amateurs, clubs, and amateur stations of MARS and the USNR also undoubtedly will be on deck to assist. W1AW and many other Connecticut amateurs will be monitoring the National Calling and Emergency Frequencies and Connecticut Net frequencies to handle traffic to ARRL and to assist as necessary in relaying other traffic. Connecticut net frequencies are 3640 and 3880. Virginia net frequencies (for Washington traffic) are 3680 and 3835. Maryland-Delaware-D.C. net frequencies are 3650 and 3820.

The National Calling and Emergency frequencies are 3550, 7100 and 14,050 for c.w.; 3875, 14,225 and 29,640 for 'phone. These frequencies will be used for calling only. Once contact is made, traffic will be handled elsewhere. The cooperation of all amateurs has been solicited to keep these frequencies clear for this purpose on the October 11th-12th week end.

Nets of the National Traffic System will remain in extraordinary session during the SET, and stations of the National Emergency Net will also be standing by to assist. You be there, too! You will want to be a part of this nationwide demonstration of Amateur Radio's preparedness to handle emergency communications, both locally and nationally. Remember October 11th-12th!

A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers in each W, K and VE call area. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4½ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner. For a list of overseas bureaus see p. 53, June '52 QST.

- W1, K1 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.
- W2, K2 — H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
- W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
- W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
- W5, K5 — Will A. Shaw, W5ARV, 1610 Eighth Ave., Fort Worth 4, Texas
- W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
- W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
- W8, K8 — Norman W. Aiken, W8LJS, 701 East 240th St., Euclid 23, Ohio
- W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wis.
- W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
- VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
- VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
- VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
- VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — W. R. Savage, VE6EO, 329 15th St., North Lethbridge, Alta.
- VE7 — H. R. Hough, VE7HR, 1330 Mitchell St., Victoria, B. C.
- VE8 — Roy Walton, VE8CZ, Box 534, Whitehorse, Y. T.
- KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
- KZ5 — P. C. Combs, KZ5PC, Box 407, Balboa, C. Z.
- KH6 — Andy H. Fuchikami, KH6BA, 2543 Namaou Dr., Honolulu, T. H.
- KL7 — Box 73, Douglas, Alaska

How's DX?

CONDUCTED BY ROD NEWKIRK, * W1VMW

How:

We've all heard a lot about that inevitable statute, the so-called law of diminishing returns. As our 200-country DXers will heartily concur, it can be quite a statistical cross to bear.

The tabulation below will give an interesting illustration of the thing and its irrevocable clutches. Beginning with the postwar DXCC listing in 1947's July QST, we set up from subsequent July Honor Rolls a tally of *new confirmed countries per year* for several of our perennial Century Club Honor Rollees:

	C.W.-PHONE				
	('47-'48)	('48-'49)	('49-'50)	('50-'51)	('51-'52)
W1FH	51	28	16	6	9
W8HGW	70	20	17	15	6
W2BXA	56	35	19	7	4
W3BES	—	37	16	10	11
G2PL	—	30	18	5	10
<i>Average</i>	59	30	17.2	8.6	8

	'PHONE				
	('47-'48)	('48-'49)	('49-'50)	('50-'51)	('51-'52)
W1FH	50	24	17	8	16
W2BXA	—	28	23	15	10
W1JCX	—	13	21	13	16
VQ4ERR	—	28	30	23	18
XE1AC	—	—	32	15	17
W8HGW	—	—	20	21	11
<i>Average</i>	50	23.2	23.8	15.8	14.7

The average figures show that the pinch on 'phone is not yet too severe (and don't ask us if two-tenths of a QSL is okay for DXCC credit). Also, that 1951-1952 was a boom year for new ones, poor conditions notwithstanding. But the c.w.-'phone average is now much less than one new QSL per month — slim pickin's. Of course, one can always change QTH drastically enough to start all over again — *ouch!*

What:

Twenty has held up pretty well during the daytime but you never know what will happen after dark. Whatever does happen happens fast! Temporarily turning his beam by hand, W9HUZ developed his biceps on DU1s EC (14-082), FM (068), MB (087), FK8AE (120), FL8MY (120), FQ8s AK (012), AP (024), HH3L (054), HZ1MY (026), IYCC/Trieste (036), JY1OG (004), KB6AX (040), KC6s DX (032), QY (010), KJ6AR (090), KR6HW (050), KX6AI (042), PJ2s AC (075), AD (062), CC (024), SP2SJ (098), SV8WB (038), TA3AA (022), TF3MB (030), TG9CR (076), VK9DB (057), VP4LO (099), VR2CO (056), VSs IDU (060), 1ER (067), 5ELA, 6BA (076), 6CG (045), ZB1KQ (018), ZESJP (028), ZK1AB (034), ZS7C (008), 4X4BR (058), 4W1MY (113) and 9S4AD (065). ZC2MAC escaped Van's clutches. He understands KS6AA is now QRT and back in Hawaii. . . . CR5JB (054), FP8AP (064), FL8MY, HA5FA, KH6AH/KB6, KH6MF/KB6 (116), MF2AG (075), PJ2CB (095), SU1GG (060), VR2CJ (085), YZAM (073), ZA3KAA (080), ZB2A (040), ZC4RS (055), ZC6UNJ (110), ZD2HAH (068) and ZP9AH (013) fell prey to Elizabethtown's W3MFW. . . . Pending

* DX Editor, QST.

completion of his 300-watter, DL1LQ put six watts on 20 and came up with F9QV/FC (040), YU1AG (050), 5A2CF (040) and sundry others. . . . BIAB (005) on Formosa intrigued KH6PM; W1FTX captured KH6CB/KJ6 (065). . . . Among W8NOH's trophies we find CE4BX (015), F8BGO (028), KM6AX (080) and VP7NM (004). . . . C3s AR (123), MC (030), FL8MY and VS5ELA didn't get away from W5ASG. . . . ZC4RX (095) was a new one at W9NN. Bob has a brand-new DXCC diploma on the wall. . . . W2TKG snagged VP7NT (005), TI2PZ (009) and YS1O (110) while W2EEY collected OX3BQ (054) and PJ2AA (035-095). . . . HC1PM (075), VPs 4LZ (020), 6FL (032) and many others answered W8HEV. . . . W9ALI revamped his beam and it did no harm: FB8ZZ (030), KR6IN, FQ8AG, CR6PI, KG6GX, DU1JI and KA2OM took the bait. . . . W40MW is getting down to business with this DX stuff after sewing up 37 countries fast. He is cheered on by the XYL (W4UTO) and jr. on (WN4UNE). . . . The score is 130 at K2BU after SV8WB, M3US (036), KM6AH/KB6 (041) and FL8MY. . . . W1ONV wonders if ZC4RX might not be ex-SV1RX-G3FNPJ. . . . SD9HF and SL3AU have W6NLJ wondering; W8AIN is pretty sure of HP1BR (010), KM6AX (050), OA4D (095) and KA2CC (220). Don swooped on CE3HL 'way up at 14,325 kc. . . . Six FP8s, CE4AD (020), CN8s BL (005), FR (085), GL (045), FF8AC (055), IYCD/Trieste (040), OX3BQ (095), TF3SF (050), VK9XK (015), YU4BN (010) and many others tangled with W8HJK's 100 watts and long wire. . . . W4EV is now set up as W8EV. Ben notched a 60-watt WAC in 2:30 hours — DL3DF, 4X4BR, KH6FAA, EA8BE, LU1QE and TG9AQ, the sextet. . . . At W6OKK we find a nice assortment topped by CP1BK (050), VP1AA (005), VR2AS (072), ZK2AB (100), a KJ6 and an FK8. . . . W6EAY was among the fortunates to snag VS5ELA. Eric also added SPs 2KGA, 6RX (030), VS1ER and 5A2TZ. . . . FN8AD, many Oceanians and AP2L (045-065 QRH) grabbed KL7PI of Juneau. . . . West Gulf DX Club's *DX Bulletin* has this activity recorded: CP1BX (020), CRs 4AG (067), 7CK (115), 7CR (026), 9AF (077), CU3YU (060), DU1s DO (094), 1GT (048), EA8s BC (065), BM (001), EA9s AF (092), AP (002), BD (090), EA6AM (045-085), EA8AD (080), ET3R (050), FB8s BB (067-110), BE (040-100), FF8s AG (040-080), AQ (050), JC (020), FK8AI (034), FM7s WF (010-





Members of the Navy Mike and Key Club in the Far East — gathered here at JA2KW, Yokosuka Naval Base — are (front, l. to r.) W0CMU, W0TFW, W1GO, W4RW0, W4IA, W6QOY; (rear) W0BDA, W0AEK, W3FQS, W4PJM/JA2MB, W3KYF/JA2WK, W9-BUR/JA2VP, JA2KW, and JA2SM. Club officers are W6QOY, president; W4PJM, vice-president; and W3-KYF, secretary-treasurer.

080), WH (037), FO8s AB (123), AC (030-082), FR7ZA (020), F77s YB (022), YC (026), GD3UB, HB9LAA (070), 15A (015), IS1CXF (068), KAs 2FC (067), 8AB (064), KH6ADC/KH6 (034), KS6AA (024), LU4ZI (052), LZ1KAB (072), OQ5RA (082), OYZZ (000-015), SP3 PF (047) 9KKA (052), SU5s CC (042), BM (100), TF3AB (068), VKs 1EM (060), 1PN (086), 9RM (042), 9XK (049), VP3 2MD (050), 3TY (020), VQs 3BM (054), 4BU (097), 4CR (080), VQ8s AP (019), CA (018), CB (100), JG (046), VR2BG (034), VSs 2CR (059), 6AE (047-115), 7NX (003), 7YL (052), 9AW (112), VU7FK (099), YUs 1DA (068), 2CL (017), 7DG (073), ZB2I (080), ZDs 4AB (035), 9AA (032), ZE5JJ (027), ZP5CL, ZSs 2MI (080), 3HX (060), 7D (084), 4X4s BN (005-050), BX (024), DK (039), RE (022), 5A2s TB (046), TS (040), 5A3TA (050) and 9S4AX (007).

Twenty 'phone niceties mentioned by W5KUC & Co. are EA8AW (288), EL9A (320), FA3DS (325), FB8AK (170), FF8CJ (255-280), FL8MY (121), FQ8s AD (220), AS (205), FR7ZA (002), HZ1SD (235), IT1s BXX (183), CDS (255), SEM (180), JY1OG (140), KA0IJ (260), KB6s AO (242), AX (205), KC6QL (210), W5MUP/KS6 (210), KW6BE (275), KX6As (290), LX1DU (290), MI3s AB (340), LK (140), RC (210), UG (200), VG (150), MP4BBI of Bahrain (270), OE13AL (020), PJ2CA (240), SP9KKA (140), ST2NW (140), SUs 1AS (180), 5CC (200), 5EB (205), SV0WT (140), TA3AA (250-318), TF5SV (135), VKs 1PN (120), 9YT (325), VQs 2DT (150), 3CH (090), 5BQ (210), 5CY (260), 5DQ (120), VRs 1B (148), 3C (140), VSs 1AA (160), 1AD (305), 1DQ (182), 2CB (170), 2CY (156-182), 2DB (160), 7WE (186), 9AW YA5XY, YI2FD, YUs 1AC (180), 1AG (240), 4BN (165), ZCs 4DT (192), 6UNJ (118-235), ZDs 2TTE (190), 4AX (215-250), 4BC (130), 4BF (130), 6EJ (200), 6JL (185), ZE3JY (320), ZKs 1BC (313), 2AA (175), ZD9AA (150), 3V8AS (210-320), 5A2s TD (340), TO (320) and TW (160-310) ----- W4NYN's DXing is restricted to week ends but that doesn't slow him down much: CR6AC, KW6AZ (230), ZD6HJ, ZP5s CB (155), EQ (155) and 4W1MY (018) were worked. Jack assembled a WAC in one Saturday afternoon sitting ----- OX3s BD (340), BQ (260) and MW (130) worked W4RNP; W8NOH clicked with YS1A, a country he

couldn't flag on c.w. W9KAS has a 99/80 total — it shouldn't be long now! Glen picked off CN8FR, DU1AP, H18WF, HZ1TA (115), KAs 2GU 7RW 0IJ (260), KJ6AW (287), KT1s DD PU, KW6BD (238), KX6AR, VPs 2AF (100), 3LF 4LL 9HH, VK9YT (325), VR2AP (140), TA2EFA (340), YI3BZL (200), ZB2A (195) and ZC4RX.

The summer lull should be nearly over so far as other bands are concerned. Forty got hot enough for W3MFW to nab Cayman Islander VP5BH (7007) and VR2CO (070) ----- KH6ARA (009), worked by W2EEY, turns out to be ex-W2AIS ----- F8PAK told W4RNP about F8PAP (032); HC1JW (048) and ZL4CK broke in W9LMC's new r.f. section ----- W9ESQ wasn't phased by the QRN. Lou cornered EI2Z, CE3BM, KV4AE, VP8AJ and others ----- One ZK3IMZ tickled the fancy of W1T5Z. Walter thinks more of VP4LZ (003) ----- W2FJF hooked his QRP 117L7G c.c. oscillator to a 45-foot piece of wire and raised F7BAK (W2BBK) without fuss ----- W2EIK was DJ1CZ's first across-pond contact.

If you're a regular on ten you've undoubtedly bumped into W2ZXM/MM. Ed Collins of ARRL Hq. dug this pitch on Kurt's *Flying Enterprise II* layout: A 6A Q5s-807 exciter drives p.p. 4-250As with Class B 4-250As modulating. The Captain receives with an FB50-D and HQ129X. A 5-Kw. a.c. generator contributes the power and the antenna is a 3-element close-spaced rotary. W2ZXM/MM intends to give Rothman's modulation circuit a try soon.

Fifteen could level off for some consistent performance right about now. W4UGT decided that 21 Mc. would be a good band a feller might use to crack this DX game. Wayne scored with CN2IP, PY2AQ, G6GN, LUs 1EP and 8EE right off the bat ----- CE3AX, KC6QY, KH6RU, KG4AF, KV4AA, HP1BR, OA4C, W2AIS/KH6, ZLs 1HY 2CW 3IA, VKs 3FH 4AP and 4ZB were quickly clobbered by W6AM. Chas of W1AW put up a vertical 2-element collinear and here's who came back, but quickly: GC3EML, LU9AX, ON4IL, KT1UX, PA6s ALO SPR and ZB1BM. VS6AC (21,057) was heard but not worked.

Where:

Since the powers that be got around to legalizing ham radio for JAs (Japanese nationals), QSLs may be sent via JARL, P. O. Box 377, Tokyo ----- If better addresses are not at hand, W3MFW advises that any KB6s will get their cards if sent to KB6-so-and-so, Canton Island, Phoenix Group, South Pacific ----- In addition to the QTH roster to follow, these stations desire QSLs via RSGB: HZ1TA, JY1OG, MF2AG, SU1XZ, VU7FK, YI2AM, YI3BZL and 3A2AL.



Here's how Bill Storer whiled away the hours on Macquarie Island as VK1BS. Baby, it's cold outside! (Photo courtesy W5KUC, W6DXC)

- AP2L Box 151, Karachi 1, Pakistan
- B1AB Box 346, Taipei, Formosa
- C3AR C. L. Terrel, MSA, APO 63, % PM, San Francisco, Calif.
- C3MC (ex-C3JK) Box 419, Taipei, Formosa
- CR4AH Nuno Pinheiro, Sal Airport, Cape Verde Islands
- CR5UP (QSL via W4PJD)
- CR6BZ Antonio, Box 378, Luanda, Angola
- EA0AD Box 195, Santa Isabel, Fernando Poo Island, Sp Guinea
- FB8BB (QSL via WINWO)
- FF8AN Marcel Verber, Box 971, Dakar, Fr. West Africa
- FF8AQ Emile Henry, Aerodrome de Tessalit, via Gao, Sudan
- FF8AS (QSL to FF8AN)
- ex-FF8MH P. O. Box 476, Pointe-Noire, Fr. Equatorial Africa
- FP8AI (QSL to VE3BJD)
- FP8AJ (QSL to VE3CCK)
- FP8AP Gus Roblot, Box 192, St. Pierre & Miquelon
- FP8AQ (QSL to W2ZBO)
- FU8AC Vincent Fousagrive, Port Vila, New Hebrides
- KA3CR APO 47, % PM, San Francisco, Calif.
- KC6DX (QSL via W4LRO)

KH6ARA (ex-W2AIS) Pat Miller, 283 Awakea Road, Lanikai, Oahu, T. H.
 KH6CB/KJ6 Bill Chamberlain, 5106 Kalaniana'ole Highway, Honolulu, T. H.
 KR6HX (W9FNB) Phil S. Bengston, Okinawa Ionosphere Station, 9465th TSU, Signal Corps, APO 331, % PM, San Francisco, Calif.
 KW6BD % CAA, Wake Island
 ex-LJZZ (W5QML/4) Lt. Col. Chas. E. Spitz, 1420 S. Randolph St., Arlington, Va.
 ex-MT2E (ex-VS9AO) H. Orrell, % Cable & Wireless Ltd., Benghazi, Cyrenaica, Libya
 OQ5GU (ex-ON4DB; QSL via OQ5RA)
 P72AA (QSL via PA6FD)
 PR9VDZ Peter, Marines Camp Suisant, Curacao, N.W.I.
 ex-PK4PH (ex-PK3PH) P. Hof, % Mr. Halbe, Binnertsstraat 24, Heerenveen (Fr.), Netherlands
 ex-VK1NL (QSL via VK3XO)
 VK9YT (QSL via W8URV)
 VP2MD (QSL via W2BUV)
 VP4LO 65 2nd St., Mt. Lambert, Trinidad, B.W.I.
 ex-VP5BN Don E. Squire, % Victor Squire, Corona 163, Santiago de Cuba, Cuba
 VP8AJ (QSL via W5GEL)
 VR2CO Nadi Airport, Fiji Islands
 W5AGB/FM P. O. Box 143, Oakdale, La.
 ZB2A Alen, Rm. 4, New Camp, RAF, Gibraltar

W1s APA FTX IKE MCW RWS VG, W2s BXA CJX EBY RA, W3MFV, W6OKK, W8NOH, W9s CFT HUZ KAS OLU/4, W9IUB, KL7PI, OQ5RA, NCDXC DXer, WGDXC DX Bulletin and OVSV's OEM generated the preceding gist.

Tidbits:

Asia — Zowie! Y13BZL knocked off a WAS in just 4:02 hours. Johnny's letter to W8AJW advises all QSLing to YI stations be done by other channels than direct, Iraq being under martial law at this writing. Y13BZL, through the efforts of three ops, was on the air almost around the clock. Chief operator G3BZL is slated to return to England this month and intends to be quite active there. His Iraqi layout included an 813 final modulated by T740s; a Ven did most of the radiating. Drop G3BZL a line if you have Y13BZL inquiries VS5ELA (W8ELA) got on the air in Brunei only after surmounting untold obstacles. Clyde's Sarawak plans were jolted by the state's declaration of emergency provoked by civil unrest. This notwithstanding, well done! KL7PI notes that FN8AD's secondary hobby is mountain climbing ZC6UNJ's QTH has a Biblical backdrop. Through the shack windows he can scan the Holy City, the Mountains of Moab and the Dead Sea. Bill's 21-Mc. ambitions will be satisfied upon arrival of proper coils for the HRO 4X4AB left Tel-Aviv for a Stateside visit and spent some entertaining hours with W9s FDX and ONY of Milwaukee's MRAC gang Another gripe is registered against the prevalent strictly north-south skip by 4X4CW. Ozy is a bit weary of working only Africans G3FNN relays some HZ1MY remarks: Dick's latest 4W1MY stop-over netted him 632 contacts as against only 160 at FL8MY. Although conditions were worse in Yemen, the pile-ups were much more orderly. The fact that he maintains a little black book really got around the grapevine fast! The gang awaits his VQ6MY trip Through W9FKC, AP2N regrets that August's page-58 photo caption should have read VU2DY, not

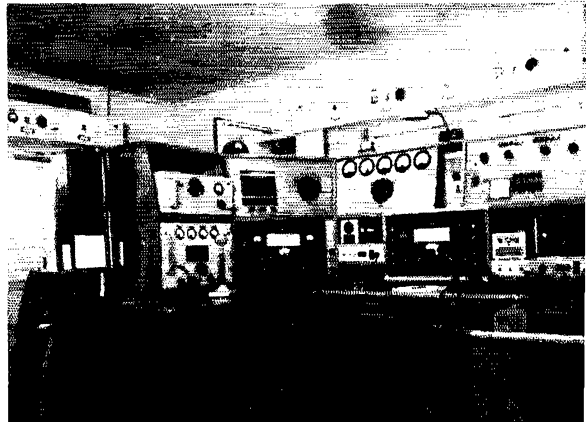
VU2DY Ex-JA2CV-JA3AK is now W5FTU/4 at Maxwell AFB, Ala. Jack Paddon, VE1OU, formerly of ARRL's Hq. staff, dropped an intriguing line to WIBUD. Therein he reported evidence which he believes indicates the well-being of that famed rare-DXer, Reg Fox of AC4YN — at least as of early Spring, 1951. As you know, rumors had flown thick and fast concerning AC4YN's fate at the hands of Tibet's new red regime. In *The Explorer's Journal* of The Explorer's Club, New York, a paper by Prince Peter of Greece and Denmark reads, in part: "The good services of Mr. Reginald Fox, Director of the Thibetan Government Wireless Service were enlisted . . . grateful we were for Mr. R. Fox's willingness to help." The Prince was researching on anthropology in the Himalayan area Formosa's C3AR is also SV0WU now and then, as well as W8SCG and W9KSG. He really flits around! Previously, the calls W3JMR, W8BPR and W8CBE were held Ex-PK3PH-PK4PH is now prepared to QSL his N.E.I. QSOs. Ship full data to the "Where" address The recent re-do on Japanese licensing put the snag on W4VE's KA9AA intentions. Doc should be licensed and going strong by the time you read this, however. His XYL has joined him in Japan, advises W9OLU/4 Ex-MT2E made five QSOs from the island of Karaman, Red Sea, while signing VS9AO. One of the lucky guys was W7GU.

Africa — OQ5RA almost dropped his uppers when, perusing the Belgian Congo Telecommunication Service's latest ham-regs reprint release, he found that the 80-meter band allocation had been omitted. Andy got off a fast letter to the Director and straightened him out — OQ5RA means to give 3.5 Mc. the works this season OQ5VN and FD8AB are QRT for vacations in Belgium and France, respectively. OQ5GU is a new contest man in the Congo FB8BE formerly signed FB8BD and EA0AD now has the same mail QTH as EA0s AB and AC CN2AS is ex-EK1RR; I5OC has been active at times in Italian Somaliland An original dispenser of Dakar contacts, ex-FF8MH is now ensconced in central (French Equatorial) Africa. W1APA hears Henri is on with au FQ8 label pronto Butch Orrell, ex-MT2E, is now doing an encore in northern Africa. Back in Benghazi now, he expects to be radio-active by Christmas WGDXC gleanings via W5KUC/UCQ facilities: VQ6BFC is rumored available. FF8AC uncorked 1200 QSLs from his French home QTH. FF8AE returned to France temporarily but FF8AQ has a c.c. 25-watter fired up. ZS6GV may sign a ZD7 call early this month with 50 watts c.w. and 'phone, all bands. VQ4BU intends VQ3 activity and VQ4RF has sights set similarly for ZD8. G2RO wants to know something re FR8OK.

Oceania — KM6BB pulled out of Midway, became KM6BB/W6 for a while and then headed for the Middle East on an unusual assignment. He was a member of the crew that flew a specially appointed and procured plane to Arabia for delivery to King Ibn Saud. Among the elaborate dressings aboard are a revolving throne and an on-board elevator. George will shortly be signing an M13 call Shipping out of Honolulu as radiop for MSTs, KH6CB gets a chance to hit the rare spots. His last work ashore on Johnston Island produced an even 100 contacts, 63 of them Wa. Bill previously signed W1PHJ/KH6/KJ6/KX6 and he'll continue to make the rounds out that way. KH6CB, as W1PHJ, originated and conducted the "Radio Code School of the Air" over WRUL. He also did a trick at WCOP.

(Continued on page 138)

That thumping signal of ZL1MP takes off from this shnazzy layout on North Island, N.Z. (Photo courtesy W6EAY)



An Antenna Coupler for 50 Mc.

Adapting Standard Coupling Methods to 6-Meter Operation

UNTIL recently v.h.f. men have had little use for antenna couplers. It was possible to put power into their arrays satisfactorily without them — why bother? TVI problems have begun to change this attitude, however, and the imminence of u.h.f. TV makes the use of something more than simple inductive coupling almost mandatory. Shielding, filtering and the use of low-pass filters and antenna couplers will become fashionable in v.h.f. circles as soon as u.h.f. TV receivers find their way into our neighbors' homes.

To keep down harmonic radiation, at least two steps are necessary. First, the equipment must be shielded, to prevent radiation of harmonics by the tank circuits themselves. Then the output of the transmitter must be fed through some sort of selective circuit or combination of circuits that will pass the desired frequency and reject the harmonics. In the case of operation on 50 and 144 Mc., a simple antenna coupler may be all that is required with a shielded transmitter in many cases, as the order of harmonics that can cause interference to either v.h.f. or u.h.f. TV is fairly high.

A suitable antenna coupler for 144-Mc. use was described by W8DUL in *QST* for January, 1952. It and the one for 50 Mc. shown herewith follow standard practice outlined many times before in *QST* and the *Handbook*, so only the basic details are given here. The 50-Mc. coupler

is connected to the transmitter output by means of a coaxial line of any convenient length. The coupling loop L_2 , should have a reactance at the operating frequency of approximately the impedance of the coaxial line from the transmitter. It is resonated by means of C_2 , which in this unit runs at about 25 per cent of maximum

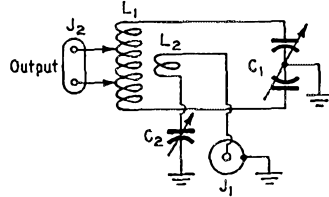


Fig. 1 — Schematic of the 50-Mc. antenna coupler.

- C_1 — 50- μ fd. per-section (National TMK-50D).
- C_2 — 50- μ fd. variable (Hammarlund MC-50M).
- L_1 — 6 turns No. 12 tinned, 2-inch diam., spaced $\frac{1}{4}$ inch. Tapped at 2 and 4 turns.
- L_2 — 4 turns No. 16 tinned, 1-inch diam., spaced $\frac{1}{4}$ inch. (B & W Miniductor No. 3013). Mount inside of L_1 .
- J_1 — Coaxial fitting.
- J_2 — Crystal socket.

capacitance. The taps on L_1 are set up for 300-ohm line, but their position may be varied to take care of any balanced transmission line.

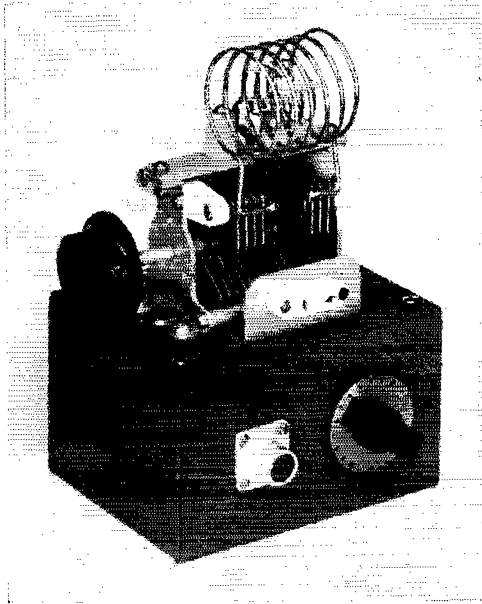
A standard $3 \times 4 \times 5$ -inch utility box makes a convenient base for the coupler, the principal components mounting on the top plate. The series-tuning condenser and the coaxial fitting are mounted on the side panel. The ends of L_1 are soldered to the lugs on the main tuning capacitor, and the coupling loop is supported by stand-offs fastened to the strap that ties the two end plates of the tuning condenser together. The leads from the input jack are made of 72-ohm transmitting Twin-Lead.

The antenna coupler should be adjusted for minimum standing-wave ratio on the coaxial line, as indicated on an s.w.r. bridge¹ connected between the transmitter and the coupler. Adjust C_1 , C_2 and the positions of the taps for minimum s.w.r. If no s.w.r. indicator is available, adjust first C_2 and then C_1 for maximum loading, varying the coupling at the transmitter end for the loading desired. The approximate position for the taps can be found by moving them out from the center of the coil until maximum loading is achieved.

The coupler can be used at any point between the transmitter and the array, including mounting the coupling unit at the array itself, if provision is made for weatherproofing the installation. The range of the tuned circuits as given is great enough to permit the use of the coupler in the 28-Mc. band also, if the builder so desires.

(Continued on page 132)

¹ ARRL *Handbook*, 29th edition, p. 487.



The 50-Mc. antenna coupler is mounted on the top plate of a standard utility box, with the series-tuning capacitor inside.

The World Above 50 Mc.

1215-1300

2300-2450

3300-3300

5650-5925

10,000-10500

21,000-22,000

50,000-9

CONDUCTED BY E. P. TILTON,* WHDQ

August in Review

It was 18 years ago almost to the day, as we write, that the late Ross Hull embarked on the project that was to result in a complete overhauling of thinking in regard to wave propagation on the frequencies above 30 Mc. Ross got his urge to try out directive antennas on 56 Mc. in August of 1934, and he ran smack into the peak inversion of the year the very first time he tried out his famous stick-and-wire array strung between the trees at Selden Hill.

To him, as to everyone then on 5 meters, it appeared that the array had worked nothing short of a miracle, for here were solid S9 signals between Boston and West Hartford, an unheard-of thing in those days of 10-watt oscillator rigs, one-tube superregenerative receivers and halfwave vertical dipoles. For days and nights on end, Ross and his associates at Headquarters knocked themselves out working Eastern New England W1s by the dozen, until one night suddenly there were no signals coming through, beam or no beam. Why?

This sudden interruption of reception was even more of a challenge to Ross' inquiring mind than had been the first flush of success. With characteristic enthusiasm he embarked on a two-year program of signal observation and recording that led to his development of the theory of air-mass boundary bending of v.h.f. waves — perhaps the finest example of scientific investigation ever to be performed by a radio amateur.

In the years since, the closing days of summer have never failed to provide v.h.f. operators something of a thrill that the 5-meter gang experienced for the first time back in 1934. So it was in August, 1952. There had been widespread griping by the v.h.f. fraternity over the poor conditions encountered earlier, but as the month came to a close it seemed to be making up for the shortcomings of the first half of 1952.

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

Officials at the 2 Meters and Down Club picnic, Los Angeles, July 27th. *L. to r.:* Brown, W6KYN, secretary; Reinsch, W6RJS, vice-president; Myers, W6IHK, 2-meter net control; Bodine, W6LJO, treasurer; Wing, W6MVK, past-president; Miller, W6VBC, president; Greenlee, W6ESR, ARRL SCM; Griggs, W6KW, ARRL director.



It takes a real bang-up opening to push 2-meter signals over the Allegheny Plateau that lies between the 2-meter activity centers of the East and the Great Lakes area, but this path is broken down a few times each year, usually in late August or early September. This year it happened on Aug. 26th. It's too early to give complete details as we write, but the report of W2UK, New Brunswick, N. J., shows what was going on. Tommy began by working W2TSY, Pine City N. Y., near Elmira, a rough 160-mile path, early in the evening. Later W2ORI, Lockport, N. Y., W3QKI, Erie, Pa., and W8SFG, Hubbard, Ohio, were worked, and W2RPO near Buffalo was heard. Then just after 11 P.M., W8BFQ, Everett, Ohio, began to roll in S9-plus. Margaret was busy until the early-morning hours, providing Ohio contacts for scores of eager W2s. K2AZ, near Mays Landing, N. J., worked W8BFQ and W8ELT in Detroit, and heard eight other Ohio, Michigan and West Virginia stations.

1200 Miles on 144 Mc. — New 220-Mc. Record — 500 Miles on 435 Mc.!

Just as this issue of *QST* was going to press a series of v.h.f. openings got underway that promises to break all records for numbers of stations active and areas covered. Beginning the night of Sept. 7th, the 2-meter band went on a rampage from Minnesota to Texas, spreading out to the northeast the following two days and nights. Literally hundreds of contacts out to 1000 miles and more have been reported already, with the best DX so far being W0EMS, Adair, Iowa, to W1RFU, Wilbraham, Mass., close to 1200 miles.

At 9 A.M. on the 9th, W8BFQ, Everett, Ohio, and W1HDQ, Canton, Conn., worked two-way on 220 Mc., a new record distance for that band, about 450 miles. On the morning of the 10th, W8BFQ heard the 435-Mc. signal of W2QED, Seabrook, N. J., but Ken was not able to hear her for a two-way 420-Mc. record. The opening was still in progress at press time.

On the night of Aug. 28th, F8IH, Algiers, had a one-hour crossband QSO, 435 to 144 Mc., with F9BG, Toulon, France, a distance close to 500 miles. Details next month.



New England was on the edge of this one, and the only W1 known to have worked the W8s was W1PBB in Monroe, Conn., who caught W8BFQ and W8SFG. W1RFU, who holds forth in one of New England's best v.h.f. spots, the top of Wilbraham Mountain, near Springfield, Mass., heard W8BFQ but could not raise her.

This end-of-August opening was associated with a large and stable high-pressure center as it moved slowly across the eastern half of the country. It was blanketing the Atlantic Seaboard by the 27th, and 144- and 420-Mc. enthusiasts along the coast experienced a night that they will long remember. From Massachusetts to North Carolina, everyone was working out on 144 Mc., and there were several near misses on the 420-Mc. record. W2EH, Collingswood, W2BLV, Haddon Heights, W2HEK, Woodstown, and W2QED, Seabrook, N. J., were all putting good signals into W1 on 420. W1PBB worked W3BSV, for their first 420-Mc. two-way, only a few miles short of the existing record, and heard W3RE, near Washington, at just the record distance. The inversion was still hanging along the coast as this copy was turned in, and it is known that W2BV and W2NLY worked W4CVQ, Raleigh, N. C., on the 28th. There may be more coming up; Labor Day week end is well known as a time for things to happen in v.h.f. circles!

W0ZJB.....48	W41UJ.....38	W8LBH.....39
W0BJV.....48	W4BEN.....35	W8BFQ.....39
W0CJS.....48		W8LPD.....37
W5AJG.....48	W5VY.....48	
W9ZHL.....48	W5GNQ.....46	W9ZHB.....48
W9OCA.....48	W5MJD.....48	W9QUV.....48
W6OB.....48	W5ONS.....45	W9HGE.....47
W0INI.....48	W5JTI.....44	W9PK.....47
W1HDQ.....48	W5ML.....44	W9VZP.....47
	W5JLY.....43	W9RQM.....47
W1CLS.....46	W5JME.....43	W9ALU.....47
W1CGY.....46	W5SFW.....43	W9UTA.....45
W1LLL.....45	W5SVV.....42	W9UNS.....45
W1HMS.....43	W5FAL.....41	
W1LSN.....42	W5FSC.....41	W9QIN.....47
W1DJ.....40	W5HLD.....40	W0DZM.....47
	W5HEZ.....38	W0NFM.....47
W2AMJ.....46		W0TEX.....47
W2RLV.....45	W6WNN.....48	W0KYF.....47
W2MEU.....45	W6UXN.....47	W0HVV.....45
W2IDZ.....45	W6ANN.....45	W0MVG.....44
W2FEJ.....41	W6TMI.....45	W0JOL.....44
W2GYV.....40	W6IWS.....41	W0JHS.....43
W2QVH.....38	W6OVK.....40	W0PKD.....43
W2ZUW.....35		W0IFI.....41
	W7HEA.....47	
W3OJU.....45	W7ERA.....47	VE3ANY.....42
W3NKM.....41	W7BQX.....47	VE3AET.....38
W3MQU.....39	W7FDJ.....46	VE1QZ.....34
W3JVI.....38	W7DYD.....45	VE1QY.....31
W3RUE.....37	W7JRG.....44	CO6WV.....21
W3OTC.....35	W7BOC.....42	XE1GE.....19
	W7JPA.....42	
W4PHH.....46	W7FIV.....41	
W4EQM.....44	W7CAM.....40	Calls in bold-
W4QN.....44	W7ACD.....40	face are holders
W4FWH.....42		of special 50-Mc.
W4CPZ.....42	W8NSS.....46	WAS certificates
W4PLW.....42	W8NQD.....45	listed in order of
W4MS.....40	W8UZ.....45	award numbers.
W4OXC.....40	W8YLS.....41	Others are based
W4FNR.....39	W8CMS.....41	on unverified re-
	W8RFW.....41	ports.

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

The Purple Glow V.H.F. Club of Albuquerque, New Mexico, is planning another balloon test in cooperation with Air Force MARS. The PG-2, carrying a crystal-controlled c.w. transmitter operating on 143.99 Mc., will be launched on October 25th. The signal will be keyed continuously at slow speed using the call AF5CA and a three-letter cypher for identification. Launching time will be 7:30 P.M. MST, and an easterly drift of 20 to 24 hours duration is anticipated. All 2-meter operators are requested to watch for the balloon transmissions and report reception details to W5CA, Tijeras, New Mexico.

While there is plenty of 2-meter activity around the New York area in the evening hours, W2MWK, Woodside, N. Y., would like to stir up more in the daylight hours. To this end, he schedules W2AA Y daily at 10:30 A.M., and

would welcome calls from others who have daytime operating hours.

220 and 420 Mc.

Things are beginning to roll on 220 Mc., and we can thank the Technicians for this. Their interest and activity have provided the push to get some of the rest of us started, and new activity reports are coming in from many sections of the country. W5WCJ writes that at least three fellows are working on 220 in the New Orleans area regularly, and looking for more company. W5NSJ, Algiers, La., has an 829B running at 50 watts input, feeding a 16-element array. W5UDL, Harvey, La., runs an 832A at 25 watts, with a 4-element beam. W5WCJ has a pair of 24Gs running 120 watts, and a 16-element array. If there are others within working range of New Orleans who are interested in 220 Mc., these boys would be glad to hear from them.

W4HHK, Collierville, Tenn., is getting set for 220 again, in the hope of working down to the Texas 220-Mc. stations. Paul has a rig with an 832A in the final, a 6J6 preamplifier — HFS combination for receiving, and was working on a 32-element array at last report. W5RCI, Marks, Mississippi, Paul's partner in the 220-Mc. venture, has an 829B rig ready to go. He reports fairly frequent reception of Channel 13 from Birmingham, Ala., so it appears that 220-Mc. DX should be possible. The first W4HHK-W5RCI 2-way on 220 Mc. was made on August 26th, with 89 signals. They worked again next morning and noon, though with weaker signals.

W4HHK, W4BYN and W5RCI are also on 420 Mc. With the aid of W4HHK's 420-Mc. converter, W5RCI has worked W4BYN crossband, 144 to 420 Mc. The distance is about 60 miles. W5RCI has a 16-element aluminum-welded array. W4BYN has an 832A final amplifier and a 16-element array.

Pressure from the boys who work both 144 and 220 in the area around Cleveland, Ohio, got W8DX, Detroit, Mich., started on 220. He has an 829B running 60 watts input, phase modulated, and a 16-element array. His receiver uses two 6BQ7 parallel-connected cascade stages, a 6BK7 mixer-cathode follower and a 6U8 overtone oscillator and harmonic amplifier giving 25 times multiplication of the crystal frequency. His first night of 220-Mc. activity in late July netted him contacts with W8s JWS, Parma, Ohio, IJG, Cleveland, IY, North Olmstead, WJC-BFQ, Everett, and FKC, Hudson, distances up to 125 miles. Next stop (he hopes) is W8WRN at Columbus. W8DX is also working on 420-Mc. TV gear.

Keeping regular schedules pays off in contacts on 420 Mc., too. During the month of July, W2QED, Seabrook, N. J., had 43 QSOs with 9 different stations in 5 states, and the August record is running ahead of this as we write. Ken is on 435.6 Mc. each Tuesday, Thursday and Saturday from 10 P.M. on, and he makes it other nights when conditions appear promising. W3KFM and W3JPK of Baltimore are on nightly from 10 to 11 P.M. W3KFM now has a 9903 in the final stage delivering about 10 watts output. W3RE is back on from his new home near Washington with a 4X-150 transmitter.

W5ONS, Victoria, Texas, the southern end of the 220-Mc. record, is now operating on 420 also, using a 9903 as a tripler to 432.3 Mc. His 5-over-5 array is about 55 feet above ground level.

Just too late for inclusion in last month's column, we received word from W5AYU, Houston, Texas, that he had made contact crossband, 432-144 Mc., with W5AXY at Austin, 150 miles. W5BDT at Austin and W5ONS have also heard snatches of W5AYU's 432-Mc. signal on several occasions. The first 432-mc. 2-way W5AYU-AXY contact was made early in the morning of Aug. 25th. W5AYU heard W5ONS for the first time the same morning.

W5AYU has an interesting receiver combination. He uses a 6AN4 grounded-grid r.f. amplifier with a half-wave trough-line plate circuit, tuned at the open end by a Johnson 5M11 miniature variable. The trough is 1½ inches wide, 2 inches deep and 5½ inches long. The plate line is made of 3/16-inch copper tubing, with voltage fed in at 1½ inches from the tube end. The signal is capacity coupled from the line 2¼ inches from the plate end to a coaxial-line 1N21B crystal mixer. The mixer line is 5 inches long and 1 inch in diameter, with ¼-inch tubing for the inner conductor, the coupling connection being 1½ inches from the shorted end. The crystal taps 1 inch up the line. The i.f. is 8 Mc. A doubler stage in the mixer-injection chain operates 212 to 424 Mc., and the 212-Mc. energy serves as an injection source

2-METER STANDINGS

Call			Call		
States	Areas	Miles	States	Areas	Miles
W1HDQ	.....16	6 650	W5ONS	.....7	2 950
W1IZY	.....15	6 750	W5SWV	.....7	2 —
W1MNF	.....14	5 600	W5FBT	.....6	2 500
W1BCN	.....14	5 580	W5IRP	.....6	2 410
W1DJK	.....13	5 520	W5FSC	.....5	2 500
W1CTW	.....12	4 500	W5DFU	.....5	2 275
W1KLC	.....12	4 500	W5JLY	.....4	2 650
			W5POG	.....4	1 450
W2BAV	.....21	7 1175			
W2NLY	.....18	6 795	W6ZL	.....2	2 1400
W2PAU	.....16	6 740	W6WSQ	.....2	2 1390
W2AZL	.....16	6 —	W6PJA	.....2	2 1390
W2UK	.....15	6 —	W6GCG	.....2	2 210
W2SFK	.....13	6 —	W6EXH	.....2	2 193
W2DFV	.....13	5 350	W6ZEM/6	.....1	1 415
W2CET	.....13	5 405	W6GGM	.....1	1 300
W2DPB	.....12	5 500	W6YYG	.....1	1 300
W2QED	.....12	5 540			
W2FHH	.....12	5 —	W8WJC	.....21	7 775
W2QNZ	.....12	5 —	W8BFC	.....21	7 775
W2BVU	.....12	4 260	W8WRN	.....19	7 670
W2ORI	.....11	6 620	W8XV	.....18	8 1200
W2UTH	.....10	6 —	W8UKS	.....18	7 720
			W8EP	.....17	7 —
W3NKM	.....19	7 660	W8WSE	.....16	7 830
W3RUE	.....18	7 760	W8RWV	.....16	7 500
W3QKI	.....17	7 920	W8BAX	.....15	6 655
W3KWL	.....15	7 560	W8FQK	.....13	7 —
W3LNA	.....14	7 720	W8DX	.....13	3 —
W3CKP	.....14	6 650	W8BLN	.....12	6 680
W3OWW	.....13	6 600	W8CYE	.....12	6 —
W3KUX	.....12	5 575	W8CPA	.....12	— 650
W3PGV	.....12	5 —			
W3LMC	.....11	4 400	W9FVJ	.....20	7 790
			W9UCH	.....20	7 750
			W9SUV	.....19	7 —
W4MKJ	.....16	7 665	W9EQC	.....19	7 820
W4HHE	.....15	6 690	W9BOV	.....15	6 —
W40XC	.....13	7 500	W9WOK	.....15	5 690
W4JDN	.....13	6 —	W9MBI	.....14	—
W4JFV	.....13	5 830	W9AFT	.....14	—
W4IKZ	.....13	5 650	W9UIA	.....12	7 540
W4JFU	.....13	5 720	W9GTA	.....11	5 540
W4CLY	.....12	5 720			
W4JHC	.....12	5 720	W9EMS	.....15	6 1080
W4OLK	.....12	5 720	W9IHD	.....15	6 725
W4FJ	.....12	5 700	W9NFM	.....14	7 660
W4LRR	.....5	2 900	W9ZJB	.....12	7 1097
			W9WZ	.....11	5 760
			W9HX	.....8	3 —
W5JTI	.....14	5 670	W9JHS	.....7	3 —
W5QNL	.....10	5 1400			
W5CVW	.....10	2 1180	VE3AIB	.....12	6 600
W5MWV	.....9	4 570	VE1QY	.....11	4 900
W5AJG	.....9	3 1260	VE3BOW	.....8	5 520
W5ML	.....9	3 760	VE3BQN	.....7	4 540
W5EKD	.....8	3 570	VE3TN	.....7	4 480
W5ABN	.....8	2 780	VE3BPB	.....6	4 525
W5VX	.....7	4 —	VE3AQC	.....6	4 520
W5VY	.....7	3 1200	VE3DER	.....6	4 450
W5FEK	.....7	2 580	VE3EAH	.....5	4 380

for a 220-Mc. converter using the same i.f.
 There is continued interest in amateur TV on 420 Mc., and some discussion of the formation of an amateur TV society to aid in exchanging ideas among interested experimenters. The TV enthusiasts are scattered far and wide, unfortunately mostly one to a neighborhood. W1BHD, W2UFU, W2HGT, W4MS, W5MUD and W8DX have been heard from in regard to amateur TV in recent weeks, and in the last year or so we've had letters about TV experimental work from just about every section of the country. Several of these fellows have expressed a willingness to help others in their work. W4MS has made prints of the W1BHD modifications on the original 1940 QST TV circuits, and the design of the camera he recently built, and will make them available to genuinely-interested parties.



Correspondence From Members-

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

DOCKET 10237

704 North 8th St.
Lamesa, Texas

Editor, *QST*:

Regarding proposed changes . . . I wish to state that I believe the changes will be detrimental and think they should not be made. . . .

— *J. Roy Meador, W5SPP*

522 West 22 Street
Kearney, Nebr.

Editor, *QST*:

As a natural-born highly-taxed long-suffering citizen of this country I object to Docket No. 10237 as proposed. . . . It should be obvious to amateurs throughout our country that without ARRL we could not long survive as a group of ardent radio enthusiasts, privileged to pursue our hobby with a minimum of bureaucratic restrictions. More power to ARRL.

— *Glen H. Byars, W0BNF*

R.F.D. 1, Box 216
Findlay, Ohio

Editor, *QST*:

. . . I urge ARRL to fight this bureaucratic encroachment on the routine operation of amateur stations. . . .

— *Ross Moorhead, W8ARO*

2601 S. Congress Ave.
Austin, Texas

Editor, *QST*:

I am definitely against the proposed restricted band segments for calling and answering. The system would do no more than try the patience of the most tolerant ham, so precise is the required procedure. . . .

— *William E. Harris, W5TVN*

20 Allen St.
Berwick, Me.

Editor, *QST*:

. . . The Great Bay Radio Association with a membership of about 40 amateurs protests the proposed new Section 12.112. We can see little merit in calling-frequency segments as proposed except possibly during emergency operations. It means the practical loss of these kilocycles for normal amateur use and saddles the amateur with another group of regulations and band edges to watch. . . .

— *Walter M. Amazeen, W1PLN*

118 Robinson Place
Red Bank, N. J.

Editor, *QST*:

The one hundred and twenty licensed members of this organization wish to go on record as OPPOSED to the recent proposal of the FCC to amend Part 12 Rules Governing Amateur Radio Service.

We feel this proposal will serve no purpose to further the art of amateur radio and has no valid place in the rules and regulations of the amateur radio service.

— *David Henderson, W2QND, Secy.*
Garden State Amateur Radio Assn.

P. O. Box 572
Springfield, Ill.

Editor, *QST*:

This is to advise that at our last regular meeting it was voted that our club go on record as being unanimously opposed to the FCC proposal to amend the Rules Governing Amateur Radio Service (Part 12), regarding calling and answering frequencies.

— *Jane Lyons, W9MAE, Secy.*
Sangamon Valley Radio Club

114 Idlewilde Drive
Winston-Salem, N. C.

Editor, *QST*:

Having been a licensed amateur since 1934 I would like to be on record as vigorously opposing this proposal. . . . There is a little bit of freedom to be lost if this impractical and restrictive regulation goes into effect.

— *Lewis Kanoy, W4DCW*

872 Watkins
Birmingham, Mich.

Editor, *QST*:

. . . The amateur bands are too small now to handle the 104,000 licenses, even without cutting off 634 kilocycles from the current general-use amateur frequencies.

— *Andrew M. Gent, W8GCP*

R.F.D. 4
Colchester, Conn.

Editor, *QST*:

My copy of *QST* arrived on time as usual and was diligently perused from cover to cover. When I read the editorial under "It Seems To Us" the storm broke. I am referring to that portion relative to the establishment of a calling frequency within the amateur bands. . . .

I strongly urge that the League adopt a policy of opposition to this proposed regulation designed to establish a calling frequency for normal usage in our bands.

— *Charles J. Keenan, W1LF*

Granite City, Ill.

Editor, *QST*:

. . . Egyptian Radio Club and others in Illinois and Missouri areas around St. Louis violently opposed to this plan of operation. . . .

— *J. H. Adamson*

233 Holmes Road
Pittsfield, Mass.

Editor, *QST*:

. . . My conversations with many other amateurs indicate that such a plan is unnecessary and very much unwanted.

— *Robert M. Stephens, W1JLT*

1301 Gunby Ave.
Tampa 6, Fla.

Editor, *QST*:

. . . A resolution was made and passed unanimously by the members that Tampa Amateur Radio Club, Inc., be placed on record as completely and unalterably opposed to the setting up by FCC of calling-answering channels when there is no emergency need. The Secretary was requested to so advise the League.

We are certainly not opposed to calling and answering channels when there is a definite emergency need for such channels, but we feel that such channels for everyday use is senseless and that there is no need or basis for a dictatorial and asinine restriction of that nature.

We urge and call upon the League to oppose this senseless and useless proposal.

— *Mack S. Lee, Secy.*
Tampa Amateur Radio Club

145 Blackburn Road
Summit, N. J.

Editor, *QST*:

. . . The Somerset Hills Radio Club believes that the adoption of the rule assigning calling frequencies to amateur radio is not in the best interests of amateur radio and will not permit the best use of the amateur bands.

— *F. B. Parsons, W2COT, Pres.*
Somerset Hills Radio Club



Hints and Kinks

For the Experimenter



SOURCE OF INSULATED TUBING

HOSPITALS throw away the gum tubing used to give patients intravenous feeding. The discarded tubing is just the right size for use as spaghetti insulation covering, is more flexible than ordinary sheathing, and not particularly inflammable. In addition, it is extremely strong, and less susceptible to damage by heat than many plastics. — Joseph R. Lebo, W2OEU

TUNABLE I.F. STRIP FOR V.H.F. CONVERTERS

VERY few communications receivers have the tuning rate required for use with crystal-controlled converters in the v.h.f. bands. This problem can be solved by modifying a BC-454 receiver so that it tunes from 8 to 14 Mc. instead of the original 3 to 5 Mc. About the only difficult part of the modification is to change the r.f., mixer, and oscillator coils. A noise limiter and a.v.c. are added refinements that have already been described in *QST*.¹

The coil modifications are shown in Fig. 1. To change the r.f. coil, first remove the coil from its shield can, and then remove the tuning slug by first yanking off the bakelite locking strip with needle-nose pliers. Next remove the winding by unsoldering the top coil connection only. Peel back the winding to the bottom and wind 12 turns upward, double-spaced in the original wire grooves (not double the wire diameter). It will be necessary to cross over one groove per turn for this purpose, but the wire can be held in place by winding tight and drilling a new hole

at the top of the winding. The slug is then replaced, and a 1/4-inch hole for slug adjustment is drilled in the shield can and base. To add friction to the adjustment screw, melt a little wax and let it run down the screw. This will make a tight thread, and will make it unnecessary to replace the bakelite locking strips.

The mixer coil is changed by taking about half of the top pie winding off and resoldering it to the connector prong. The grid winding is unsoldered at the bottom coil connection and 13 turns are wound down from the top double-spaced like the r.f. coil. The slug is replaced, and the shield drilled for adjustment as before.

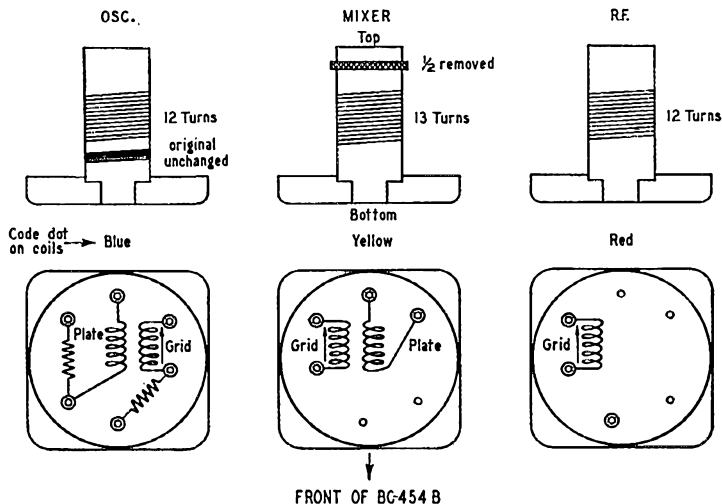
On the oscillator coil, leave the small feed-back winding exactly as it is. Unsolder the top connection of the tuned grid winding, and rewind 12 turns upward, double-spaced, starting at the feed-back winding. Replace the slug and drill the shield can for adjustment.

Replace the coils in the unit, and with the aid of a signal source, align the circuits in the conventional manner. The conversion at W8FKC resulted in a 7.5- to 14.1-Mc. tuning range. The tracking is as good as in the average communications receiver, and the over-all gain is excellent. The i.f. used at W8FKC is 9- to 13-Mc. for coverage of the 2-meter band, and from 9- to 14-Mc. for the 20-Mc. band.

This arrangement can also be used to make an efficient mobile v.h.f. receiver. It permits the use of crystal-controlled converters to gain the desired stability, and can be built very compactly, with the converter mounted alongside the i.f. strip in a surplus FT-220 receiver rack. — Ralph W. Burhans, W8FKC

¹Jordan, "New Life for the 'Q5-er,'" *QST*, Feb., 1951.

Fig. 1 — With simple modifications, the BC-454 "Command" receiver can be made into an excellent tuned i.f. and audio system for use with v.h.f. converters. The coil modifications shown here are described in detail in the text.





Operating News



F. E. HANDY, WIBDI, Communications Mgr.
J. A. MOSKEY, WJIMY, Deputy Comm. Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coördinator

L. G. McCOY, WIICP, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, Administrative Aide

The Simulated Emergency Test. It is hoped that each local test spark-plugged this October by an ARRL Emergency Coördinator will be, in effect, a "surprise" test, a practical drill based on appropriate communications plans for the locality. In many cases the local government officials of a city or area and the agencies served will be contacted by our local amateur leaders to establish friendly relations, maintain contact and enable them to take a part or offer suggestions so the test will be most nearly the type an *actual* emergency might call for as to the timeliness or traffic handled. Besides analysis of the ECs annual report to show our over-all position and ability to cope with emergencies and to help us strengthen any weak spot, this is the annual time to *reregister emergency-powered equipment*, note changes in capabilities and plans to bring them up to date, to demonstrate operative mobile gear. There's the new (gratis) ARRL *Official Mobile Unit* pocket card, also the *Emergency Radio Unit* placard to put on the car or rig. Where you have appropriate operative equipment to demonstrate to your EC, you should get such placard from your EC before or during these exercises. Using this enables you to get better public understanding of your mobile, and reflects the prestige and values in these public service aspects.

AREC and Novices. Announcement of the annual Simulated Emergency Test by ARRL reminds us to say to one and all that *this is the time to get annual endorsement* of your Amateur Radio Emergency Corps card if you have held one. Be sure to register your facilities to get *proper official identifying recognition of your status as to readiness for public service work* if you are not an AREC card holder already. All amateurs should be a registered part of the Emergency Corps. Our amateur fraternity in its emergency operating aspect needs the entire strength of active organized amateur radio behind it. Thus only can this agency do most for our institution in fulfilling the traditional obligations in time of natural disaster or other need.

It is the official policy of the League for ARRL Emergency Coördinators to welcome Novices and to register fully their facilities. Their availabilities when registered will be considered to man circuits and posts and assist in other ways in the larger emergency plans developed for the amateur group to create and maintain "one strong facility" in connection with general emergency work and civil defense planning. It is appreciated that all Novices are busy learning to enjoy c.w. to the full,

and aiming at the FCC General Class ticket in the shortest possible time. To belong to AREC or RACES to receive some "in emergency" local operating assignments to different points and stations should in no way interfere with *this* objective! Where there are enough Novices *additionally* working v.h.f. they can work together in one two-meter net under normal operating conditions; that net should be put in the 145-Mc. sector which is also set aside for RACES nets under circumstances requiring special civil defense testing if one is set up, but just to volunteer your *operator* availability is the *big* and needed step to take. Since a high percentage of RACES work is by voice, training of all personnel in handling record-type communications with concise practices and achieving good net discipline under an NCS of their choosing is in the best communications tradition, and an aim for all responsible amateurs. We therefore encourage ECs to sign up all *new-licensed General Class personnel and Novices* working *all bands* as well as to see that every outstanding AREC card receives endorsement in the Full and Supporting Division of the AREC! Novices, seek out your EC (address from SCM given on page 6, *QST*, if necessary) and get the AREC identity cards given on registration.

Fall WIAW Schedule. Note in this issue the new WIAW schedule, effective with the change from Daylight to Standard Time September 28th. The station then resumes the Tuesday-Thursday policy of looking in the Novice band for QSOs from 3.55 Mc. right after the 7 P.M. CST c.w. bulletin before WIAW goes over the band for other calls. Code-practice periods will continue to start *daily* at 8:30 P.M. CST in practice speed ranges 5 to 35 w.p.m.; monthly *certification* speeds 10 to 35 w.p.m. Four times per day Information Bulletins and CRPL forecasts "to all amateurs" start at 7 and 11 P.M. CST (c.w.) and 8 and 10:30 P.M. CST by voice. The general periods for two-way work with all amateurs in the different bands are as indicated in the table elsewhere in this issue.

In Less Than a Year . . . 35 W.P.M. Most active WNs find little trouble getting the General Class ticket *well ahead* of the 12 months available! To move from the Novice Class to get a thirty-five-word-per-minute ARRL Code Proficiency Certificate is also pretty nice going in one short year! In July '51 Eugene Gertler became WN2KHJ. In May '52 it was our pleasure, after awarding Gene a succession of endorsement stickers for different intermediate code speeds, to

"graduate" him from the ARRL CP Program at 35 w.p.m. As a good high school student WN2KHJ worked his rig mainly week ends starting in September.

Here is one example of going much further and faster with the steppingstone ARRL-WIAW program than in the average case. May we invite attention to all new amateurs and Novices to this practice program and the monthly run for certifications! First certificate can be obtained starting at 10 w.p.m. It's safe to get your first endorsement sticker for 15 w.p.m. before going up for the FCC exam. Make copying-down of all Official Bulletins as well as practice transmissions a habit. We're happy to correct papers and certify, where indicated, on the once-per-month runs for qualification. Use the ARRL CP Program!

— F. E. H.

WIAW OPERATING SCHEDULE

(Effective September 28, 1952)

(All times given are Eastern Standard Time)

Upon return to Standard Time, WIAW will return to its fall-winter operating schedule, continuing operation until 0300 (for increased West Coast coverage) and adding general operation on the new band 21-21.45 Mc. Daily code practice and a Novice period will be continued. Mimeographed master schedules showing complete WIAW operation in EST, CST or PST will be sent to anyone on request.

Operating-Visiting hours:

Monday through Friday: 1500-0300 (following day)

Saturday: 1900-0230 (Sunday)

Sunday: 1500-2230

Exception: WIAW will be closed from 0300 November 27th to 1500 November 28th in observance of the Thanksgiving Day holiday.

General Operation: Use the chart below for determining times during which WIAW engages in general operation on various frequencies, 'phone and c.w. Note that since the schedule is organized in EST, certain morning operating periods may fall in the evening of the previous day in western time zones. WIAW will participate in all official ARRL operating activities, using scheduled general operating periods for this purpose if necessary.

Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules:

Frequencies:

C.W. — 1885, 3555, 7130, 14,100, 52,000, 146,000 kc.

'Phone — 1885, 3950, 14,280, 52,000, 146,000 kc.

Frequencies may vary slightly from round figures given; they are to assist in finding the WIAW signal, not for exact calibration purposes.

Times:

Sunday through Friday: 2000 by c.w., 2100 by 'phone.

Monday through Saturday: 2330 by 'phone, 2400 by c.w.

Code Proficiency Program: Practice transmissions are made on the above-listed c.w. frequencies, starting at 2130 daily. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately ten minutes of practice is given at each speed. Exceptions: On October 15th, and November 13th, WIAW will transmit Code Proficiency Qualifying Runs instead of the regular code practice. Next certificate qualifying runs from W8TQD are October 15th and November 13th; from W6OWP, October 4th and November 9th.

JULY CD QSO PARTIES

Apparently out to bring top score honors back to the East, W4KFC outclassed all other participants in the c.w. section of the July CD Parties with 91,030 points. W3FQB, fourth high in the April Party, pulled up to second place. Those Westerners are still in their pitching, though. W6GEB's third-place score was a mere 560 points below that of W3FQB, and he had plenty of competition from W6WOO! W4FV, who usually manages to stay up in the top score brackets of the 'phone parties, turned in the highest 'phone total. He was followed closely by W2ZVW, who would have tied for first place had he made one more contact. C.w. party leader W4KFC chalked up the third highest 'phone score and showed he can handle a microphone, too! Listed below are the other high claimed scores. The figures following each call indicate the claimed scores, number of contacts and number of ARRL sections worked. Final and complete results will appear in the October CD Bulletin.

C. W.

W4KFC.....	91,030-350-51	W4RVU.....	44,200-165-52
W3FQB.....	72,000-281-50	W3PRT.....	43,470-201-42
W6GEB.....	71,440-165-47	W9NH.....	41,170-173-46
W6WOO.....	70,512-161-48	W8TZO.....	40,700-178-44
W8NBK.....	62,805-232-53	W6IA.....	35,955-146-47
W8YHM.....	62,100-150-45	W8DAE.....	35,400-170-40
W4SAT.....	57,250-225-50	W5RLD.....	34,800-142-48
W4HQN.....	54,310-202-52	W2GMW.....	34,020-173-38
W4NH.....	49,980-196-51	W2AQT.....	33,000-165-40
W4SHJ.....	49,440-199-48	W1ODW.....	32,580-181-36
W1EOB.....	49,350-223-47	W7OPO.....	32,400-100-36
W4AKC.....	47,000-200-47	W7JU.....	32,264- 93-37
W7MLL.....	46,620-120-42	W2GUM.....	30,590-161-38
W6BIP.....	45,892-112-44	W7UTM.....	30,560- 81-40
W8ZJM.....	45,590-188-47	W2CFN.....	30,545-149-41
VE1BK.....	45,360-212-42		

'PHONE

W4FV.....	1650- 25-11	W5DEJ.....	800- 13- 8
W2ZVW.....	1600- 25-10	W1AQE.....	630- 14- 9
W4KFC.....	1375- 18-11	W4SHJ.....	450- 8- 6
W8ZJM.....	1150- 17-10		

WIAW GENERAL-CONTACT SCHEDULE

(Effective September 28, 1952)

WIAW welcomes calls from any amateur station. Starting September 28th, WIAW will listen for calls in accordance with the following time-frequency chart.

EST	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0020-0100 ¹	3555	7130	3555	7130	3555
0100-0200	3950	7130	3555	7130	3950
0200-0300	7130	3950	7130	3950	3950
1500-1600	14,280	21/28 Mc. ³	14,100	.....	.....
1600-1700	14,280	21/28 Mc. ³	14,100	21/28 Mc. ³	21,020	.....
1700-1800	14,100	14,280	21,020	14,280	14,100	.....
1930-2000	7130	.....	7130	.....	7130	.....
2020-2100 ¹	7130	3555 ²	7130	3555 ²	7130	.....
2110-2130 ¹	3950	52 Mc.	146 Mc.	3950	3950	.....
2230-2330	3555	3950	7130	1885	3555	.....
2340-2400 ¹	3950	1885	3950	1885	3950	.....

¹ Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins at 0000 and 2000 on c.w. and at 2100 and 2330 on 'phone.

² WIAW will listen for Novice Class licensees on 3700-3750 kc. before looking over the band for other contacts.

³ Operation will usually be conducted on 21,020-kc. c.w., but 28,768-kc. 'phone will be used occasionally.



With the AREC

A reminder — this is the month of the Simulated Emergency Test (October 11-12). By the time you read this, ECs will probably have received a copy of the annual SET Bulletin, containing complete instructions, explanations, and aids in putting on their part of the annual nationwide demonstration and test of amateur radio emergency communication facilities. As in last year, most Simulated Emergency Test activities will have a civil defense flavor, but also as in last year's test, and in that of every prior year, the Red Cross has promised full cooperation in alerting its Chapters and activating its three key amateur collecting stations: W3PZA, W9DUA and W6CXO. See the detailed announcement of the SET elsewhere in this issue.

If your EC does not appear to be making any plans to participate, now is the time to build a fire under him.

Utah, and particularly the Salt Lake area, is not normally concerned with the flood problems that plague so many other areas. However, the winter of 1951-52 saw an all-time record in snowfall in the Utah Mountains and the density and water content were nearly twice normal. The normal channels for handling the water soon reached and far exceeded capacity and almost before anyone realized what was happening, streets were washing out, homes were being flooded or undermined and damage was mounting rapidly. At 1245 on April 27th, the call came alerting the amateur communications group. Within 11 minutes, the first mobile units were checking in on the air. As each unit checked in with the control station as available for duty, it was given an assignment in helping to control the mass movement of automobile and pedestrian traffic in the immediate flood zone, in supplying communications for the work crews building dikes, and in the dispatch of workmen, materials and equipment. City engineers and officials were placed in our cars to direct operations, requisition men and materials via the control station.

The flood level rose steadily and at times it looked as if the stricken areas would be greatly extended. The river rapidly reached flood stage and the entire area along its banks was threatened. In all of the control operations, communications were furnished to the full extent of our personnel and equipment. All in all, the critical period lasted for nearly four weeks. During that period, there was hardly a time during the day or night, that one of the control stations was not standing by on the emergency mobile frequency (29,626 kc.) and that one or more of the cars were not in the field. Insofar as it was possible, two men were kept in each mobile unit so that if one had to leave the car to go in on foot, the unit was not lost to the control station. In some places, hand-talkies on the 75-meter band were used to communicate from dike-to-car and then on 10 meters from car to control center. Much was learned that will be of value in future operations and as rapidly as possible is being incorporated into our procedures and set-up.

The successful operation of these emergency units was a result of over a year of training in conjunction with other local services, notably the Police Department, with which operators and equipment were freely interchanged during the emergency.

Beyond all doubt, amateur radio has thoroughly justified itself in this area and has earned the gratitude of the community. Official recognition has come from the Chief of Police, the Police Commissioner and many of the other officials who had the opportunity to see the gang in action. During the training period and especially during the flood, an "esprit de corps" has sprung up that is truly remarkable. Many of the hams who are not members of the Auxiliary Police group called in and offered to help. To them, sincere thanks. Without a single exception, assignments were accepted and executed promptly and cheerfully.

Control center was set up at W7MGA, and the gang will be forever grateful to Walt and Esther (his XYL) for their gracious hospitality and kindness. To the rest of the ham gang who voluntarily stayed off the frequency, and the short-skip stations who listened but stayed clear, a hearty "thank you." The following took part in the direct operation: W7s EHF EWX GGR JHM JOE JVA LCA MFQ MGA NMK NCO NOE OSL PVJ QAA QDF SBK SP and ZDX.

— W7JVA.

West Hartford EC WIJEQ recently commented that a considerable number of AREC registrants are Novices in the teen-age group. It is easy enough to tell whether or not a registrant is a Novice licensee, but on our present Form 7 registration there is no place for the applicant to state his age so that the EC will have a better idea how to work him into the organization. Vern's suggestion that all AREC registrants indicate their ages after their names strikes us as being a good and practical one. Next time we revise Form 7, we'll have a space for the registrant's age. Meanwhile, let's try to remember to put it in anyway.

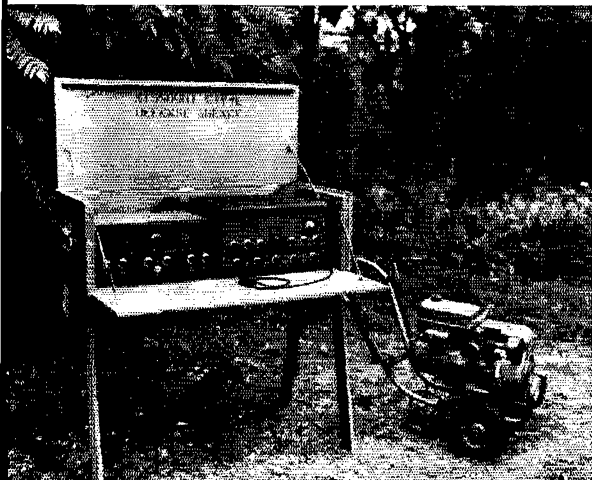
A 90-m.p.h. wind on June 22nd struck the Girl Scout Camp at Wall Lake, about 12 miles west of Sioux Falls, South Dakota, blowing down tents and disrupting telephone service with Sioux Falls. W0s BQS, HWS and NGW set up a mobile radio link between the camp and Radio Station K1HO at Sioux Falls, relaying information and requests to parents to come after the girls.

— W0GCP, SEC South Dakota

While tuning up the trailer-mobile station of the Birmingham Amateur Radio Club, W4CUE, on July 12th in preparation for a c.d. drill the following day, W4OLG received word that help was needed to find two lost children 25 miles from Birmingham. Picking up the children's parents, OLG headed for the area where the search was under progress, with W4KNW and W4RTP being dispatched later to perform as relay stations on the highway. W4GJW and W4EBD operated W4CUE/4 as the base station. The two lost children were located and the emergency was secured after two and one half hours.

— W4GJW, SCM Alabama

Sixteen SECs submitted reports for the month of June on behalf of 2845 AREC members. This is a drop from the May accumulation. None of the 16 was a newcomer, and the total number of different sections reported this year so far remains at 25.



This is the "portable package" of the Missouri Civil Defense Agency, constructed under the supervision of State Communications Chief W0LBM. This complete field station is transported in a mobile-equipped station wagon, and is capable of operation in the Disaster Communications Service bands. Over-all state plans call for construction of seven of these units, distributed strategically and operated by local amateurs. The speaker is mounted in the top cover of the receiver, to save room. The generator is rated at 750 watts.

QST for

Section Emergency Coördinators of the Amateur Radio Emergency Corps

The Section Emergency Coördinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coördinators for the various communities in his Section. Does your town have an EC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

ATLANTIC DIVISION				
Eastern Pennsylvania Maryland-Delaware-D.C. Southern New Jersey Western New York Western Pennsylvania	W3ISE K2BG W2UTH/FRL	W. T. Shreve Herbert C. Brooks Henry A. Blodgett	1507 Niessen Rd. 800 Lincoln Ave. 38 Duffern Dr.	Oreland Palmyra Rochester 16
CENTRAL DIVISION				
Illinois Indiana Wisconsin	W9QLZ W9LZI W9OVO	George E. Keith, jr. J. Herman Barnett, jr. Clayton Cardy	RFD #2, Box 22A 20 Meridian Pl.	Utica Indianapolis Sawyer
DAKOTA DIVISION				
North Dakota South Dakota Minnesota	W0RRW W0GCP W0BOL	E. G. Anderson Wilbur Simantel Robert A. Prehm	1413 11th St. N. 113 E. 10 St. 1130 Delaware Ave.	Fargo Mitchell St. Paul 7
DELTA DIVISION				
Arkansas Louisiana Mississippi Tennessee	W5EA W5IUG W5LPL W4AEE	Leo V. Brians E. B. Hazlewood Edwin P. Hobbs Harry T. Carroll	6th William Rt. 1 2317 Pine St. 616 Marthonna Rd. S.	Carlisle Baton Rouge Gulfport Madison
GREAT LAKES DIVISION				
Kentucky Michigan Ohio	W4MGT W8DTH W8UPB	Henry C. Hall Francis E. Gary Dana E. Cartwright, sr.	334 Grosvenor Ave. 620 Thayer St. 2979 Observatory Rd.	Lexington Flint Cincinnati 8
HUDSON DIVISION				
Eastern New York N.Y.C. & Long Island Northern New Jersey	W2HJ W2KTF W2NKD	Stephen J. Neason Charles F. Baker Thomas J. Ryan, jr.	794 River St. 94 North Grand Ave. 1082 Anna St.	Troy Baldwin, L. I. Elizabeth 4
MIDWEST DIVISION				
Iowa Kansas Missouri Nebraska	W0VRA W0PAH W0VRF W0DJ	Jack P. Henry W. G. Schrenk O. H. Huggins Francis B. Johnson	1215 Vine St. 1528 Pierre St. 3605 E. 72nd St. 320 S. 44th St.	Waterloo Manhattan Kansas City Lincoln
NEW ENGLAND DIVISION				
Connecticut Maine Eastern Massachusetts Western Massachusetts New Hampshire Rhode Island Vermont	W1LKF W1BYK W1BL W1JYH W1MHI W1JEN	Peter A. de Bruyn Donald R. Dean Raymond E. Boardman Roger E. Corey Carl M. Getter Harold M. Drown	163 S. Marshall St. 36 James St. 53 Thurston Rd. 67 W. Allen Ridge Rd. 185 Early St. 15 1/4 Peru St.	Hartford 5 Auburn Newton Upper Falls 64 Springfield 8 Providence Burlington
NORTHWESTERN DIVISION				
Alaska Idaho Montana Oregon Washington	KL7PE W7IWU W7KUH W7HDN W7BTV	John H. Huber Alan K. Ross Walter R. Marten E. C. Wiedmaier Eugene H. Dodge	Box 2097 2105 Irene St. 1022 Yale Ave. 11004 N. E. Shaver 663 N. Skyline Dr.	Fairbanks Boise Billings Portland 13 Tacoma 6
PACIFIC DIVISION				
Hawaii Nevada Santa Clara Valley East Bay San Francisco Sacramento Valley San Joaquin Valley	KH6AS W7HJ W6AEV W6RYC W6NL W6KME W6PYM	John Keawe Frank A. Wilson George W. Harper Harry T. Cameron Samuel C. Van Liew E. J. Schoenbackler E. Howard Hale	714 Ocean View Dr. 433 Birch St. 101 Plymouth Ave. 1280 Walden Rd. 215 Knowles Ave. 1622 "Q" St. 741 E. Main St.	Honolulu Boulder City San Carlos Walnut Creek Daly City Sacramento 14 Turlock
ROANOKE DIVISION				
North Carolina South Carolina Virginia West Virginia	W4ZC W4DX W4NAD W8YPR	Roy C. Corderman E. J. Team William E. Sampson, jr. S. A. Whitt	792 Oaklawn Ave. 346 Fair St. 4801 Stuart Ave. 500 Kirk St.	Winston-Salem Cameron Richmond Princeton
ROCKY MOUNTAIN DIVISION				
Colorado Utah Wyoming	W0KHO W7JOE W7LKQ	O. E. Cunningham John Tempest, jr. Duane L. Williams	Box 178 1599 Orchard Dr. 1022 S. Cherry, Apt. 4	Eads Salt Lake City Casper
SOUTHEASTERN DIVISION				
Alabama Eastern Florida Western Florida Georgia West Indies (Cuba-P.R.-V.I.) Canal Zone	W4ISD W4KJ W4P0W W4FYC K14ES KZ5FL	P. G. Persson H. B. Doten Harold Smith J. Herb Axson Pedro A. Piza Frank H. Lerchen	123 Margaret St. Box 357 2809 N. "Q" St. 202 N. Semmes St. P. O. Box 2001 Box 124	Mobile New Port Richey Pensacola East Point Ponce, P. R. Balboa
SOUTHWESTERN DIVISION				
Los Angeles Arizona San Diego	W6K5X W7OLF W6SK	Kenneth L. Kime Cameron A. Allen Don Campbell	2240 23rd St. 1020 E. Maryland 4002 Greenwood St.	Santa Monica Phoenix San Diego 10
WEST GULF DIVISION				
Northern Texas Oklahoma Southern Texas New Mexico	W5IQD W5ACM W5GLS W5PLK	T. Bruce Craig Claude P. Gardner George N. Sharp Ben G. Kaskob	1706 27th St. Route 6, Box 120 3541 Federal St. P. O. Box C	Lubbock Oklahoma City Pasadena Rancho Verde, Socorro
MARITIME DIVISION				
Maritime	VE1FQ	L. J. Fader	125 Henry St.	Halifax, N. S.
ONTARIO DIVISION				
Ontario	VE3KM	T. W. Clemence	2278 King St., East	Hamilton, Ont.
QUEBEC DIVISION				
Quebec	VE2BR	A. George Brewer	4334 Montrose Ave.	Westmount, Montreal, Que.
VANALTA DIVISION				
Alberta British Columbia Yukon	VE6MJ VE7DD	Sydney T. Jones Cecil O. Sawyer	10706 57th Ave. 6650 Balsam St.	Edmonton, Alta. Vancouver, B.C.
PRAIRIE DIVISION				
Manitoba Saskatchewan	VE5BZ	Wm. R. MacDonagh	Box 54	Zealandia, Sask.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....248	W9YXO.....240	W6AM.....235
W8HGW.....244	G2PL.....239	W3CPV.....235
W3BES.....243	W6ENV.....238	W6MEK.....234
W6VFR.....241	W3GHD.....236	

RADIOTELEPHONE

W1FH.....219	W9RBI.....200	W3LTU.....190
PY2CK.....216	W1NWO.....198	SM5KP.....190
VQ4ERR.....213	W1JCK.....196	ZS6BW.....189
XE1AC.....213	W2APU.....192	W3BES.....185
W8HGW.....201	W2BXA.....190	

From July 15 to August 15, 1952, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below.

NEW MEMBERS

OQ5LL.....161	W3LXE.....102	W9NN.....100
W3CTV.....111	W2EQG.....101	W4EEO.....100
W5OLG.....108	W6ALQ.....101	OE1KF.....100
PY1MK.....105	DL3RK.....101	W6VZG.....100
PY7LJ.....102	W2LWI.....101	W7PZ.....100
SM3FY.....102	PA9MOT.....101	

RADIOTELEPHONE

OQ5LL.....122	ZS6Z.....109	CT1DX.....103
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ENDORSEMENTS

PA0UN.....230	W4NNH.....173	W6WO.....145
W2QKS.....230	W2LJR.....171	W8JBI.....144
W5MIS.....216	W6NTR.....171	W1IKE.....141
Z32X.....211	W3ALX.....170	W6LMZ.....137
W2AGO.....210	W6IBD.....170	G3CBN.....132
SM5KP.....201	W4JDR.....168	G6BS.....131
W2YW.....200	ZL4GA.....160	W1BOD.....131
W1GKK.....200	W9TKX.....160	W1JNV.....130
W8VE.....200	W6EAY.....160	W6NZ.....130
W5EGK.....200	W2GVZ.....160	W2OCC.....128
W1HX.....200	W2REF.....160	W9EXY.....126
4X4RE.....189	DL1AU.....152	W8ZJM.....119
KH6CD.....183	W7AH.....152	Z8GJ.....113
W4TM.....183	G4ZU.....150	F9DN.....111
PY4IE.....180	W8BWC.....148	W9HUV.....111
SM5WI.....179	G6RB.....146	W9BBS.....110

RADIOTELEPHONE

W3GHD.....161	G6AY.....156	G5LN.....110
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DXCC NOTES

Announcement is hereby made of the addition to the ARRL Postwar Countries List of Qatar, a Sheikdom on the Persian Gulf coast of Arabia near Bahrain Island. To our knowledge, no official prefix has been assigned this country. DXCC credit will be given for any Qatar cards confirming contacts made since November 15, 1945. And in future ARRL DX Competitions those working Qatar may claim credit for a separate country.

CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on October 15th at 2130 EDST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1887, 3555, 7130, 14,100, 28,060, 52,000 and 146,000 kc. The next qualifying run from W6WOP only will be transmitted on October 4th at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 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 W1AW each

evening at 2130 EDST. References to texts used on several of the transmissions are given below.

Date	Subject of Practice Text from August QST
Oct. 2nd:	<i>Automatic Tuning of the Antenna Coupler</i> , p. 11
Oct. 8th:	<i>V.H.F. Parasitics in Beam Tetrodes</i> , p. 14
Oct. 10th:	<i>A 30-Watt Transmitter for 50 Mc.</i> , p. 17
Oct. 14th:	<i>Cutting Down VFO Drift</i> , p. 20
Oct. 16th:	<i>A Flea-Power Portable</i> . . . p. 24
Oct. 20th:	<i>Cheaper and Better 'Phone Monitoring</i> , p. 31
Oct. 22nd:	<i>The Wavelength Factor — III</i> , p. 42
Oct. 28th:	<i>Antenna Couplers for the Novice</i> , p. 27
Oct. 30th:	<i>The World Above 50 Mc.</i> , p. 53

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
Saskatchewan*	Oct. 1, 1952	Harold R. Horn	Dec. 15, 1952
Yukon*	Oct. 15, 1952	W. R. Williamson	Mar. 17, 1952
San Francisco	Oct. 15, 1952	R. F. Cseikowitz	Apr. 14, 1952
West Indies	Oct. 15, 1952	William Werner	Aug. 15, 1952
Santa Clara Valley	Oct. 15, 1952	Roy I. Cousin	Sept. 5, 1952
Colorado	Oct. 15, 1952	M. W. Mitchell	Sept. 15, 1952
San Diego	Oct. 15, 1952	Mrs. Ellen White	Oct. 16, 1952
Maritime*	Oct. 15, 1952	Arthur M. Crowell	Oct. 18, 1952
Sacramento Valley	Oct. 15, 1952	Ronald G. Martin	Nov. 1, 1952
Kentucky	Oct. 15, 1952	Ira W. Lyle, jr.	Jan. 2, 1953
Hawaii	Oct. 31, 1952	John R. Sanders	Jan. 14, 1953
Michigan	Dec. 15, 1952	Norman C. MacPhail	Feb. 17, 1953
Minnesota	Dec. 15, 1952	Charles M. Bove	Feb. 17, 1953
Oregon	Dec. 15, 1952	J. E. Roden	Mar. 1, 1953
Wyoming	Dec. 15, 1952	Arden D. Gaddis	Mar. 1, 1953
Missouri	Dec. 15, 1952	Clarence L. Arundale	Mar. 1, 1953
Mississippi	Jan. 2, 1953	Norman B. Feehan	Mar. 8, 1953
Western Penna.	Jan. 15, 1953	Ernest J. Hlinsky	Mar. 17, 1953
Md.-Del.-D.C.	Jan. 15, 1953	James W. John	Mar. 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.

San Joaquin Valley	E. Howard Hale, W6FYM	April 15, 1952
Montana	Edward G. Brown, W7KGN	Sept. 1, 1952
Northern Texas	William J. Gentry, W5GF	Oct. 15, 1952

TRAFFIC TOPICS

The First and Second Call Areas of the Transcontinental Phone Net handled a total of 1470 messages in July, 641 and 829 respectively, as reported by W1SS. This traffic was handled by 28 stations.

National Traffic System. All NTS Net Managers have been informed that the annual ARRL Simulated Emergency Test will take place on October 11-12. The mass origination of traffic to ARRL Headquarters will not be solicited this year, but each EC participating in the SET will originate a message to Headquarters summarizing local SET activities for the record. We hope and expect that much of this traffic will flow through the National Traffic System, and that section, regional and area NTS nets will operate on a standby basis in extra session on these two dates so that traffic for Headquarters will reach its destination promptly. There will also be considerable traffic floating around of a Red Cross, and perhaps a Civil Defense nature, so there ought to be enough to do to keep everybody busy.

July reports:

Net	Sessions	Traffic	High	Low	Average	Most Consistent
BAN	23	673	84	10	29	1RN, 2RN
CAN	23	455	37	4	19.7	9RN
1RN	23	147	15	1	6.4	Conn.
2RN	46	283	16	0	6	JN
3RN	40	119	12	0	3	E. Pa.
4RN	16	111	12	1	7	Fla., S. C., Va.
RN5	9	10	4	0	1.1	Ala., Okla.
RN6	31	765	42	1	24.7	
RN7	22	226	20	1	10	Wash.
8RN	22	26	8	0	1	Mich.
9RN	25	229	23	1	9.2	Ky.
TEN	24	341	63	1	14.2	Minn.
QIN	38	235	24		6.1	

(Ind.)

For the first time in NTS reporting history, we have received either a formal report or informal word of how things are going from every area and regional net manager. Only PAN and TRN failed to submit statistical reports. Considering that this is written in mid-summer, when traffic activity is at its lowest ebb, we think that this is a harbinger of better things to come in the fall.

Eastern Area Net: In making his report, W8SCW "averaged out" unreported sessions to gain a fairly accurate over-all picture.

Central Area Net: W9JUU reports fine support on CAN. It would make things a little easier if regional representatives would try to QNI promptly at 2030 CST.

Pacific Area Net: W7WJ says it's rough trying to cover RN7, PAN and part of TCC three nights a week. PAN hopes for more activity and support from regional nets this fall.

First Regional Net: Certificates have been issued to W1s EFR, ODW and VCH.

Second Regional Net: K2BG is the new 2RN Manager.

Fifth Regional Net: Formal report by Assistant Manager W4KIX, but a letter from W5MRK indicates thinking toward a bigger and better RN5 this fall.

Sixth Regional Net: RN6 is back on PDST, meeting at 1945 and 2130. Net certificates have been issued to W6s JOH, PIQ and WPF.

Seventh Regional Net: Special credit for holding the fort during the summer goes to W7s CZX, FRU, GDV, TH and W8BTU/7.

Ninth Regional Net: Orchids to the Kentucky Net (KYN) which was represented 100% in July. W9TT says it is a relief to have CAN on the air this summer.

Tenth Regional Net: The big event in July was that Iowa missed a TEN net session — first time in history. TEN will open up full blast September 15. W0ITQ says he believes that Doc, W9SCA, is still doing some dentistry as traffic skeds and time permit.

Thirteenth Regional Net: VE3ATR and VE3BUR are holding down the fort; no VE1s or VE2s heard.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for July traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	315	2377	1914	445	5051
W8LAB	38	1383	1331	27	2779
K5FKF	72	1082	982	172	2308
KG6FAA	467	939	706	183	2295
W2BTB	15	821	843	12	1691
W6HK	181	732	612	118	1643
K4WAR	472	443	355	88	1358
W8ZGT	8	643	661	7	1319
W9JUU	16	555	518	10	1099
W6GYH	10	509	470	39	1028
KL7AIR	79	456	406	50	991
W6WPF	18	462	431	31	942
W1CRW	43	432	395	31	901
JASAN/KASAB	158	371	300	71	900
W7PEF	318	235	0	235	788
W2ZOL	2	363	371	3	739
W6KYV	116	316	124	181	737
W6QXO	12	325	256	68	661
W5GUD	418	106	2	104	630
K6FAL	67	269	181	88	605
W9SCA	10	274	263	5	552
Late Report					
W6IAB (June)	23	771	764	7	1565

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

W9NZZ 247	W7BA 105	Late Report
W8ARO 134	W2IVS 103	W9YIX (June) 124
W6OFJ 105		

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

W4TAV (left) and W4RRU (right) proudly display the plaques they were awarded by Kentucky SCM W4KKG at the Mammoth Cave Ham Reunion on June 17th. The plaques were awarded to the outstanding operators for the 1951-52 season on the two Kentucky nets, KYN (c.w.) and KYB (phone) respectively. W4TAV, the c.w. winner, is one of the KYN mainstays and also participates in TLJ/9RN and 4RN. She is the daughter of W4NEP and is only 14 years old. W4RRU has been outstanding on KYB, is OPS and OBS, has a fine station and operates it in a fine manner.



SCM AEC ORS CP SEC OBS TLS OC

Station Activities

OES A10PR EC DXCG CLUBS RM OPS RCC

• 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: ISE, RMs: AXA, BIP, E. Pa. Nets: 3610 kc. The Lebanon Valley SRA is continuing its weekly 2-meter transmitter hunts and reports a highly successful c.d. demonstration held on July 27th. All York and Adams Counties AREC members are urged to register with AQN, the EC for that area. Vacations did not curtail operation for several of the gang; PDJ was portable 8, 9, and 0 on 80 meters, 'phone and c.w., SNY was portable 3 at Canadensis on 40 meters, and WN3NI was mobile in Ohio on 2 meters. In the mobile group, HWT and 2TXN now are on 75 and GJA is on 10 meters. CLM and DUI are installing Viking gear, AD is rebuilding, RJB has new VFO and KEV is cleaning the cobwebs off his mobile rig. AKC is back on 75 meters, as we hope HA will be soon, after recent hospitalization. We lose BYK to W2, as he now is located at Maple Shade, N. J. RKN has new QTH in Lancaster. RCG reports good results with ground plane on 80 meters. On the Novice front, SWZ and THIS dropped the "N," the latter running 30 watts on 40 meters and also building a new 50-watt rig. WN3UT is the latest Novice in Lancaster. WN3TEC made his first contact with an airborne station, 2RIIV. Operation was on 146 Mc. QV is doing a fine job for the TVI committee. Traffic: (July) W3CUL 5051, BIP 134, AD 23, DUI 14, BFF 10, PVE 8, RJB 6, RCG 5, AQN 3, A1B 1. (June) W3RJB 32, PDJ 6, QLI 6.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, James W. John, W3OMN — The Chesapeake Amateur Radio Club held its regular meeting July 14th when "Rollo" Baker spoke on "160 Meg. Commercial Mobile Radio Communication." Raymond S. Bark, of Bendix, gave a talk on "Biological Electricity" at the July 28th meeting. The annual PRVN picnic was held Sunday, Aug. 3rd, on the Skyline Drive. The Rock Creek Amateur Radio Assn. visited K4AF and K4USA on July 11th. Another of the RCARA "infamous" bull sessions was the program for July 25th. P7Z has completed a mobile rig, EAX, University of Maryland Amateur Radio Assn., has completed its console operating position. IACD visited CDQ. RJA is settled in new QTH in Catonsville and is on 80 meters. Traffic: W3ONB 42, JE 30, COK 15, NNX 12, RJA 10, PKC 2.

SOUTHERN NEW JERSEY — SCM, Lloyd L. Gainey, W2UCV — K2BG became manager of 2RN on July 1st. PCF received his 2nd-class 'phone ticket, and now is working 75 and 160 meters. JTI is off the air temporarily and is in a sanitarium at Mt. Kipp, Glen Gardner, N. J. He recently was visited by ATB, SJB, EBU, AZZ, and GYG. QLB has just returned from a trip through the South. He was mobile on 10 meters and reports several very pleasant contacts. HEX has joined the MEPN and is active in drill and handling traffic. Ex-W3BYK now is located in Maple Shade, N. J., awaiting his W2 call. ASG is back in this area after an extended Western jaunt. KN2ANW is providing an almost constant signal on 2 meters lately. PAU returned from a leisurely trip to Florida. He took his time and made it in two days! FXT spent a month on Chesapeake Bay in his yacht. The only electronic equipment aboard is a Tiny Tim six-volt generator! The CRC held its annual picnic and transmitter hunt at Hammonton Lake recently. The hidden transmitter site was a masterpiece of deception. KHW was present at the East Coast 160-Meter Picnic held at Telechester, Md. OQN attended the convention at West Springfield, Mass., where he won the transmitter hunt. Traffic: K2BG 105, W2RG 88, ASG 12, ZI 8, HEX 1.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — SEC: UTH, RMs: RUF, COU, PAM: GSS, NYS, 3616 kc., at 7 p.m.; 3980 kc., 8:30 p.m. NYS, 3595 kc., 8 p.m. NYS C.D., 3509.5 and 3970 kc., 9 a.m. Sun. SUK is confined to the hospital and we hope he is back with us soon. QHH and QQ are very active OOs. K2DG erected new antenna for 80 meters. We regret the passing of the father of COU. Joe has resigned as manager of 2RN because of added duties. GRH is active in YCD, NYS, NYSS, DON,

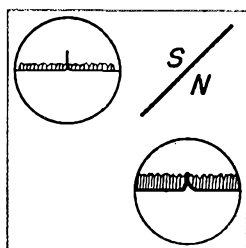
and is going to radio school in Valparaiso, QAA/2, on vacation at Black Lake, worked 82 out of 88 stations called on 75 meters. RSR/2 was heard during the noon hour from Conesus Lake. SMM is in summer school and working at a local b.c. station. The XYL of QBY is progressing nicely after a sojourn in the hospital. N2AIC, sister of KIJ, is on 80-meter c.w. Many of the amateurs in W. N.Y. are receiving authority from the Canadian Dept. of Transport to operate in Canada. GSS and MSY vacationed in Michigan. SJV visited Director 3CEG, RXM and DAA went fishing during vacation. At a meeting of the Cattaraugus Amateur Radio Society in Olean the charter members signed the constitution. Guests who spoke were SJV, UTH, and QY. Erie County AREC held a c.d. test; the last minute location of the control station atop the Red Cross Building proved successful. HCG is arranging amateur participation in coming CD tests. Lockport hams surprised RUY with a birthday party. Amateurs of the electronic section at Bell held a picnic at Killicott Cr. Pk. YL JVV, of Watertown, is a regular in NYS c.w. OBU visited RUF, ALP and LXW now have General Class licenses. Is ABC proceeding in Gowanda? OZR asked directions to Ray's and received a police escort to the QTH. Appointees, please check expiration dates on your certificates and send in for endorsement. EMW has new QTH where outdoor antennas are not allowed but will be on NYS again with indoor antenna. ZOL and BTB, while on vacation, visited VE3QB, ADW, SWL Switzer, SZGT, ZGS, GDB, NZZ, and others. BTB and ZOL make BPL for totals. COU spent two weeks at Camp Drum with the National Guard and while there visited WJQ, JWU, GYH, QBG, and ZSE; then to N.Y.C. and saw VNJ, NKD, K2BG, CGG, CUI, JXM, IIN, and WCL; and then on the way home LRW, TYC, and landline QSO with BNC and BRS. Traffic: W2BTB 1691, ZOL 739, RUF 250, TPN 121, COU 107, QAA 46, ZRC 46, WZQ 45, SJV 44, GRH 41, VEP 38, JWU 28, KEL 20, OE 18, RJJ 7, ZHU 2.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — RMs: GEG, NUG, PAM: AER. The Erie Radio Club reports via QN that the Erie County EC set-up shows 25 full members, 5 supporting, with drills on Sun. on 29,050 kc., along with 12 mobile units and 4 emergency radio units. It is with regret we record the passing of TAC, a real amateur and ex-officer of RAE. QPP tells us that WBA has an Elmac mobile rig. POS was heard on 6 meters down Sharon way recently. 4BIN, remembered as 8BIN, paid a visit to his old home town. The RAE gang played an important part in honoring Col. Gabrielski. Looks like ODF, QN, PSI, TMK, NXX, KLD, OIH, LKJ, and PIY did a swell job with mobile units in helping in the gala event. The Steel City Amateur Radio Club still talks about its Field Day. NBP returns to his old hunting ground with the KWH gang. NKM, one of the country's outstanding v.h.f. men, very sorrowfully confesses he has given up 2 meters and mailing his nice 2-meter DX cards to those who need the much-needed state confirmations. Unless we heard wrong NRG is no longer a single man. PAP now is a full-fledged civilian again. DNO spent Field Day at the KWH outfit. JT now is 100 per cent Collins. The boys from Altoona with *Hamateur News* sent in Field Day results with 223 contacts and the following taking part: POP, RYN, LJQ, TXQ, BEY, LQD, LIV, KFD, and PRO. Our old reliable friend from Johnstown, LIW, surprises us by writing from Norway as a field representative from Raytheon. He asks his many friends to write to him. Address mail to R. M. Ackley, Raytheon Tech. Rep. MAAG (NOR) A. F. Section, American Embassy, Oslo, Norway. The South Hills Brass Pounders and Modulators Annual Hamfest was held at South Park, Pittsburgh, Aug. 3rd. NCJ, up in Erie, reports he has a new exciter 80 to 10 meters. KNQ and a friend had a nice long chat with your SCM and Division Director (EG). LST was a lone visitor from Oil City to the hamfest. The MPO and UUG combination, along with KWA and JSH, represented a good portion of XNT, and OM A-1 operators. KUN, in Emporium, says he is ready for real traffic-handling. WN3SYW, in Glenhew, also holds Technician Class ticket. Traffic: (July) W3UHN 18, KUN 4, NCJ 2. (June) W3JSH 82.

CENTRAL DIVISION

ILLINOIS — SCM, H. F. Lund, W9KQL — Section Nets: ILLN (c.w.) 3515 kc.; IEN (phone) 3940 kc. SEC: QLZ, Asst. SEC: HFG, RAI; BUK, PAM; UQT. After completing a house-painting job, a vacation in Wisconsin, and rebuilding the rig your SCM again is active on the bands. The Rock Island, Starved Rock, and Weldon Springs Hamfests were well-attended and all reported a good time. Field Day report messages were received from IT, KA, KDX, PCS, UTI, WWO, WX, and WXV. OCG reworked his rig for use on 27

(Continued on page 74)



Two of the most important considerations in the design of a Communications receiver are the amount of voltage gain and the signal to noise ratio. Voltage gain is pretty well understood, the amount desired usually being that which will produce fair noise output from the receiver in the absence of an antenna or signal. It is good practice to provide some reserve gain to care for aging tubes and adverse operating conditions. When this re-

serve gain is available, the background noise level noted with the RF gain fully advanced will be high. This is not considered to be disadvantageous since the amount of gain actually in use can be controlled by a front panel RF gain control.

The amount of background noise in the absence of a signal bears no relation to the signal to noise ratio of the receiver nor does the amount of random line noise pickup. This point is frequently misunderstood, the signal to noise ratio often being incorrectly linked to the receiver's ability to reject noise. The best check that can be made on signal to noise ratio without the benefit of instruments is to note the amount of residual noise present when a weak signal is received in the absence of locally generated noise such as line noise or splatter. This can only supply rough information since no standard is available. Two receivers side by side would of course provide comparative data. The amount of selectivity used has some bearing on the signal to noise ratio; the narrower the selectivity, the better the signal to noise ratio up to the point where loss of sideband power becomes objectionable. This fact can best be appreciated when CW is received with the crystal filter switched to the most selective position. Although the background noise drops noticeably, the actual signal strength remains almost the same, or in the case of the HRO-Sixty, increases.

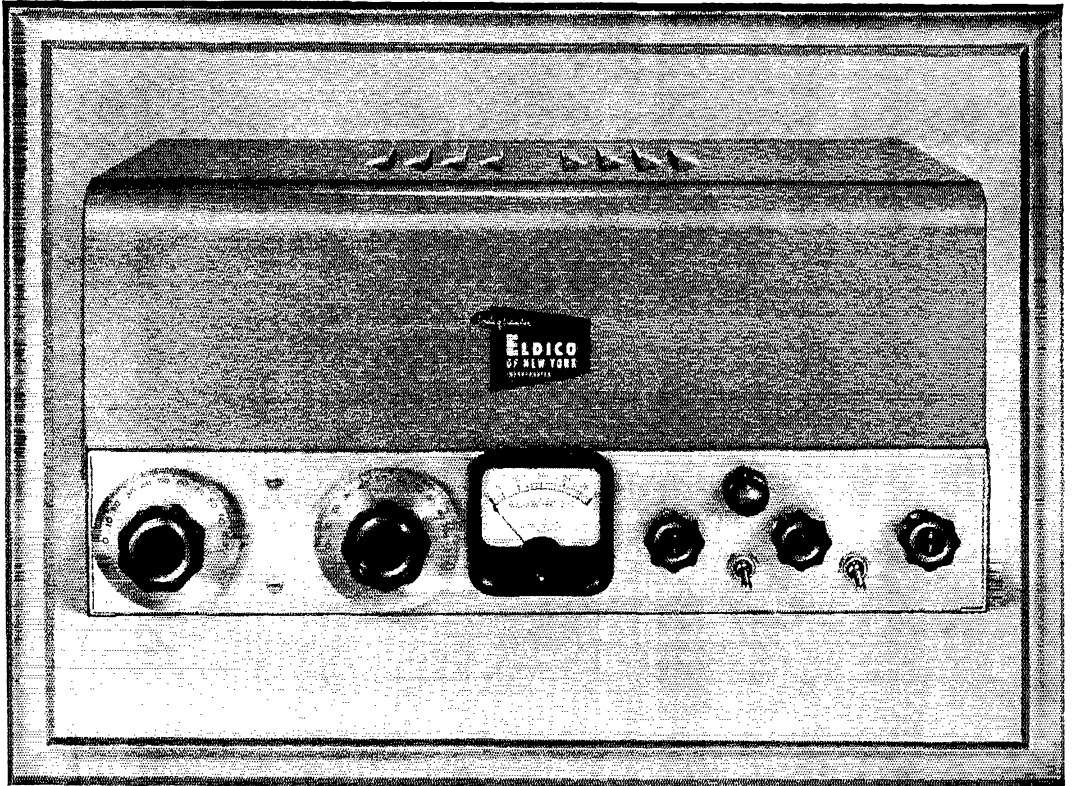
In all of our receivers we strive for maximum signal to noise ratio and reasonable gain. The gain is controlled in production by altering the cathode bias resistors of one or more tubes. The gain alteration actually takes place in the IF amplifier with the amount of RF gain being controlled as a design feature. Often when a receiver is retubed or the circuit altered changes in the bias are necessary.

While the "S" Meter of a receiver serves as an indication of relative signal strength, it should not be relied upon for comparison between receivers of the same or different manufacture. The "S" Meter sensitivity, or activity, is generally dependent on gain and design factors other than those which affect the signal to noise ratio. Additional preselectors added to receivers already using two stages of RF amplification seldom do any more than increase the "S" Meter reading. This could have been done more simply by increasing IF gain. If the receiver had sufficient front end gain the signal to noise ratio is unchanged or adversely affected by adding stages unless the added preselector stage is of better design. Too much front end gain results in cross modulation and poor overload characteristics.

JACK IVERS, W1HSV



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"My TR-75TV is doing Fb and so are the other two a couple of the boys here got after seeing mine. In a little over two weeks have made contacts with every US region (W1, W2, W3, etc.) to a VE1, VE2, VE7 and CM8CC. All reports were good, in fact I have yet to get anything less than RST559X."

W8EHC

"Your TR-75TV construction was simple and all components of the highest quality. Some DX and most of the States have been worked but best of all no complaints from TV owners."

WSUTC

"Incidentally the use of a TR-75TV has completely eliminated a bad case of TVI on Channel 5 which I have never been able to clear up with any of my other transmitters."

W2RME

"I think your TR-75TV outrates all other transmitters because it is so reasonably priced and since the kit gives the owner the experience of building a transmitter and seeing it work."

WN9QVP

"Everything considered, the TR-75TV is outstanding. Since its completion a little over a month ago I have worked 12 countries (ten confirmed)."

W2GAU

"Pleasantly surprised with high quality of components, the completeness and the excellent engineering and design of my TR-75TV transmitter kit."

W60AP

"TR-75TV is really working fine and I am reaching out. Worked Tacoma, Washington; Lebanon, Oregon; San Marino, California; Hobbs, New Mexico; so I am beginning to get around for just a green novice."

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Anchorage Alaska,

(Continued from page 70)

Me. Licensed operators around Chanutte AFB have organized an excellent club. GSB reports ten countries worked on 14-Mc. mobile. CSW is completing organization of the aeronautical c.d. warning net. 4MXU is slant 9 from Scott AFB working c.w. on 3.5, 7, and 14 Mc. Add to the list of 100 per cent ham families the Bremigans of Homewood with Dad, ZME; Mom, WNSP; and Son, RQT. Dad's brother is 7NBH. We have a good chance of getting a license-plate bill if each of us works hard to convince our local legislators. HR3RB, a former Danvilleite, spent two weeks visiting around the Vermilion County Area. PAO has moved to the 9.9- and 14-Mc. bands. CFX got a reissue of his old call under a new ticket after an absence of 11 years. ECP is 144-Mc. mobile with 2E26 final. Third harmonics of 144-Mc. signals are being received by MBI on the 430-Mc. band. BPU made DXCC with 110 countries confirmed. BJE dropped a dit and now is heard as BJ. Following a windstorm in which a distribution transformer was damaged, ICF has to contend with an 89.60-cycle sawtooth wave with 5 transients on 28 Mc. OQV graduated to General Class and QJR passed his Extra Class exam. 4NUU is a newcomer to Highland Park. NJE is delaying his vacation until the mobile rig is completed. CQJ got a mobile rig and converter but the h.c. radio still is missing. DOR moved into the same block with NJE and JRT; air time and TVI are both rationed. QIS has converted ARC-5 to 7 Mc. QAB, in order to get the rig from under the bed, is adding a room to his house. AUL operates in the 21-Mc. band and is trying to get converts. 4CVO/9 took a message from a JA for QSP to Washington, D. C. To expedite delivery he hopped a plane and made a personal delivery the same afternoon. EH sports a Collins KW-1 working into the famous 135-ft. vertical. LCG got WAS the hard way; his contacts take 30 to 90 minutes. BVM has added a 144-Mc. rig to his equipment array. Traffic: (July) W9YIX 188, CSW 106, SXL 30, W4MXU/9 22, W9LGR 12, YTV 11, LMC 9. (June) W9YIX 298, CSW 243, LGR 30, SXL 22, DOR 13, YTV 9, JLL 8, LMC 5.

INDIANA — SCM, Clifford C. McGuyer, W9DGA — OAC spends his time ragchewing. DKR now is with the Delco Radio Corporation. IZC works 20 meters. FLO is building new high-powered final amplifier for 2 meters. CGM has new receiver and has moved to Michigan. FJR and NTA have received their Advanced Class licenses. ESQ is president of the Kokomo Club, with YDP the club reporter. LOZ has 160- and 10-meter mobile. BXP is a papa. JBQ has new final amplifier. VGD likes Marconi-type antennas. PQA works 40 meters with an old 45 T.N.T. HSC and CMT are new OPS. The IRCC held its annual picnic at Indianapolis with good attendance and our Central Division Director, W9AND, was present. DHJ is installing 2-meter gear in his car. DLI, HDB, LEF, and DHJ attended the v.h.f. picnic at Turkey Run. O LX is a new member of QIN. TT received his Extra Class license. PPS is a new ORS. CMT is supervisor of signals for the C and O Railroad. ZIB is experimenting on 2 and 6 meters. CVN says his noise level is too great to work QIN. PEX has a mobile rig. WN9TOF and WN9TKO are working 2 meters. MUR is building 2-meter rig and reports lots of local 2-meter activity. PPS has new antenna tuner and received his 20-w.p.m. Code Proficiency sticker. YWE is a member of MARS and has new 200-watt final amplifier. BKJ had a nice vacation. FJI has recovered from an operation. MZE was promoted to corporal in the Air Force. KAS worked HZITA on 20-meter phone, and is building a 15-meter three-element rotary beam. JIJ reports QIN traffic for July at 235. BKJ, DKS, LDL, NYK, NTV, PMA, and EOQ provided communications for the National Guard as they passed through Fort Wayne. This is the most active mobile group in the section. PMT and KLR worked the IRCC picnic. UIA worked three Cuban stations on 6 meters within 30 minutes. FVM visited Evansville. MJV moved to Alaska. The XYL of DGA is WN9UHY. NZZ and JJJ made BPL for July. PEX and FSA had a nice vacation in the Dakotas. SNQ and OAC work 7 Mc. WN9UHV is new in Evansville and has new Harvey-Wells. Results of the phone-c.w. ball game at the IRCC picnic was 11 to 3 in favor of the c.w. team. JIJ was manager of the winning team. If you would like information on any ARRL appointment, contact the SCM. Traffic: (July) W9JUL 1099, NZZ 380, TT 310, YWE 89, WBA 71, BKJ 60, JBQ 57, PMT 47, KVE 42, DGA 36, DOK 34, VNV 34, DHJ 31, KAS 28, FZW 26, UMS 22, FSA 17, IFR 15, ZIB 15, DKR 13, PPS 13, QLW 9, BDP 8, HSC 6, YVS 2. (June) W9WBA 71, KAS 32, DKR 31, IZC 22, ZIB 22, IFR 10.

WISCONSIN — SCM, Reno W. Gotsch, W9RQM — SEC; OVO, PAM; ESJ, RM; IQW, Phone Net (BEN) 3950 kc. 6 p.m. C.V. Net (WIN) 7 p.m. 3625 kc. Statewide mobile emergency and c.d. frequency: 29,620 kc. The La-Crosse Club enjoyed a visit by ex-9YCV, now 4YCV, stationed with MARS-Army at Washington, D. C. IKY says his new QTH is the best radio location in the area. Since his XYL received her ticket HDV has to split operating time with her. QYH still is on 28 Mc. CXY was on the job on Armed Forces Day and has a Certificate of Merit for a solid copy of the message, as well as QSL cards for contacts with WAR, AIR, and NSS. WN9TWB is new in Kenosha on 3740 kc. New calls at Sturgeon Bay are SAC and UFY. FDX reports sponsorship of a Milwaukee Novice Net

(MNN) by the MRAC on 3735 kc. at 0900 Sundays and 1630 Thursdays. WN9RZJ is one of the founders. Tri-State meetings on assignment of frequencies and channels under the RACES program were attended and reported by RUF, Asst. SEC. Full information was made available to all ECs through OVO, Wisconsin SEC. Considerable favorable publicity in various journals was secured and reported through the efforts of ONY for amateur radio activities in the section. The BARC family outing was held July 20th. DDG raised beam to 60 ft. WN9SOH worked W4 on 144 Mc. FAN reports a 144-Mc. opening to Ohio July 27th. IQW finds it necessary to relinquish his duties as WIN Net Mgr. KXF picked up FPSAM for country No. 109. CTZ has new three-element beam on a windmill tower. BWM, MVO, and 4FJV were visitors in the Waupesa Area. The Wisconsin Council of Clubs held its fall meeting in conjunction with the Ground Hog Party at Watertown Sept. 14th on 144 Mc. LEE worked 9WVGZ, Iowa, for his 6th state. LJV, airborne mobile, was heard by LEE for over an hour while flying over Illinois. NYS has a 4-over-4 on top of new 120-ft. towers ILR is new EC for Kenosha. Traffic: W9SFL 85, HDV 17, FCP 9, IFS 9, CFP 8, CXY 8, RQM 8, OVO 7, MUM 5, FDX 3, NLE 2.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, J. W. Sikorski, W0RRN — SEC; GCP, RM; OLB. This will include some news from last month. New calls: KWW, Pierre, KVA and KVB, Sioux Falls. There is a new addition to the family of IEI and ZUS, Aberdeen. CLJ is working for Collins. GDE's rig absorbed some lightning but he's back on the air. New Advanced Class tickets: GGJ and CQL, Rapid City, and DTB, Centerville. BTK is mobile on 160, and 2PJ and PKE on 10 meters. GGJ says he has a new beam and is working 10 meters. DTB is EC for Turner County and BQG for Moody County. EYB visited 7RBU, ex-9HDO of Mitchell, who now works for Morrow at Salem, Ore. GCP is building a low-power modulator for his Lyco. After six years searching for Delaware, RRN finally received his WAS. BLZ has six long wires up and is adding at least two more. The Big Sioux Radio Club was organized at a picnic in Luverne, Minn. The Club includes members from Flandreau, Madison, and Trent, in South Dakota, and Pipestone, Luverne, and Uida, Minnesota. Traffic: (July) K9FAL 79, WISWX/8 2. (June) K9FAL 261, W9EHO 42.

MINNESOTA — SCM, Charles M. Bove, W0MXX — Asst. SCM, Jean Walter, 9KYE, SEC; BOL, RM; RPT. The Mobile Amateur Radio Corps put on a splendid demonstration at the Minneapolis Aquatennial. They had a request from the Aquatennial Committee to participate in this civic function. This involved emergency calls and control wherever large crowds were assembled, such as lake activities and the two large parades. The Mobile Corps responded 100 per cent. OTU has moved to Minneapolis. FIT, of Albert Lea, is responsible for two new Novices. For services rendered during the recent floods the St. Paul Red Cross Chapter has authorized a sum of money to purchase radio equipment for their chapter house to be at the disposal of the St. Paul amateurs in case of another emergency. TOZ and his XYL, who also is a ham, have moved to California. PCV is flying B29s between Japan and Korea. ATD now is mobile using an 815 in the final. Walt is on 10 meters. If you hear him give him a call. He also has a new pole for his 2- and 10-meter beams. EQO is running 8 watts with a Command transmitter on 75 meters. HTX is running 13,788 to a 6L6 on 80-meter c.w. OPA attended the St. Paul Radio Club picnic. HZR, ANY, and ACV are back from the armed service. HPY has built a new rig using p.p. 6146s. WN9IYP gave medical aid to yours truly on his last trip to the hospital. AIH has been handling a lot of DX traffic lately. Wouldn't it be wonderful if everybody joined the Emergency Corps? Drop a card to the SEC, Bob Prehm, W0BOL, 1130 Delaware, St. Paul, Minn. New Hams: IYP, KMN, KJZ, KHC, IMC, IDV, KMP, and KNI. Traffic: W0DQL 69, AIH 52, UCV 30, MXX 20, RXL 10, JNC 4, WN9IYP 3.

DELTA DIVISION

ARKANSAS — SCM, Fred Ward, W5LUX — Everyone enjoyed the meeting at Spothaven, on Lake Conway, near Conway, Ark. Our thanks to the Conway Radio Amateur League. JIC and PZC are new OBS and will transmit on the Arkansas net frequencies. DFX's new QTH is DeWitt, Ark. The University of Arkansas Amateur Radio Club had a big Field Day, using the call 5YM/5 with three rigs and eight operators. ANR and some of the boys are working 2 meters. OCO is active on 20 meters these days and UZB is working 10-meter mobile. AAE and PX are new ECs and Arkansas needs about a dozen more. FMF has been busy with code class and reports that four of the boys took exam and passed the Novice test, one boy 14, two 13, and one, a son, 11 years old. FMF now has two sons with tickets. SEP now has the call 0YIH. Fellows, check with EA and see if your mobile is listed. According to our records there are only nine mobile units in Arkansas. Don't forget the Fishery at DeValls Bluff Oct. 12th. Besides the fish we'll get some dope on civil defense and emergency net operation. Traffic: W5FA 32, LUX 5.

(Continued on page 76)

“USE MARCHING FIRE—and follow me!” Shouting this command, Lieutenant Carl Dodd struck out in advance of his platoon to lead the assault on Hill 256, near Subuk, Korea. During the fierce in-fighting that followed, he constantly inspired his men by his personal disregard of death. Once, alone, he wiped out a machine gun nest; another time, a mortar. After two furious days, Dodd’s outnumbered, but spirited, force had won the vital hill.

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(Continued from page 74)

MISSISSIPPI — SCM, Norman B. Feehan, W5JHS — The only new operator we have any record of this month is VME. There must be more so let's hear from you so we can welcome you to the fold. We now have a Mississippi MARS 'phone net in the State. RIM is Net Control. Let's all get behind him and give him all we've got. There is more news from Korea, thanks to RMC. JFE is in Japan with an AACs outfit after his recuperation from his wound. RUT is doing a bang-up job over there. IRLA, Jim from K5FBB, will be over there by the time this is printed. SFC checked into the Hurricane Net mobile with a fine signal. WA checks in under emergency power. RIM, RHG, and PFC are regular members from Jackson. Vacation time is nearly over. It is time to shine the old bug up for the traffic season. I hope there will be more for this column next month. Traffic: W5RIM 30, JHS 23.

TENNESSEE — SCM, Mark M. Bowelle, W4CXY — SEC: AEE. RM: AGC. PAM: PFF. Considering that this report is for the month of July, the number of reporting stations is very large. Fine work, gang; please keep those reports rolling in. TPN now meets at 6000 on 3980 kc. Mon. through Fri. with PZW as NCS, in addition to the regular time of 1900. Tue. and Thur. and 0800 Sun. TN (c.w. net) is back on 3635 kc. at 1900 Mon. through Sat. and RM AGC will welcome new members. Pick out the net and time that you like best and check in, fellows. Don't let low power 'phone or slow code speed keep you from this fine operating experience. Mary, VJX, has eliminated the "N" from her call and is active in emergency and c.w. nets. Along with her OM, NJE, she owns complete equipment for four stations, antennas and all. The Memphis Club had a fine booth at the Alert America C.D. Exhibit, demonstrated mobile net operation and did a fine job of selling ham radio to the general public. John Oliver, ex-4DF and now 6LZS, reports from Burbank and sends his 73 to the Tennessee gang. NBN has returned from duty with the Navy. OGG is handling a new 75-watt rig, RHO has TVI problems, and RMJ has gone mobile with a new Elmac in his flivver. FLW has about recovered from his recent fire. BAQ, HHK, UDQ, and UDI took a flying trip East and were able to attend the Maine Hamfest. Traffic: W4PFP 480, IIB 110, AGC 75, ODR 63, SUH 44, AEE 36, CXY 25, NJE 20, RHO 6, RMJ 6, NDC 3, PMR 3, BAQ 2, FLW 2, OGG 2.

GREAT LAKES DIVISION

KENTUCKY — SCM, I. W. Lyle, jr., W4KKG — K4WBG reports in with a nice two-month total. MWX, RM for this section, has everything ready for the coming season and KYN, SZL located at the Barren County Fair. UWA is new ham in Thompkinsville from Tennessee. NEP blew out two power transformers in two weeks! TAV went to scout camp but bemoaned the fact that she couldn't take a rig along — no 110! JUI, Kentucky's high-scoring frequency contest man, is building new temperature-controlled frequency standard. PRT reported that MGT bought a new TV set. Guess the rig will gather dust now. HI! CDA complains of the hot WX. It was only about 105 in my shack for a couple of months. Al! At least I think it was, I didn't spend much time there. SMU gets Advanced Class. TPA Technician Class licenses. TZZ worked Indiana and Illinois on 144 Mc. KZF still is rebuilding the entire shack. MFG now is at Fort Dix and looking down Kentucky way for some schedules. He signs K2WAO. My term expires January 2nd and because of the press of business I will be unable to accept nomination again as some of the fellows have mentioned. Get that nomination in right now for your candidate with the proper number of ARRL members signing same and start working to get him elected. Traffic: K4WBG 433, W4TAV 138, MWX 119, PRT 30, CDA 11, NEP 7, KKG 4, SZL 1.

MICHIGAN — SCM, Norman C. MacPhail, W8DLZ — Asst. SCMs: R. B. Cooper, AQA; J. R. Beljan, SCW; M. C. Wills, CPB. SEC: GJH. RMs: YKC, ELW, UKV. PAM: UTH. New appointments: EC to WBZ (Bay County); EC to TPT (Saginaw County); OBS to FGB and GNS. The annual BR picnic at Midland was a big success. Hats off to BVY and his gang for a great job. New officers for the BR are LR, pres.; AQA, QPO, and TDO, directors; NZZ, JUQ, and LR, alt. directors; AQA, secy.-treas. Net Control Stations are AQA, EEF, MQU, TDO, DXJ, NZZ, SPF, JYJ, TQP, and DXH. DXJ will give the time signals preceding the MEN on Sunday mornings, and DXH will act as NCS for the coming year. The Inter-county Emergency Radio Assn. picnic at Kensington was by far the biggest event of the year. More than 1500 attended, with 270 mobiles much in evidence. ZLK advises the Cherryland Radio Club has a new 3-kw. generator. HKT is moving into his new home, and the shack has number one priority. DQL has been QRT since Aug. 11th. Leonard says he will attempt portable operation from wherever the Army stations him. NQ is building new dock, painting boat, and cutting grass. YIN is up to his ears in traffic and can be heard on QMN, 8RN, EAN, and CAN. GNS has a new rig running 500 watts to a pair of 812As. ENX and GNK are conducting c.d. tests around Grand Marais. WNSJPY is going Novice-mobile. CRH has a new BC-610. CTC has heard working portable from his vacation spot on Torch Lake. ZLMB/8 is back at his old stamping grounds for the summer. Welcome back,

Herm. CPB is eager for VE8MC to get back up in the deep snow so they can renew their daily schedules on 20 meters. Traffic: (July) W8ZGT 1319, ELW 145, NZZ 132, JYJ 125, ILP 68, QBO 56, SPF 52, IV 37, 1KX 36, ZLK 36, CPB 31, QJX 26, AQA 24, GJX 18, NCH 14, DLZ 12, KBI 12, DAP 11, GJB 11, LR 10, QGZ 9, HKT 7, FX 5, TQP 1. (June) W8WXO 90, YIN 53, YKC 47, NOH 32, GNS 20, QJX 19, FFG 11, FX 9, TQP 8, WN&JPY 7, W8EGI 6, PUV 6, DQL 4, MGQ 2.

OHIO — SCM, John E. Siringer, W8AJW — Asst. SCMs: C. D. Hall, SPUN, and J. E. Erickson, 8DAE. SEC: UPB. PAM: PUN. RMs: DAE and PMJ. One BPL card was issued this month to you, guessed it, ARO. New appointee is PM, OO II and IV. The majority of the lads are complaining about the heat and, needless to say, the traffic list bears out the fact that something has gotten the boys down. ZLP was presented with a YL harmonic, Karen Louise. IZQ is very QRL building an addition to his home. YGR extends orchids to the few stalwarts who have kept BN going the past couple of months. KS, former c.w. hound, has slipped to 10-meter mobile with A3 emission. GZ has spent most of the month at Camp Grayling, Mich. The Cincy gang's July meeting was held at the USNRTC which included a special tour allowing inspection of equipment. FYW has been appointed Radio Officer for the State of Ohio under the RACES program. APF has replaced WAB as EC for Franklin County. MQG is the new editor of *Carascope*. CARA held a picnic Sept. 7th. Springfield's Q5 states that ENS has a new 20-meter beam. FNM has received his Ph.D. in education at John Harvard. EOP now is smoking OP's (other people's) cigarettes, and KJP is the latest member to get his Novice ticket. Our live wire SEC tells us that on Aug. 23rd and 24th the CAP conducted an SARCAP (Search and Rescue, Civil Air Patrol). On Oct. 4th the CACARC will hold a hamfest at Gray's Armory in Cleveland. CTZ and AJJ will perform most of the leg-work under the direction of YPE, pres. On Sept. 27th and 28th, the CACARC sponsored an All-Band Contest. LYD is doing a good job with the RACES program in Cleveland. It's been said that JNF has substituted matchbook-cover collecting in place of amateur radio. LJS, QSL Manager, bemoans the fact that many amateurs with cards on file have not sent in self-addressed envelopes. The *Shack Gossip* from over Toledo way relates that the local amateurs were profusely praised by the Director of Civil Defense for their role in the Atomic Bomb Test of June 8th: BN has gone 160-meter mobile; KEU, KET, KIS, and KIX are new Novice licensees in the Toledo Area; and HUX and HWX need two cards each for WAS. EQN is getting close to his WAOC (Worked All Ohio Counties) certificate. Someone suggested to Hamlin that he install two mobile rigs in his car, travel to the seldom-heard counties, and work himself. Traffic: (July) W8ARO 447, FYO 197, UPB 119, DAE 72, YGR 34, AL 22, ET 21, TLW 17, AJW 15, RN 11, LBH 6, DMD 4, FXJ 4, GZ 3, WE 3, BUM 2, PBX 2, ZJM 2. (June) W8UPB 127, AQ 6, JUJ 6.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, E W2LLI — RMs: TYC, KBT, PAMs: IJG, JQI, K2CA. VP, DVZ, LEL, YOK, NIX, LZM, and PGE are mobile on 3.8 and 28 Mc. YOK is Advanced Class. FRY has returned to Michigan. KN2AUX is a new ham in Suffern. IVS is portable at a camp in Phoenicia. BLU and HEI claim it's too hot in the shack these days for ham radio. LEL has upped anchor for Italy. PGE works out FB with new Elmac. LZM is relief operator for the boys on vacation at WKNY. SIF is an FB control operator at c.d. headquarters in Ulster. VP is enjoying a short vacation. ILI has been awarded an honorary membership in the Rip Van Winkle Club. MRR is recovering from a serious illness. Gil is EC for Rockland and has 11 mobiles operating on 29.6 Mc. as part of the AREC. K2CA and Novice EOM, recently ill, are recovering. AWF will be A3 on all bands soon. RMM is mobile with a new Elmac. APF is mobile on 144 and 28 Mc. CLL, our former SCM, will become active again this fall. Traffickers attention: NYS meets on 3615 kc. at 7 p.m.; NYS on 3595 kc. at 8 p.m. daily; NYS 'Phone Net, 3980 kc. Mon. through Sat. at 6:30 p.m. and Sun. at 8:30 a.m. Your cooperation during the past season is appreciated and progress has been made. Let us continue to progress. Our section total will reach an all-time high this season if you will take that minute to send in your report no matter how small it may be. Please don't forget your comments for this column. PGV is camping in the Adirondacks and is mobile on 28 Mc. GM is on vacation in West Virginia. HEI is Advanced Class and will handle traffic on 3.8 Mc. Endorsements: QGH, ITF, and AAR as EC. Traffic: (July) W2LRW 173, IVS 112, EFU 53, TYC 53, ILI 40, BLU 12, APH 9, HEI 3. (June) W2EFU 28.

NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, jr., W2OBU — Asst. SCM, Harry Danals, 2TUK. SEC: KTF. RM: TUK. PAM: YBT. This month's report was written by TUK while our SCM enjoys a well-deserved vacation. BVY reports a very busy month in Kings County AREC. FI and Nassau AREC staged a 144-Mc. demonstration for c.d. officials commemorating the second anniversary of c.d. activities. QBR assists with Nassau AREC drills from county c.d. headquarters. VKF re-

(Continued on page 78)

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(Continued from page 76)

ports c.d. buttons are being distributed in N.Y.C. SEC KTF shows continued AREC improvement. NLI traffic net had good summer coverage with GXC, LPJ, OBU, OJX, and VNJ active. NLI welcomes your attendance at 7:30 p.m. EST on 3630 kc. Mon. through Fri. ZAI reports 10-meter AREC drills Thurs. at 8-9 p.m. on 28.72 Mc. KNA sparks 144-Mc. Suffolk AREC on Mon. at 9 p.m. OGX has new 813 final. IN is looking for new QTH. AOD reports little activity on 420 Mc. YBT, PAM for NLI, is rebuilding. CIT, QBR, QBS, and TUK are active with Freeport Naval Reserve. CLG is increasing power on phone. LPJ has a new Viking rig. EC has his Extra Class ticket. GG and his XYL vacationed in VP9-Land. RWQ is refinishing the shack. EBY and WL are active Official Observers. KN2AFY has a good 2-meter signal. VNJ is leaving for Northern New Jersey and NLI loses one of its best members. JZX, YBT, AD, CDG, GIC, and WFY assisted in the Air Race Radio Net, relaying reports on the Women's Transcontinental Air Race. JZX attended the Awards Dinner where amateur radio received praise for its valuable assistance. BQM is active on 75-meter AREC net, Sundays 10 A.M., 3910 kc. DLP, without a home station, does very well with mobile rig. DIC has new antenna for 75 meters. PF spent time at K2USA. TUK finally is on 144 Mc. from new QTH. OBU visited RUF and VE3EAM while on vacation up North. KEB assists at GBF in AREC drills while the OM, KPF, works mobile on 2 and 10 meters. VL and K2AC are mobile on all bands with Elmac rigs. CB is going after the noise on 144-Mc. mobile while daughter, KAE, goes after DX on 14 Mc. WN2KDI is looking for Western contacts to complete Novice WAS. IQS is going high power on all bands. BFN is joining the ever-increasing numbers on 10 meters. GLU is watching the TV set most of the time. IBQ has new 2-meter beam. FDM is going on 144 Mc. KAC is on 10-meter mobile with new Gonset Commander. The Tu-Boro Club offers a certificate to anyone who contacts five of its members on any band, phone or c.w. LGK will be active on 10 meters in the October CD Party. The Lake Success, Mid-Island, and Nassau Clubs, together with MARS members, demonstrated amateur radio at the Mineola Fair for the third consecutive year. UXY is on 2- and 20-meter mobile. Remember the Hudson Division Convention at Albany this year. Join the AREC and prepare for possible emergency work or RACES activity. Drop in on the section traffic nets whenever you have traffic. The ORS and OPS boys will always help with reliable traffic know-how. Traffic: W2VNI 230, GXC 145, EC 108, LPJ 78, JZX 60, DIC 30, LGG 26, IN 12, BQM 9, PF 8, YBT 6, CLG 4, DLP 3, OGX 2.

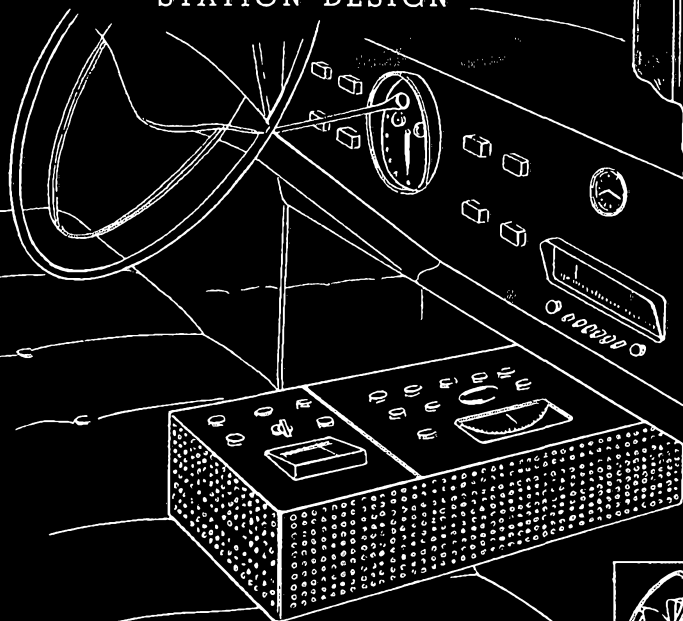
NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — Asst. SCM, Donald V. Reid, 2FMG. SEC: NKD. We are pleased to announce the appointment of NKD, your former SCM, as the new SEC. Please forward AREC activity reports to him at 1082 Anna St., Elizabeth, N. J., N. N.J. Phone Net meets at 9 a.m. Sun., 3900 kc.; Jersey Net (c.w.) nightly except Sun. on 3695 kc.; N.J.C.D. Phone Net 3993 kc., Sun. at 9:30 A.M.; N.J.C.D. (c.w.) Net Tues. at 7:45 p.m., RG NCS. CCS has been active as Net Control Station for the TCPN and C.D. Nets. CFB has received his ORS certificate. ESW/LUL prepared Hawthorne c.d. drill held in early September. IKO, Springfield, has just received his M.S. Degree from Stevens Institute of Technology. COT reports 6 meters open occasionally from Canada and east of the Mississippi during the month of July. CUI has been active on four nets. CWK just received his DXCC certificate. JKH visited W1AW and was very pleased with our Headquarters station. JBN has new 2-meter mobile rig in operation. LMB now is located at 699 Summit St. N., Barberton, Ohio. Good luck, Herm, at your new QTH. NIY won the Vermont QSO Party as high for N.N.J. NKD now is on 144 Mc. with 829 final, crystal-controlled converter and five-element rotary beam and is very active in many nets. OUS is 2-meter Net Control for Monmouth County c.d. communications net 9 p.m. Mon. on 147.150 Mc. OPS's new QTH is Livingston, N. J. ZBY visited Palisades Amusement Park MARS radio station. 3TKR has received his General Class license and now is on 10 meters at new QTH in Paterson with 40 watts on three-element rotary beam, and has 25 watts mobile. He reports he has joined the Passaic Valley Radio Club and now has become a member of the Jersey gang. Glad to have you join us. Another newcomer to the section is KH6ADY. Ted now is Supply Officer at NAD, Earle, N. J. EWZ reports fifteen days active duty as Commanding Officer of the 823rd Signal Operations Company at Fort Monmouth. Traffic: (July) W2DXD 217, CCS 206, CUI 143, EAS 49, NKD 38, LMB 29, CJX 8, OUS 8, CFB 3, COT 2, NIY 2. (June) W2CUI 150, OUS 34.

MIDWEST DIVISION

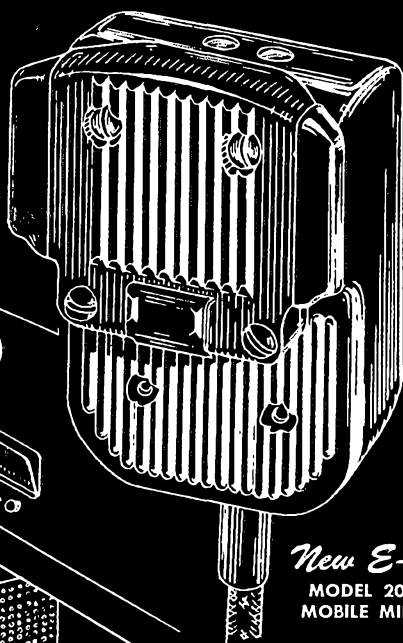
IOWA — SCM, Wm. G. Davis, W6PP — Things are quiet and reports few but this is vacation time. Mobile activity is very high judging from the things I hear. DLD vacationed in California. DFC now has Advanced Class ticket, as has BVE. BBZ has Extra Class license. TGG reports from Greenland; he is on way to Pole. The Waterloo Club visited the Marshalltown Club and put on an S.E.T. with 12 mobiles on 29.6 Mc. 9MQV visited NYX. The

(Continued on page 80)

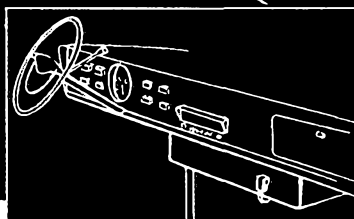
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Reconciling ham radio with the symbol of the American highway is a difficult problem since modern automobiles are seldom designed with amateur radio installations in mind. Here is a unique, universal installation that should prove acceptable to critical XYL's across the land. The receiver and transmitter are mounted in an oblong box that pivots from a point under the dash. The equipment housing is reinforced with angle stock for rigidity. Dimensions are limited only by your own requirements. The pivot mechanism is a simple pipe stand held on top and bottom. The pipe should be threaded by a local plumber to permit nuts and washers to snugly hold the equipment case, yet permit it to pivot 90°. When not in use, the entire station is simply pushed under the dashboard. And, unlike the inconsiderate

automotive designer, Electro-Voice has designed, specifically for mobile operation, the new Model 208, a handheld, light-weight carbon microphone. This remarkable unit is a single button, high output, carbon microphone designed for maximum intelligibility. A panel mounting bracket included with the microphone holds it face in on dashboard or side of transmitter . . . thus, when it is removed it is instantly ready for use. A differential noise-cancelling design (the first ever engineered at a popular price), to be operated close to your mouth, it has a high impact gray styrene case which is shock resistant and water proof. Press-to-talk switch actuates button and relay simultaneously. Amazingly enough, the amateur net is only \$9.90. See your E-V distributor today!

W8HCW

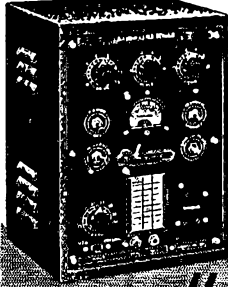
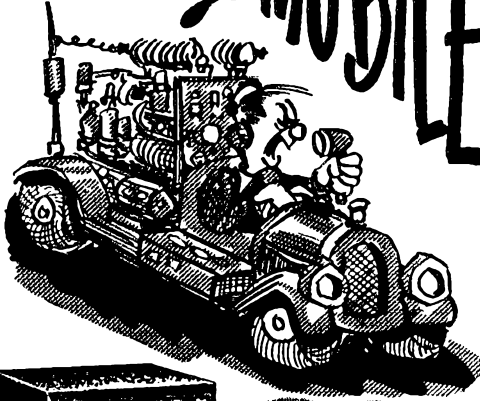
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Iowa 75 picnic was a great success with 103 in attendance, including the SCM, Asst. SCM, and SEC. YKS now is reporting on TLGN. VRA reports that the Waterloo gang is very active on its EC drills. He complains, though, that the reports from the other ECs in the State are few. PP had a swell vacation rock-hunting in Wyoming and Colorado, and visited with ENV at Denver and PNK at Climax, Colo. Both are former Iowans, one from Mitchellville and one from Waterloo. PNK claims to be the highest ham in the U.S.A. and so far has no challengers. Vacations have cut down the reports this month. Let's have the news when you get home, fellows. Traffic: W0SCA 552, BDR 195, BVE 85, QVA 82, BBZ 30, PZO 4.

KANSAS — SCM, Earl N. Johnston, W0IGV — SEC: PAH, PAM; HEC, RM; FDJ. The Johnson County Radio Amateurs Club elected following new officers: FL/8, pres.; DTD, vice-pres.; LQV, secy.; ECZ, treas.; WMH, act. mgr.; CIA, technical chairman; and LAI, publicity. The Club made a field trip through WDAF-TV July 25th. The CKRC of Salina has a new call, KQU, with STC as custodian. CKRC held its first c.d. drill with c.d. officials July 18th. Four fixed stations and five mobiles participated. The new antenna on City Hall gave 25-mile range with 8-9 signals all the way. The WARC of Wichita holds weekly transmitter hunts and now has more than 60 mobiles. CVN has a new Viking. STC has new 10-meter beam. ILB is on 40- and 80-meter c.w. WN0FOG is now W0FOG. BWB has new Gonset. The Missouri Valley Emergency Net, reporting weekly drills with 100 per cent attendance, has 14 mobiles out of 16 on the Net. EOT, of Chanute, has new Viking and IFR is working on mobile rig. BNU was active with traffic during July. NCV and WIT, of Topeka, had an enjoyable trip to Teton Mts. camping out with the family and mobilizing to their hearts' content. IMH has new Elmco in the car. SWR is going to town with his composite mobile rig on 75 meters. ELW is very active mobile on 10 meters and had lots of contacts while vacationing in Chicago. Traffic: W0NIY 96, BLI 37, BNU 30, FDJ 19, ICV 4, PB 4, IUB 2, YFE 1.

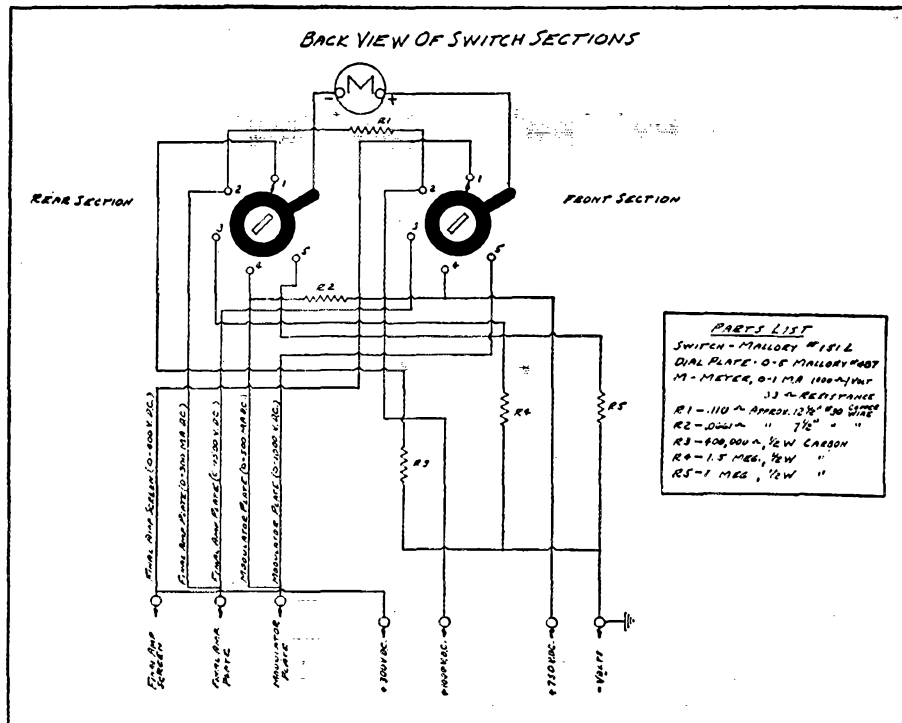
MISSOURI — SCM, Clarence L. Arundale, W0GBJ — SEC: VRF. The Tri-State Radio Society held its annual picnic at Cunningham Park, in Joplin, July 27th. The picnic was well attended and lots of nice prizes were distributed at the drawing. The St. Louis Amateur Radio Club held its annual picnic June 20th and Field Day the 21st. Those participating were CAR, QZL, EST, CDA, and WN0GPN. The Club recently acquired a 3000-watt emergency generator. The Northwest St. Louis Amateur Radio Club and the South St. Louis Amateur Radio Club participated in Field Day activities. RD is pounding brass for the merchant marine. IWZ now is located in Linn, Mo., after seeing service at KG6 where he met our ex-Director, DEA. UXQ has moved from Rolla to St. Louis and has accepted a position with Electro-Communications located in Clayton. DPC and RDU have 420-Mc. television transmitters near completion which have 832As in the final. Both transmitters use R. M. A. Sync. signals and image orthicons in their cameras. JEU is pounding brass the hard way. He uses 1½-h.p. gas engine, belt-driven generator, 6-volt battery and vibrator power supply for receiver and transmitter which runs 3 watts. PME is operating at EDA. OUD is troubled with falling plaster in the shack. RR/mm has discontinued operation because of BCI on the boat. BAF/m kept 40-meter schedule with KIK while on his vacation trip. QXO makes BPL again. The summer heat ruined PLJ's mike. CXE is back from a 4-week trip to the West Coast and GCL is touring the West on his vacation. WAP is QRL work. 5SRG paid us a visit. Traffic: (July) W0QXO 661, CPI 118, HUI 58, K9WBD 33, W0KIK 25, EBE 12, OUD 9, CKQ 5, GBJ 4, EDA 2, GCL 1. (June) W0WAP 18, QMF 8.

NEBRASKA — SCM, Guy R. Bailey, W0KJP — It is with deep regret your SCM reports the death of our former director, VHR. Chet was a great ham and we all will miss him. AUH reports new officers of the Grand Island Club are DW, pres.; AUH, secy.-treas. AYM also reports new officers of SENRC are BWK, pres.; ZJF, vice-pres.; WKP, secy.-treas.; and GTW, act. mgr. Margaret also says 5JOV was a recent visitor to SENRC, his old stamping ground. CKZ has rebuilt his rig and now is operating on 10 meters. EXP, ATU, and CBH are working 20 meters for the summer. RQK is putting up new sky hook for 20 meters. FRN will attend M.I.T. this fall. QXR, IOS, YMU, GFQ, JDJ, and HQQ attended the Estee Park Hamfest. M3RR, ISV, DPS, GFQ, and ENE are new members of the Ak-Sar-Ben Radio Club. JKE received the prize for designing the Club QSL card for station EQU, which will be sent to all Field Day contacts. The local gang sure is going to miss CSN. Mig is moving to San Jose, Calif., where Doc, ex-BBX, now is established. QHG is doing a swell job keeping Omaha on the 75-meter net. All the rest of the gang here, including the SCM, are QRL for various reasons. New officers of the Falls City Radio Club are JUJ, pres.; APH, vice-pres.; and BQR, secy.-treas. BNF reports the most active hams in Kearney are CSE, FOW, FJU, HGI, KLB and, of course, Glen himself. Traffic: W0QHG 36.

By the time you read this, Floyd Campbell, W0CBH, will be your new SCM. See page 6 for his address.

(Continued on page 82)

MALLORY HAM BULLETIN



An Interesting New Application for the Mallory 151-L Hamswitch*

This switch may be used conveniently for switching a single meter into or out of 5 isolated circuits. Ample space is provided between its two switch sections for soldering meter multiplying resistors directly to its soldering lugs. Thus, range expansion of the meter may be had automatically as the switch is actuated from circuit to circuit.

Use this switch with voltages up to and including 1500 volts DC. Because its simple construction omits the two circuit-closing center sections, it must be used with multiplying resistors exclusively when measuring the flow of

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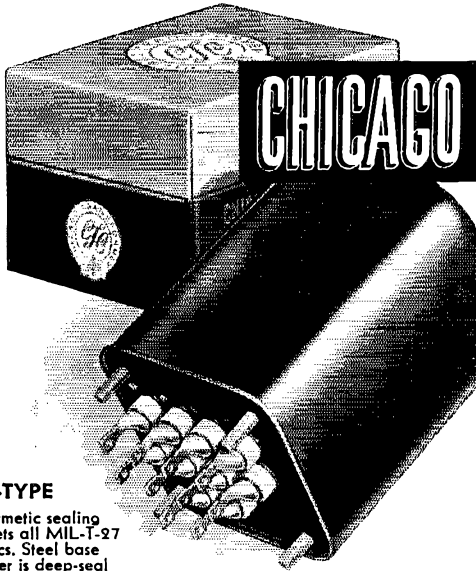
Send for complete details on this switch.
A copy of the above schematic will be sent upon your request.

*Reg. U. S. Pat. Off.

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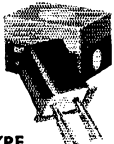
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NEW ENGLAND DIVISION

CONNECTICUT — SCM, Roger C. Amundsen, W1HYF — SEC: LKF. PAM: FOB. RM: KYQ. CN-3640 kc., CPN-3880 kc., CEN-29,680 kc. FOB is our new PAM and will have CPN in good order by the time this is published. NLM is new ORS, and QJM has been reinstated as ORS now that he has been discharged from USN and has a farm. The following had EC certificates endorsed this month: SUD, ODG, HRR, GIX, AOS, KYQ, and RFL. WNIUFF/8 can be heard on 3713 kc. from Ohio for a month. BDI is putting mobile in a new car. Sorry to hear of Silent Key at WIEJI. RRE has a new Viking coming. CN now meets at 9 A.M. Sundays to clear traffic for CPN and also for ragchews. SJO now is NCS for TCPN. QNS for CN: KYQ 23, LV and RFJ 17. RPQ and BCE helped BVB put up new 40-foot vertical. UAC is an ex-WN. WN1WAP, WN1WAV, WN1VJG, and WN1VJH are among the new blood in this section. When you read this we will have had our fall net meeting and things will be in full swing for a real active season. Reports will be more complete, we hope. Traffic: (July) WISJO 366, KYQ 91, LV 48, ODW 45, AW 43, BDI 41, HYF 25, RWS 21, RRE 18, NEK 6. (June) WIRFJ7.

CONNECTICUT QSO PARTY

October 25-26, 1952

All Connecticut amateurs are cordially invited to take part in the Fifth Annual Connecticut QSO Party to be sponsored by the Connecticut Wireless Assn.

Rules: 1) The Party will begin at 5:00 p.m. EST October 25th and end at 11:00 p.m. EST October 26th. 2) Any and all amateur bands may be used, and either phone, c.w., or both. C.w.-to-phone and cross-band contacts are permitted, but no extra credit is allowed for such QSOs. 3) The general call will be "CQ (CN)" on c.w. and "CQ Connecticut" on phone. 4) The same station may be counted but once regardless of band. Mobile, portable and home stations covered by the same station license all constitute the same station. 5) Exchange names of town areas. 6) Score 1 point per contact; multiply contact points by number of town areas worked for final score. 7) Reports must show times of QSO, call of stations worked, town area of station worked. All reports must be postmarked no later than November 15th and should be sent to H. A. Bubb, W1JTD, 676 Middle Turnpike, Manchester, Conn. 8) Prizes will be awarded to the winners. All decisions of the C.W.A. Contest Committee will be final.

Here is an opportunity to see how many Connecticut stations you can work in a 30-hour period. Get on the air October 25th and 26th and meet the gang around your section!

MAINE — SCM, Orestes R. Brackett, W1PTL — SEC: BYK. RM: LKP. The Pine Tree Net meets on 3596 kc. at 1900 EDST, Mon. through Fri. VWN, from Warren, has his new ticket and WAS, from Portland, also got his after many heart-breaking tries. Nice going, Vince. SRW has a swell signal on 75 meters. Sure good to hear him in there. The gang from the PAWA in Portland sure went all out to see that the hamfest there was super-duper this year. The entertainment was of the best, quite a bit different from the average, and there were about 350 in attendance. Some very nice prizes were given, among which was one of the new Viking transmitter kits which was won by the XYL of W1QQY. I guess Al is going to claim it, though, and already he has it together and on the air. There were many hams from out of the State. As a matter of fact I believe there were more from out of the State than there were from within. TUT won the foot-sending contest, with 3MAX coming in a close second. KHGGI, from the Hawaiian Islands, came the farthest to attend. QKG is back with us on the air after a long absence. Traffic: W1LKP 51, SUX 24, EFR 18, HXQ 11, VV 11, PTL 8, BX 4.

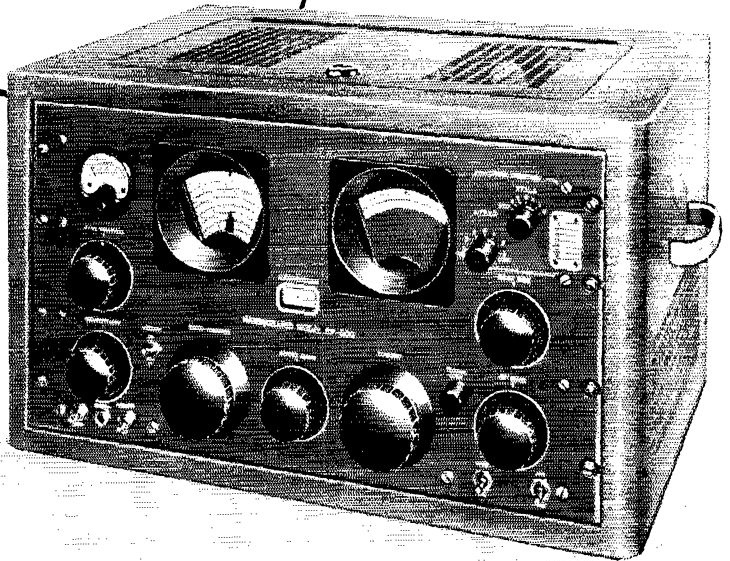
EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — TCY is our new EC for Watertown. UTH is new OO. Class 1V. Appointments endorsed for another year: MCR Boston, SMV Cohasset, BB Winthrop, BKR Westford, Carlisle Littleton, Tyngsboro, as ECs; BB and BHW as OOs. LMU as OES and OBS; BDU and JCK as ORS; AAL as RM. WCO is a new ham in Needham on 28 Mc. OSX has a new baby YL. PLQ now is in the Air Corps. FWS and his XYL went to VO-Land to see his second grandson. TSJ and TQQ have Class A. UPS, Dedham, has Harvey Wells transmitter. UXN is on 28 Mc. SAR and QKY are mobile on 28 Mc. RGW and WB are on with TTY on 144 Mc. SH has rig on 28 Mc. in the car. The South Shore Club held its summer meeting in July. MEG has Defense Dept. Certificate of Merit, also WNH certificate No. 31. TYA is at Camp Gordon, Ga. HFX is on

(Continued on page 84)



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for selective channel operations

With its six crystal-controlled fixed-frequencies, the "SP-600" is the perfect receiver for point-to-point and network applications. Pre-arrange day and night fixed-frequencies. With crystal control you can select your desired channels immediately without searching. You'll always be on the nose because of crystal control.

The "SP-600-JX," built to JAN specs and specially ruggedized to provide years of day-in-day-out competent perform-

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But whether you want to operate on a fixed-frequency for contact with an individual station or network, or roam the entire receiver range from 540 Kc to 54 Mc in search of other contacts, you just can't operate a finer receiver than the "SP-600-JX."

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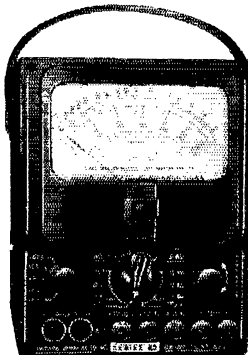


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(20,000 Ohms per Volt)
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60 Megohms,
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A compact, laboratory type, *high sensitivity* test set indispensable for test and maintenance of modern amateur communications equipment.

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CURRENT RANGES: 0-120 microamps; 0-1.2-12-120-MA;
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RESISTANCE RANGES: 0-6000—600K—6 Meg—60 Megohms.

DECIBEL RANGES: From -26 to +70DB.

Complete with batteries and test leads..... **\$3995**

PLUS superior physical features:

- ★ 4½", 50 microamps, Easy Reading Meter.
- ★ Heavy duty bakelite case 5½ x 7½ x 3".
- ★ Deep etched, anodized aluminum panel.
- ★ Recessed 6000 volt safety jacks.
- ★ Only two pin jacks for all standard ranges.

LC-1 LEATHER CARRYING CASE—Custom designed, top-grain cowhide case with tool and test lead compartment. **\$9.50**
See Series 85 and other famous "Precision" instruments, on display at leading radio parts and ham equipment distributors. Write for latest catalog.

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92-27 Horace Harding Blvd., Elmhurst 13, N. Y.

3.5 Mc. with BC-457. HPH won top prize at the Portland Hamfest, an 876 receiver. He is out of the Navy. Quite a few from this section also were at Portland: FWS, ALP, MME, SAI, BB, IIM, SCS, SS, LAU, MPP, TY, and many others. The Falmouth Amateur Radio Club, UG/1, was out on Field Day. DWO is painting his house. RDV has rig in the car on 28 Mc. The Sharon C.D. Net helped out in a recent forest-fire fight. EMG has been taking it easy on nets. AVY went to Portland. BB has a sked with Fletcher Ice Island at North Pole. WU has a pair of 2-125As. AKN is on from his camp in Wareham. PEX is busy with CAP. TQS/1, in Provincetown, is trying to make WAS, 24 more to go. UTH is on almost all bands. MEV has moved all his things to Maine. Luck to you, Emery. KYO has moved to Maine. The Gypsy Radio Club held an outing. John George passed his exam. BSY and his XYL, WN1WAB, moved to Weston. APM, of Hingham, has back the call that he had in 1923; he is on 3.5 Mc. VJO and TIO are new hams in Winthrop. Traffic: (July) WIEMG 95, TY 67, JCK 17, AVY 15, JFS 14, RSE 14, BB 11, WU 10, BY 9, AKN 4, UTH 2, (June) WIJCK 80, BGW 10, PEX 4, QON 4, TQS 3.

WESTERN MASSACHUSETTS—SCM, Victor W. Paounoff, W1E0B—SEC: JYH. PAM: RDR. RM: BVR. WMN meets Mon. through Fri. at 7 p.m. on 3560 kc. TZA has been accepted by the University of Massachusetts and will start this fall. WN1TVJ spent part of the summer portable from Jaffrey, N. H. BDV is using 10-watt 'phone and c.w. from York Beach this summer. COI is planning more rhombics up in the hills. Response to inquiries about the slow-speed net have been low. How about you newcomers and old-timers? Here is a chance to obtain some training in net operation. It is useful for both c.w. and 'phone net operation. SPF sends Official Bulletins in Worcester on 28,720 kc. Mon., Wed., and Sat. at 7:15 p.m. There are 23 AREC 'phone stations on the Worcester 10-meter net. BDV carried the mail in Maine. GVJ attended the Portland Hamfest. AZW sent activities report on many of the Pittsfield gang. Many thanks. BKG finally finished his home and a new VFO. Hope he will become active again. WN1VZX, at 13 years, is the youngest member of the Pittsfield RC. HRC has moved from Rhode Island to Pittsfield. Welcome. Clayt. JLT is up to 180 countries. SDS is building remote tuning unit for end-fed antenna. New hams in the Pittsfield Area include WNs WCG, VUY, WUK, VZX, WCC, and UEG. EG formerly was TAO. Looks like most of the Pittsfield gang spent the summer rebuilding or experimenting. There should be plenty of activity from that direction this coming season. Traffic: (July) W1BVR 38, TVJ 13, SDT 10, HRV 9, GVJ 6. (June) W1BVR 54, TZA 19, GVT 11.

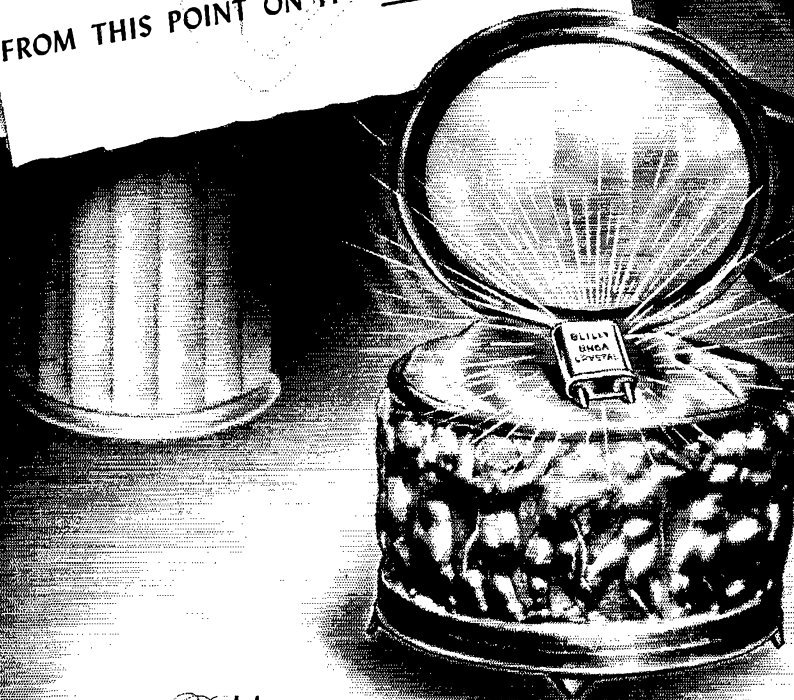
NEW HAMPSHIRE—SCM, Carroll A. Currier, W1GMH—RM: CRW. This is my first report as your new SCM and I hope that I will receive the same support that has been given to Norm and assure you that I always will be ready to help in any way that I can. The news must come from you, so keep it coming. A post card will do. N1TVQ and N1UNV are now Gen. Cl. NAZ and N1UGQ recently were married. The Nashua Mike and Key Club have new poles up for antennas. Congratulations to CRW on the organization of the World Wide Network and the great job they are doing. SGD and QHS have mobile rigs. Now that we are to start our winter's busy season why not get in some of the various nets and get in some good practice in traffic-handling and also meet some great fellows? Do you know that we have top honors in the New England States for traffic handled per station reporting? EKN has been called to active duty in the Naval Reserve. BT says he has his TVI licked. Don't forget to send in some news items and above all those reports on traffic. They all count no matter how small. Let's keep New Hampshire alive. Traffic: W1CRW 301, JNC 22, GMH 8.

VERMONT—SCM, Raymond N. Flood, W1FPS—SEC: JEN. PAM: AXN. RM: OAK. Only five reports were received this month. Guess vacations and other activities are interfering with ham radio. AVY says that nine Rutland stations took part in a Simulated Emergency Test with good results. Nice going, Bill. UFZ is using an Atom-X transmitter and an 8-40 receiver on 11 meters and reports good luck on that band. TQD now is using VFO on 40 meters. There's no let-up in OAK's ham activity; she sends in another FB traffic total for the month. JEN sent in his first SEC report; he is pretty busy with other activities but still found time to tend to his SEC duties. Thanks, OM. FPS took a week-end trip to Montreal and called on MMN/OAK (some antenna farm); and also stopped at the Deanery in Burlington. Traffic: W1OAK 159, AVP 98, FPS 2.

NORTHWESTERN DIVISION

ALASKA—SCM, Glen Jefferson, KL7NT—Reporting too late to include last month, W6MMZ says he regained residence in Alaska just in time to get reissue of his old call, KL7DG. He also says he recovered from participation in the annual Seward Mountain Marathon and spent the 50 bucks won for being 11th out of 28 starters. AON, after stacking a "Beer Can" vertical, transfers to Sitka. KL7AIR, Elmendorf Field, AQP chief operator, works W5AGB/FM (Continued on page 86)

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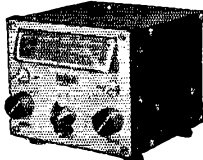
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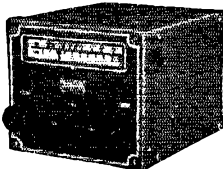
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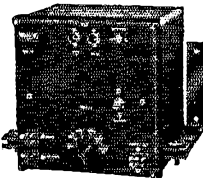
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on Fletchers Island, near the North Pole, regularly. KL7VT, at Summit, wants to know if anyone is interested in 2 and/or 6 meters. This looks like a chance for business since KL7IS at Lake Minchumina says CAA v.h.f. circuits are solid into Anchorage. This is about 200-plus miles across the Alaska range. Let's get going some of you fellows. APM is alone at Cordova and on 7650 kc. every night. Traffic: KL7AIR 991, AON 32, RE 19, AJR 14, GO 10.

IDAHO—SCM, Alan K. Ross, W7IWU—Lewiston: IDZ sends a nice letter with the following news: IFG was hurt in a plane crash but has recovered OK. EYC, ex-KL7, has returned to Alaska. OOV and XYL, OOV, have a new Elmec for mobile on 10 and 75 meters. OOV also is the first YL in the area with Advanced Class ticket. POZ works for KBKH and has a new Morrow converter. Vacationing hamers are DTJ at Lake Pend Oreille; CCY in Mexico; FBM, the mountain lakes; IDZ, Puget Sound; Twin Falls; KEA left KSEI in Pocatello for position as radio engineer with FCC monitoring station in Twin Falls. He plans to visit some of the Boise fellows soon, unofficially, of course. Blackfoot: LQU seems to be turning to DX with VE8RS and EI9J for July. Boise: The Gem State Radio Club picnic in Nampa was well attended. FOF's VFO went to FM because of short-lived grasshopper in the coil. Traffic: (July) W7OOW 21, FIS 2, LQU 2, June) W7FIS 5.

MONTANA—SCM, Edward G. Brown, W7KGJ—Hamfests and other vacation activities have taken a heavy toll of news and activities reports for this month. Thanks very much to the gang for reflecting KGJ to another term as SCM. SAW has taken over the duties of Emergency Coordinator in the Billings Area. LIT returned home after spending several years in the Navy. Jack pounded brass aboard ship and spent much of the time in Korean waters. CT and AYG planned to attend the Big Springs Hamfest. KUI has moved to Belgrade and is active in Gallatin Amateur Radio Club activities. QCN made the grade and has dropped the "N" from his Novice call. QCC is changing QTH in Laurel and is temporarily off the air. RDM is building 160-meter mobile using an 8-53A for a receiver. LBK is mobile with 1.5 watts on 75 meters. Harry Darby of 719 1/2 North 25th street, Billings, received his W7SCG call last week. The Billings gang was busy setting up a radio booth at the Midland Empire Fair Grounds again this year. Traffic: W7JDZ 28, KGJ 12.

OREGON—SCM, J. E. Roden, W7MQ—GDV finds out that a Zepp antenna gets out better than a center-fed Hertz, from his reports. He also is active in MARS. BDN lost all of his radio repair equipment, manuals, and parts in a disastrous fire at his place of business. GNJ is working hard trying to keep the OEN the top-notch net in the country, and seems to be succeeding regardless of the summer slump in amateur activities. HJL soon will be heard on the air with a new rig and this should place his community of Ritter on the map. AEX has disposed of his radio business to LZO, who recently returned from Alaska. EQJ now is the father of twin girls, who will add somewhat to his QRM problems, no doubt. The Pendleton Amateur Radio Club is making plans to build a complete radio-equipped trailer to be used for any emergency, and will include a large 115-volt a.c. power plant. Traffic: W7OJG 180, GDV 55, MQ 48, GNJ 38, HDN 30, JKU 30, EUG 15, FKA 14, ETG 11, LVN 5.

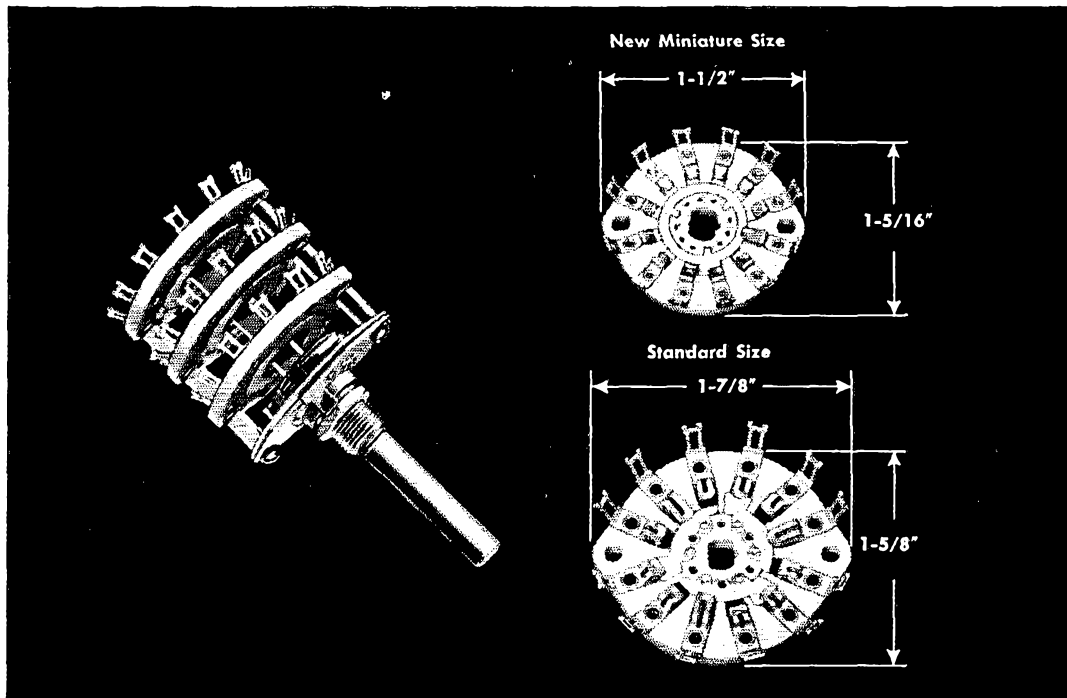
WASHINGTON—SCM, Laurence M. Sebring, W7CZY—SEC: BTY, RM: FLX, PAM: NRB. CWN spent his vacation at Mutiny Bay. ETO is having trouble with line noise. EQN is using cold H2O pipes for a ground and getting more noise than from the antenna. BG now has 3-band mobile receiver. He took in the Pacific Division Convention in San Francisco. BTV de-TV'd his Viking. New officers of Seattle's Northend Club are HRC, pres.; IHJ, vice-pres.; PGY, treas.; FTR, secy.; CO, sgt. at arms. FWD completed one-year perfect attendance on WSN. GVC reports 4 mobiles with loops for hidden transmitter hunts. KIX and CTS won the code contest at the Richland picnic, sending with their left feet. AIB has completed numerous antenna experiments, conclusion, folded dipoles. FTK has a new rig under construction using V70Ds in the final. EHL is QRL keeping the "Bon's" (Tacoma) TV customers in a happy mood. JJK and LFA are at Camp San Luis. KHL is home from a cruise up Alaska way with MISTS. LEC still is TV'ing. MCU is with the Coast Guard at Key West. MPH is planning on rebuilding with a pair of 813s. MTX took a trip around the State on his vacation and had to go back to work to recuperate. NKB completed his new workshop with lots of test gear. NDO has TVI. OEB has GJV's 10-meter beam mounted, but still no DX. He also is trying his hand as NCS on WSN. PZ has a new job with Northwest Airlines. PHP sends word that he does not like Army chow. The VARC held its picnic at Tannawax Lake. Members of the Seattle Northend Club held a "Saw-Wood Picnic," headed by KZP, at MSI's place on Lake Carney, where they power-sawed wood to replace that which they burned on Field Day. The XYL of BA designed and made up mobile hunt trophies, with blue ribbon for first, red for second, and white for third. PGY has 3 blue ribbons so far. LBF is home from Japan and operating mobile until his home rig is de-TV'ed. JFO has a new HRO-60. NJ has new Gonset mobile transmitter. ETK has started new Pacific Trunk phone net on 3810 kc. During vacations JNC and

(Continued on page 88)



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KZP kept in touch with home with their mobile rigs. Traffic: W7BA 275, CZX 192, ETK 182, FRU 146, FIX 99, KCU 93, AQN 28, AFB 22, APS 20, OPO 20, EHH 15, RT 15, EKT 11, JWE 5, CTS 4, ETO 4, EVW 4, NRB 4, ZU 3, NTU 2, BTV 1.

PACIFIC DIVISION

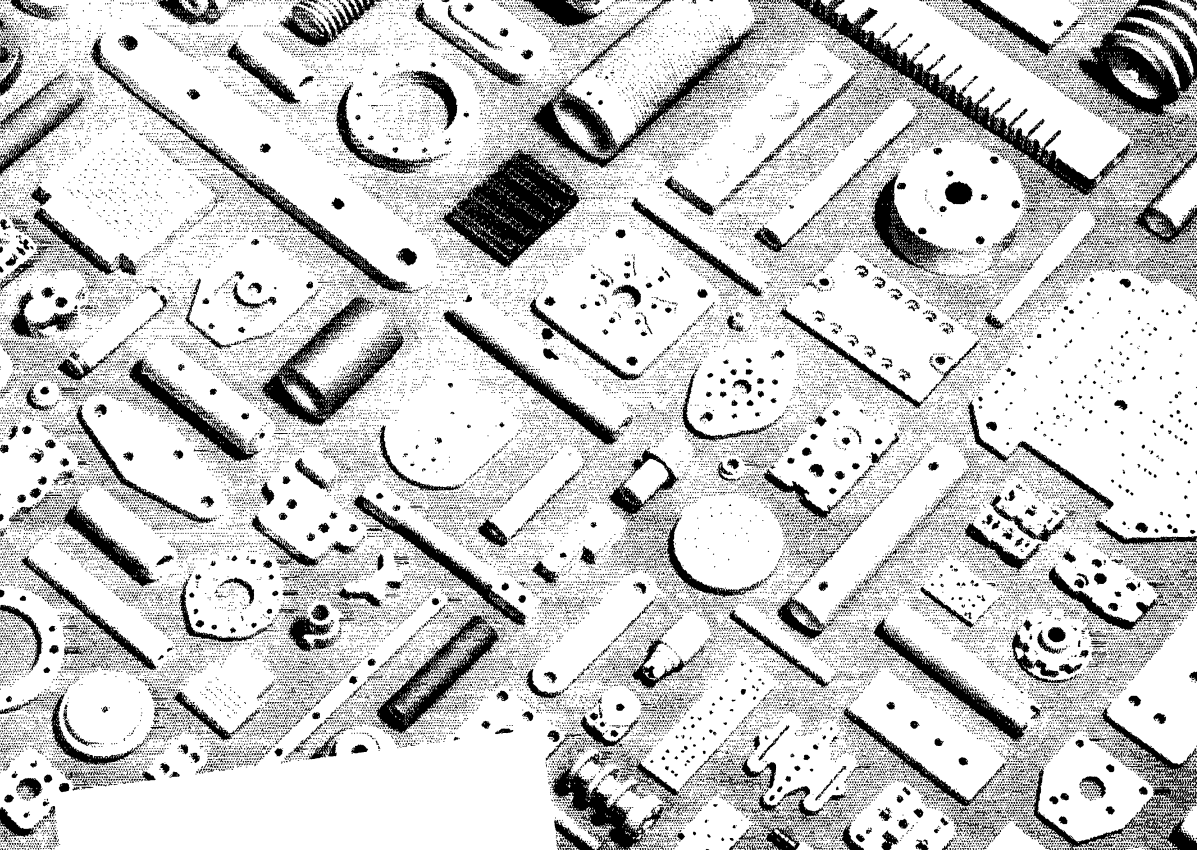
HAWAII—SCM, John R. Sanders, KH6RU—The HHARC gang plans an outing similar to Field Day this fall minus the radio gear and contest work. The Honolulu Mobile Club held another Treasure Hunt, QO, who has long carried the 75-meter mobile "Standard" almost alone, has lately been joined by EY, AFQ, RR, and ADM. ZP has been working Inter-Island very nicely with 2 watts single sideband on 3.9 Mc. KS built a new 14-Mc. final. AO has been working much DX with his new push-push 14-Mc. final. ST again is active in Honolulu after a two-year sojourn on the Mainland. KR says the Halemaumau Fire Pit reminds him of some final plates he has seen during DX Contests! RU is hard put to get his station wagon full of mobile gear into his new Willys sedan. APL is a new station at Waimanalo. TS has logged 115 stations reporting into the Inter-Island Net over a period of ten days. If you have traffic for other Islands or wish to participate in the net activity, come up on 3950 kc. Tues., Thurs., or Sat. at 8 p.m. HST. Traffic: KG6FAA 2295, JASAN/KA8AB 900, KH6TS 22.

NEVADA—SCM, Ray T. Warner, W7JU—SEC: HJ. ECs: JLM, JVW, KOA, MBQ, OXX, TTY, VO, LGS, and ZT. RM: PST. OPS: JUO. OO: LGS. Nevada State frequencies are 3660, 7225, and 29,360 kc. Your SEC advises that 33 Nevada hams now are registered with AREC, under 9 ECs. Have you placed your application for the RACES program? PRM is active on 10 meters with his new Viking and NC-183. QIH is heard on 40 meters. JO says he's not a bit snobby—just can't hear you through power leaks. HJ, DVJ, JVW, NRU, and JU are all on 75-meter mobile. ZT is NCS on MARS 'phone net. JU now is active in MARS. John Reinartz, K6BJ, will give a talk on "Modulation" to the Southern Nevada hams Oct. 9th or 10th. VOZ, of Stead AFB at Reno, is on 10 meters, both mobile and fixed. BVZ haunts 7225 kc. when not QRL building his new abode in Paradise Valley. ARRL appointments are open for hams in the Reno and Northern Nevada area. Traffic: W7JU 21.

SANTA CLARA VALLEY—SCM, Roy I. Couzin, W6LZL—Summer activities are keeping the clubs in the section very busy. The NPEC furnished communication for the Redwood City Rodeo, which was appreciated very much. The SCCARA really is in high gear preparing for the Annual Bar-B-Q, OUX will be moving to the East Bay section soon. CIS will soon move to Sacramento. The NPEC will miss you both and hope to see you via the air lanes. A newcomer to the South San Francisco Area is W7NPB, from Salt Lake City. The PAARA is holding Monday night drills on 146.00 Mc. JWD is Net Control Station. Your SCM and many other members of the section enjoyed themselves very much at the Pacific Division Hamfest held in San Francisco July 4-5-6. AVJ, RNG, and LNG are enjoying 75-meter mobile. VIQ has left the Santa Clara Valley section and now is in the East Bay section. MMG is off to WI-1 and for his annual visit. OFJ, the Police Commissioner of Morgan Hill, will finish his new rig soon; he now checks in on LSN at 2130 Monday through Friday on 3600 kc. CAZ is doing a lot of experimenting and checking in on the Palo Alto Emergency Net at 2000 Monday nights on 146 Mc. HC still is very busy but manages to check in on RN6. San Mateo is planning a Fiesta and the area hams will have a booth displaying emergency equipment. The SCCARA is planning a booth at the coming Santa Clara County Fair. New calls in the area are W6NNOG, OIF, OKW, QWB. Traffic: W6OFJ 153, HC 15, CAZ 8, MMG 1.

EAST BAY—SCM, Ray H. Cornell, W6JZ—Asst. SCMs: Guy Black, 6RLB, and Julio Amaro, 6WGM. SEC: RVC. RMs: IPW, JOH. PAM: KZF, KZF, our PAM, is going to move across the Bay to Marin County, where he still will be heard on MTN and on the staff net. RVC is taking a six-week course on the U.C. campus and finds little time to carry out his EC duties. The August meeting of CCRC was held at WGM's QTH. FCC regulations and Field Day trophies took up the entire session. Many East Bay hams attended the SCCARA picnic at San Jose. One local ham dealer had a rooting section that really entertained the hams. LMZ now is known as Captain Nelson in Richmond. JIG is rebuilding the ham shack and mobile station. HHX is active on BAN. JOH and IPW are active on BAN and RN6. IPW put .0004 condensers from his three-wire service to the neutral at the service switch to control TVI. 4EYX visited yours truly and contracted an FB case of pneumonia from the California WX. Southern Alameda County c.d. still is conducting effective drills. Movies and coffee follow the drills. K6FAL makes BPL on the first traffic report. 5QNQ/6 is a new member of the section; QTH is St. Helens, Calif. PYH has an FB picture of his station in the July/August DX'ER. NZ finally hooked Zone 39. 4WIMY, at Yemen, is W6MLY. IDY is completing 4-250-A final with pi-network. 'Phone men active

(Continued on page 90)



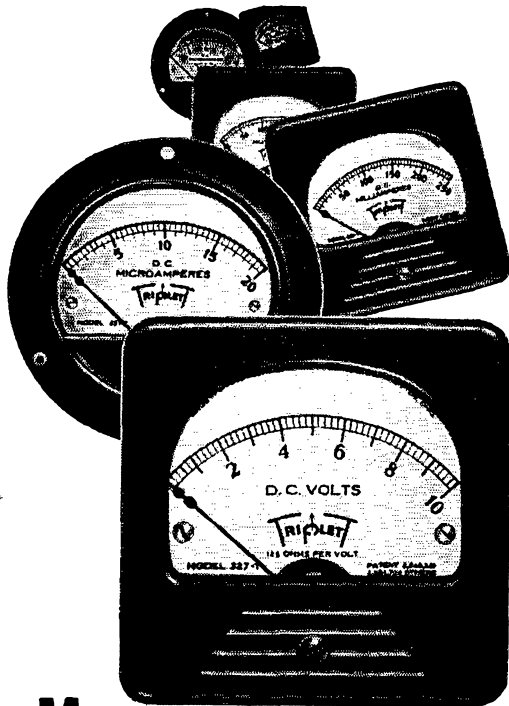
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SAN FRANCISCO — SCM, R. F. Czeikowitz, W6ATO — Phone JU 7-5561. SEC: NL, Phone PL 5-6457. *Eureka Area:* EC, SLX. The Humboldt Amateur Radio Club has started a c.w. net on 3722 kc. The Club purchases the crystals, selling them to Novices at cost, or loaning them to Novices unable to afford a crystal. The Club made a very forward-looking step when a preliminary TVI organization was set up. New members are Merle Dodd, WN6PYL, and Norman Mudie, WN6NNL. Congratulations to the new WN6PYG, Lane Dam. WN7PVV, the OM of Betty Wilson, PTC, has just returned from Korea and gave the Club an interesting talk on amateur activity in that general area. DX-man Bill Branaman, FYV, has added numerous new counties to his lengthy list. The Humboldt Amateur Radio Club meets the second and fourth Fridays in the YMCA rooms, rear of municipal auditorium, entrance on "F" St., Eureka. *San Francisco Area:* EC: BYS. Congratulations to the newly-elected officers of the High-frequency Amateur Mobile Society. They are GJC, pres.; UG, vice-pres.; URA, treas.; UOQ, secy. The HAMS holds code practice before the meetings, which are held on the second Friday at the local Red Cross Building, 1825 Van Ness Ave. Charles and Jackie Rehn, of the San Francisco Radio Club, have generously offered the use of their workshop and their technical assistance to any Novice who requires assistance and advice in building equipment and is serious and conscientious in the work. This help is available Wednesday nights from 8 p.m. on at 844 Dolores St., San Francisco. Phone them for permission at VA 4-4963. NL and BYS, together with the representatives of the Oakland Radio Club, have planned a very comprehensive and impressive test during the ARRL Simulated Emergency Test to be held in October. All AREC members should do their utmost to assist in operating and helping during this exhibit of the amateur's usefulness in times of disaster. The San Francisco Radio Club now meets on the third Friday at 51 Lakeshore Plaza, on the south side of the intersection of 34th Ave and Sloat Boulevard — and a beautiful auditorium it is. *Santa Rosa Area:* EC: LOU. Sixteen stations are active on 2 meters, and six on 10 meters in the c.d. net in this Area. The Sonoma County Radio Amateurs meets the first Wednesday in the Taproom of the Grace Bros. Brewery, Second St. west of the Freeway, Santa Rosa. *Marin Area:* EC: W6KNZ. Tamalpais Club EC: ZUB. The Marin Amateur Radio Club is dark during the summer, as in past years. FYJ has been elected president of the Central California Radio Council. The Marin Radio Club meets the second Friday at the American Legion Hall, Larkspur. The Tamalpais Radio Club meets the third Friday at the home of OZC in Tiburon. Traffic: W6ATO 6.

SACRAMENTO VALLEY — Acting SCM, Willie van de Kamp, W6CKV — LRW keeps the high end of 160 meters alive. WYX is having modulation transformer troubles. SLV keeps 10-watt portable rig busy on week ends. QIV and QJD have graduated from Novice Class. GBG is struggling with 1-kw. final. JEQ is new EC for Sacramento Area. ICO and JRY now hold Advanced Class licenses. ETD is communications coordinator of amateur radio for Sacramento County civil defense, and has net on 28.7 Mc. which meets Tues. and Thurs. at 7 p.m. and is looking for volunteers.

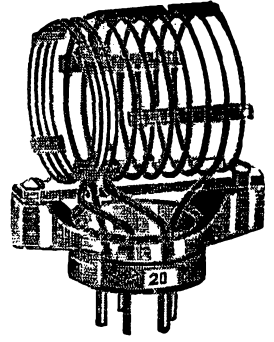
SAN JOAQUIN VALLEY — SCM, E. Howard Hale, W6FYM — SEC: FYM, VRF, EC for Antelope Valley and Edwards AFB, and EHN, EC for Eastern Kern County, sent fine reports on the great job done by hams under their jurisdiction during the recent earthquake disaster in their locality. FB, fellows, and thanks for a job well done. PIQ, at Edwards AFB, has a new Viking and new electronic key and is doing a fine job on six traffic nets. WN6OXB is a new call in Tracy. Frank Georges, of the Tullock/Hughson Area, is in Navy electronics at San Diego and has received Class B ticket with the call WBROC. Your SCM now is an ex-"digger" and also recently acquired a new 32V-3. EXH, RM and manager of SJVN, reports that 14 different stations checked in 124 times handling 59 messages during July. You are all invited to check in on your S.J.V. section net on 3525 kc. at 1900 Monday through Friday. NDP, of Fresno, and NGZ, of Bakersfield, were winners for this area in the Hallcrafters Novice Contest. QON, LDI, FYM, and MDQ were seen at the San Jose test recently. Traffic: W6PIQ 416, K6FAJ 316, W6LDI 162, EHN 65, EXH 51, GIW 38, FYM 9.

ROANOKE DIVISION

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — The Florence Club is planning a hamfest for September 28th. BFQ now is located in Florence. The following Charleston hams are mobile: ANK, BIZ, BWV, IZD, OWW, RXO, TWV, UKV, and UPK. PED has moved from Virginia and is on the air from North Augusta as ORS. FM participated in the CD Party. The following are South Carolina MARS members: ANK, PLX, CHD, (Continued on page 92)

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Catalog No. Fixed End Link	Catalog No. Fixed Center Link	Catalog No. Adjustable Center Link	Catalog No. Adjustable End Link	Band	Capacity*	Amateur Net
.....	.....	OLS-160	.....	160 Meter	100 MMFD	\$2.28
.....	.....	.....	OES-160	160 Meter	86 MMFD	2.28
OEL-80	OCL-80	OLS-80	OES-80	80 Meter	75 MMFD	1.95
OEL-40	OCL-40	OLS-40	OES-40	40 Meter	52 MMFD	1.92
OEL-20	OCL-20	OLS-20	OES-20	20 Meter	40 MMFD	1.83
OEL-15	OCL-15	OLS-15	OES-15	15 Meter	30 MMFD	1.80
OEL-10	OCL-10	OLS-10	OES-10	10 Meter	25 MMFD	1.74
OEL-6	OCL-6	.....	.....	6 Meter	17 MMFD	1.41
.....	.....	OCP-10	OEP-10	10 Meter	45 MMFD	1.74
.....	.....	OCP-20	OEP-20	20 Meter	50 MMFD	1.83

* Denotes tube plus circuit plus tank plus output coupling capacity required to resonate coil at low frequency end of band.



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Catalog Number	DESCRIPTION	Amateur Net
AM-1300	Used with RLS coils (150W)	\$1.92
AM-1301	Used with VLS coils (500W)	2.19
AM-1302	Used with MLS coils (Kilowatt)	2.61

Bud products include coils, condensers, R.F. chokes, sheet metal ware, etc. See the complete Bud line at your local distributors.



• ADD-A-LINKS

When the circuit that you are using requires a different number of turns on the coil link than is furnished with the standard coil, the links listed below can be used to replace the standard link.

Cat. No.	Used With	No. of Turns	Amateur Net
AM-1303	RLS	3½	.52
AM-1304	RLS	4½	.54
AM-1305	RLS	5½	.63
AM-1307	VLS	3½	.52
AM-1308	VLS	4½	.54
AM-1309	VLS	5½	.63
AM-1310	VLS	6½	.72
AM-1311	MLS	3½	.81
AM-1312	MLS	4½	.96
AM-1313	MLS	5½	1.05
AM-1314	MLS	6½	1.14



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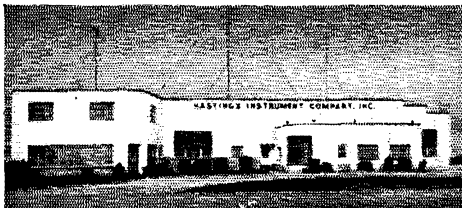
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HAMPTON 23, VIRGINIA

NTD, and ROX. More activity reports are needed to fill this column. Please send them to the SCM promptly at the end of the month. Those interested in organizing local groups to work for South Carolina license tags are asked to contact the SCM. The South Carolina section does not have a Route Manager. Anyone interested in organizing a South Carolina c.w. net should apply for RM appointment. Emergency Coördinators, please keep the SEC, DX, informed of emergency preparation in your community. Traffic: W4ANK 55, TSU 24.

VIRGINIA — SCM, H. Edgar Lindauer, W4FF — On October 11th the Roanoke Division Convention in Richmond gets underway, so if you plan to attend get your reservations in to FJ. Early registration helps to coordinate planning and programming. The Shenandoah Valley Radio Club Hamfest at Dickey Ridge Skyline Drive was attended by 150. 3MJC, a visitor from the Frankford Radio Club, Philadelphia, was winner as the first mobile rig to make outside QSO in a specified time limit. Some 50 mobiles were present and in competition. UWS, VMF, and UHC decreased their call sign power sans "N" by passing General Class exam. UWS and IJK are active on VN-SSN and have been appointed ORS. TFX has gone to join IA in Japan. PYN, William and Mary College, will return to VN after an absence of one year. WN4WBC sports a new S-76. FV will have a kw. for net operations. PED's new QTH is North Augusta, S.C. Fred Stinson and his KYL both passed Novice Class exam and await call assignments. Mrs. Fred started "boning" three days before the exam date. Some gal. Welcome to formal membership in the ham fraternity. If you can't beat 'em join 'em. Hi. PYN is sparking three SWLs to take Novice try. KFC, FF, and CC are organizing a program for Novice Roundup by PVRC. The purpose is to enlighten Novices in the Washington Area of ham activities available for expounding their new hobby. Get those mobile rigs in your auto and display your call signs in the form of license plates; 250 have been issued to date. Be ready in case of emergency. Net operations begin Oct. 6th on 3680 kc. for c.w. nets. VSN (6:30 P.M. EST) and VN (7:00 P.M. EST and 10:00 P.M. EST). VFN will occupy 3835 kc. at the usual time, 7:30 P.M. EST. Net Managers are MWH for VN, PXA for VSN, and JAQ for VFN. Traffic: (July) W4SHJ 64, PWX 39, FV 22, UWS 20, CFV 17, 2KJE/4 16, KFC 8, FF 2. (June) W4FV 35.

WEST VIRGINIA — SCM, John T. Steele, W8MCR — There is very little to report from West Virginia this month. The gang has been vacationing and too busy to report any activity. EMG has been very active on 75-meter mobile touring the State and having a lot of fun. FUS reports going mobile on 75 meters; he also reports he is planning to take the Extra Class exam in September. GEP is operating portable from Camp Shaw-Mi-Del-Ega, near Lewisburg, and having many fine contacts. Activity on the W. Va. Phone Net will be resumed the first Monday in September, according to 8EVR, the PAM. The frequency will be 3890 kc. as always. We have had no report as to when WVN will resume but assume it also will be in early September. The following news was received from AUJ: YPR and YMN visited Weston hams recently. The Stonewall Jackson ARC held its annual picnic at Lake Riley. BWI and ZBF have moved back to Weston. The civil defense meeting was so well attended it looked like a hamfest. Traffic: W8FUS 22, GEP 6, AUJ 5.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, W0IQZ — SEC/RM/PAM: KHQ. Asst. SEC: PGX. MGX handed yours truly a batch of Grand Junction news while in Radio Products. FRE, former president of the Grand Junction Radio Club, has moved to Sacramento. UVV is new president and DGA is new vice-president. The Grand Junction Club held Field Day on Grand Mesa, the highest flat-top mountain in the world with an altitude of 10,500 feet and 57 square miles on top. BXM vacationed back East, so missed his report this time. He reports that the v.h.f. try-out from Pikes Peak was a failure because there was no opening. Tough luck. Maybe next year it will open up. This month's news covers both June and July because of lack of time and also lack of reports. TV has reared its ugly head in Denver and some of the boys are already getting complaints. Your SCM bought a set and isn't bothered with TVI because he watches the programs while they are on the air! I find that a very simple solution! If no more reports are received next month than in the last two months, the next news will be the last your SCM will write for this column if a new SCM has been elected. Traffic: (July) W0/KHQ 199, JGE 1. (June) W0KHQ 259.

UTAH — SCM, Floyd L. Hinshaw, W7UTM — Judging by station activity reports, or rather the lack of them, vacation-time has a firm grip on Utah amateurs. TVL completed his new rig and is chasing DX on 20-meter phone and c.w. KKW is "knee-deep" in 2-meter gear, but finds work interferes with hamming. Any Utah station who can, and WILL, check into RN7 at 9 P.M. on 3575 kc. will be welcomed and is urgently needed to receive Utah traffic from Servicemen in the armed forces. Come on, fellows, let's show the gang we are alive!

(Continued on page 94)

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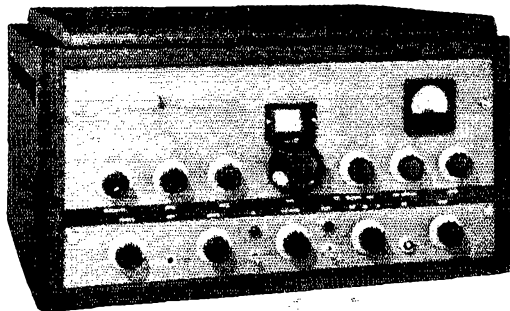
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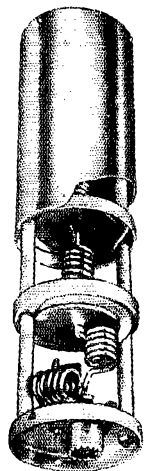
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SOUTHEASTERN DIVISION

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — Now is the time to get our fall and winter activities underway. Cooler nights should step up net activities. All nets, phone and c.w., need your support. On Oct. 11th we will have another Simulated Emergency Test. Let's put this one over big this year. Then there is the CD Party in October also. Clewiston; PJU will be back in October, Jacksonville: The JARS Beam paid tribute to PZT, via EAS, in the July issue. ASR is in the Navy and off to California. GNG has gone to Albany, Ga., and OXD to Miami. Miami: IYT is on vacation to Kansas and Texas. TRA is in New Hampshire and says will get in behind the Novice traffic net upon return. Okeechobee; PZT has flexible in each half of 3.5-Mc. antenna for quick change in length. Ulmer tops the traffic score for July. Orlando: NKD (MO for K. of Kc.) is using Viking sender and Collins 75A2 receiver. Orlando mobiles include OZC (c.w.), AWS, TVQ, KCK, DQA, TOD, QN, and PWW. WNs include TEE, TVR, WFY, UGW, UZG, and VFI. West Palm Beach: CKB, reporting again from Mexico, tells of royal treatment at XE11Q. (Also heard W4RVU of Deland calling DX) On July 27th the K. of Kc. hit its 900th meeting! Several original members still are with us and remarks were made by WS, PT, ASR, and others. From Massachusetts KJ writes that he called on 1BBM, who is working on 2400-Mc. gear. (W1HDQ, please note). Recent appointments: ORS to TKD, OPS to DRD, OBS to TRP and AKF, OO to RVU, AKF, TVQ, UJX, SAT, and UKH. Warning: Be on the lookout for unlawful use of the calls W4DU and W4JKC. (The latter is showing up on 14 Mc.) Traffic: W4PZT 185, PJU 171, FPC 165, DRD 151, FJC 60, WS 52, RWM 32, LMT 16, FWZ 15, TRA 15, IYT 4, IM 1.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PQW. EC: PLE. NN has emergency power unit. AOK has returned to HB9-Land. BYE has his mobile rig going. We regret that this section is losing FEE, KJV, JYK, SQO, and UNV via the transfer route. MFI is attending microwave school. ROM has been QRL boats. PLE is planning big rig and has done an excellent job in lining up the emergency group. The commanding officer at Eglin AFB has made emergency power units available and cooperated wonderfully with the ham program. SYP has mobile rig going. UXW and VCR are improving the MARS station, K4FAR. EARS at Eglin has 30 licensed and 20 unlicensed members. The Hair Net, on 29,560 kc., meets regularly at 2000 Mondays. NJB is running high power on 75 meters. MS is building on the TV camera and working 14 Mc. PTK is enjoying mobile. VCB is racing UTB for WAS on 10 meters. SZH is fighting cyclops. PQW has been entertaining 5OSN. PAA is determined to master electronic key. Fellows, if you don't send it in I can't write it.

GEORGIA — SCM, James P. Born, jr., W4ZD — The Georgia Cracker Radio Club and Affiliated Net's annual hamfest and barbeque was held Aug. 3rd at Dixon's Lodge near Macon. Approximately 225 attended, with 65 Cracker Net members and 50 members of other affiliated nets present. LXE was reelected pres.; KPQ, first vice-pres.; PGV, second vice-pres.; ACH, third vice-pres.; MZO, secy.-treas.; ZD, historian. The officers of the Club are also the NCS of the Cracker Emergency Net as follows: LXE, net mgr.; KPQ, north NCS; PGV, east NCS; and ACH, south NCS. WN4VYR, jr. operator of OHH, won the HQ-129X Hammarlund receiver and LYG won the Millen grid-dip meter. 50XP now is living in Harlem, Ga. MA has a new 3.85-Mc. mobile rig. WN4WMT is a new ham in Elberton and has a new Hallcrafters SR-75. The Camp Gordon Radio Club of Augusta will issue an operating award to be known as "The Tobacco Road Certificate." The requirements for eligibility will be: Submit proof to the Council of the Club of two-way radio contact with 25 members of the Camp Gordon Radio Club. There will be no time limit on the QSOs and any past contacts will count. The contacts may be for any band or type of emission. KFL is rebuilding his 7-Mc. rig. EIC has a new three-element wide-spaced beam for 14 Mc. KL has made DXCC on c.w. FBH sw is running 400 watts on 50 Mc. KGP is building a p.p. 813 final for 3.85 Mc. We regret to have to report WLT as a Silent Key. He received his license Aug. 12th and died Aug. 13th so was never on the air. Traffic: K4WAR 1358, W4EJC 168, ZD 27, POI 24, NS 20, HYV 17, MTS 12, OSE 6, BQU 2.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: ES, HZ, MS, PR, DJ, and DV are active on 75-meter mobile. NCS KP4ID now is able to QSY rapidly since he has crystals on the front panel. NY donated an 18-inch electric clock to KP4ID with call letters and AREC printed on the face. DJ and KV4AA handled urgent traffic for the Governor of Connecticut from W1AW. PZ is on 80 meters with 300 watts rushing the season with DX. CY is building c.w. transmitter. KV4AA has new concrete shack and emergency power plant. OBS KP4CP now sends Official Bulletins at 7 p.m. daily. OBS KP4DV transmits Official Bulletins Mon., Fri., and Sat. at 7:30 p.m. AST on 14,204 kc. HV is trying various antenna loading systems. RD is using two halves in phase on 80 meters with 600-ohm line. RA resigned as c.d. radio officer. ZK and his son, PZ, visited your SCM. HG is transferring from Mayaguez to

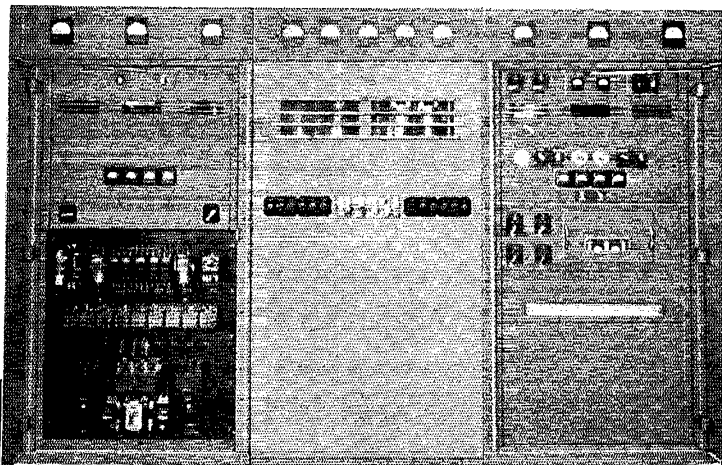
(Continued on page 96)

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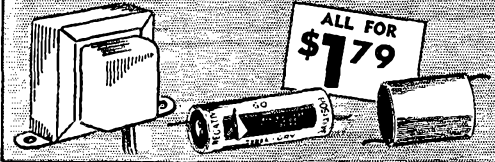
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San Juan. AK now can run a kw. on 40 meters. The AREC 10-meter net, with KP4CY as NCS, is plugging along Fri. at 8 p.m. on 28.8 Mc. RP is building combined grid-dipper/antennascope. IY built vacuum-tube voltmeter. KP4ID's phone number at Red Cross is 2-0475; MARS KP4USA 2-0000, extension 5159. Traffic: KP4ID 14, DJ 6.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Samuel A. Greenlee, W6ESR — SEC: KBX, PAM: PIB, RMs: FYW, GJP, Section Traffic Nets: L.A. Section Net (LSN) Monday through Friday — c.w., 3600 kc. at 2030. El Capitan Net (ECN), 3655 kc. at 1950. BPL this month was made by HK, GYH, WPF, and KYV. On July 21st amateurs of the Pacific Coast made history. Shortly after the first 'quake was felt, mobile units were on their way to locate the scene of the disaster. For hours the only communications in and out of the desert town of Tehachapi was by ham radio. The magnificent job performed by our traffic nets and by the many hams who were either active or standing by to help if needed did much to secure the permanence of hamdom in the scheme of things. Gentlemen of LAX — well done! Activity keeps up despite the bad QRN. DPL is working on organization of cross-country teenage net. JQB is rebuilding. (What, again?) COF is determined to de-TV that rig! Trouble runs in bunches for QJW — now he's QRL busted leg. Get well fast, Bill. CK still is keeping the boys clear of FCC. (He's OO.) CFL diagrammed a new tower that seems to raise itself. Congrats to NJU on General Class ticket. FYW (RM) says the El Capitan Net welcomes those who want to learn traffic procedure and that the Paso Robles Club gang on 144 Mc. consists of MSG, YCZ, WZW, FYW, and WNs BIY and CMR. EBK worked 10 and 80 meters on his vacation trip up North. BLY reports that ZPB and NCP put on FB communications demonstrations at Service Clubs, that PIB got backing in Whittier for his license plate bill. Thanks, Ira. By the way — don't forget to write your Assemblyman supporting that movement, or contact PIB for information. HLZ sent in an FB report of Mission Trail activities in the 'quake; as did VFR on behalf of MCAN-4 and RFU for the gang of U. of C., Santa Barbara. Grand job, fellows, K6EA finally has TVI licked on his all-band kw. (Wish I could print his remarks about some TV sets, golly!) 'Tis said the Daylight Emergency Net (2 meters) is going great guns. COZ reports he had an elegant time vacationing at Girls Camp... hmmm! BHG is fooling with antenna tuners. NCP reports a visit from KL7AKJ (by dog-sled?), who now is OGC in Rolling Hills. WPF is kept busy dodging 8666 that go boom. KYV says it's swords at sunrise for anyone who opposes FCC action on F1-2 and 3. The annual picnic of the Two Meter and Down Club was a terrific success — and what prizes! EPL got Old Timers Club certificate. FMG, Net Manager, calls attention to the new time for LSN, 8:30 p.m. Note to Santa Barbara and San Luis Obispo hams: Ifen we don't hear from you, we can't report your doings! DCB is new prexy of Mid-Cities Club. Other officers are CAM, RLN, and BPD, secy. DYU came upon a bad wreck on the highway, sent Mayday on his mobile, got an ambulance there pronto, and is credited with probably saving a life. (This information via QJW.) A low bow to the boys at HGV for always being on deck when wanted. They were activated during the 'quake, as was PLY, the LACD control station. CPIX (ex-W6RIG) is looking for the boys on 14,010 kc. from 6-8 p.m. PST. KXS, SEC, reports the resignation of FPD, EC Crescent Bay, because he is QRL business. New EC is FZA. Several AREC nets were alerted during the 'quake. Also reporting: BUK, EBK, GJP, KQS, LDR, MU, PIB, PMS. Traffic: W6HK 1643, GYH 1028, WPF 942, KYV 737, NCP 182, HOV 148, FMG 124, PMS 86, BHG 82, GJP 64, COZ 59, EA 55, HLZ 40, PIB 32, QJW 31, ESR 29, BLY 26, CK 24, COF 8, FYW 8, KXS 7, JQB 5, DPL 2.

ARIZONA — SCM, Albert Steinbrecher, W7LVR — SEC: OIF, RMs: JGZ, RJN, Arizona Net: 3865 kc. Tues. and Thurs. 7 p.m. Tucson Net: 29,000 kc. Thurs. 8 p.m. Arizona MARS: 4025 kc. Tues. and Thurs. 9 p.m. New appointments: KYM as EC for Prescott; HUV and RBP as OBS; HUV as OES; HUV as OO; HUV, LAD, and NYK as OPS; LAD as ORS. We certainly regret to announce the death of Jack Coynor, NIN, in an airplane accident while crop dusting. Jack was a good DXer and c.w. operator. The Grand Central Radio Club has just been established in Tucson with 15 members and the following officers: KXE, pres.; PJM, vice-pres; LHD, secy.-treas. KXE is back on the air with a pair of 807s. DRG, PMD, and PKM got Adv Cl. and RCJ passed Tech. Class exam. PEF is handling traffic from Camp Lawton on Mt. Lemmon and made BPL this month. Congrats, Cleo. MOI is back in town with a mobile rig. QCR and family have left for KL7-Land. PZ finally got his DXCC with 101 countries. Congrats, Ben. Loco is out of the hospital and will be back on the air with that powerful kw. LLO is working 25 watts on 10 meters from the top of Mt. Lemmon on week ends. We have some new papers too: LMS, MOI, and SPK. Appointments: PLEASE SEND IN ACTIVITIES REPORTS. Traffic: W7PEF 788, EMD 145, MLL 25, BH 24, LVR 9. SAN DIEGO — SCM, Mrs. Ellen White, W6YYM — Asst. SCMs: Shelley, E. Trotter, 6BAM; Richard E. Hud-

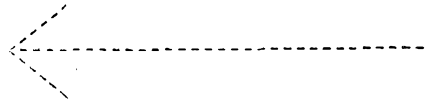
(Continued on page 98)

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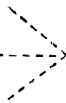
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dleston, 6DLN; Thomas H. Wells, 6EWU. SEC: SK, RM; IZG. EC: DEY. The new SEC for this section, SK, would appreciate any help and suggestions offered him. Remember the dates, October 11th and 12th — the Southwestern Division Convention will be held then in Balboa Park, San Diego. The two-day affair, including a pre-convention get-together, ragchew, and swim party (Friday night at the Manor Hotel), has been well planned and it looks like fun for all, so try to be there to help make it a really big success! In case you're doubtful, the door prize will be an HRO-60 and the pre-registration prize an Elmac mobile transmitter! RM, IZG offers many thanks to TET, GTC, MUF, FCT, 7MLL, MAE, BF, and K6NRC, as well as all SSN men, for fine QNI during the month of July. A summary of activities in Orange: DEY reports that the control station is located at Orange County Communications Center, with a BC-610 on 10 meters, a 522 on 2 meters. The fellows also are obtaining a 15' x 20' room at the same location by October for AREC/c.d. and a club station. NKB is back in the fold from K17-Land. ZE and DEY have been doing some successful experimenting with 2-meter mobile gear. IAB, the Pendleton station, ran up a total of 2779 for July traffic total. Ray, chief operator, says the gear includes stacked rhombics to Japan, a single rhombic for stateside and KH6 work, and a new bi-square with reflector going up for 20 meters. The boys operate 75 and 20 meters simultaneously in two large trailer vans in the field. Our thanks to all who rendered assistance during the recent 'quakes at Tahatchapi. Traffic: (July) W6IAB 2779, ELQ 352, IZG 305, BAM 3. (June) W6IAB 1565.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, William A. Green, W5BKH — SEC: JQD. RM: QHL. PAM: IWQ. I wish to express my appreciation to all for the cooperation accorded me in the administration of this section. Your new SCM, Bill Gentry, W5GF, is a swell fellow and I ask that you make his term of office as enjoyable as you have mine. He will need your activity reports each month in order to give your work recognition. The Odessa Emergency Net took part in the city-wide cleanup campaign helping to fight polio, furnishing instant communication from several patrol cars to the central dispatching point. This is good practice for c.d. with more than 500 messages being handled by GUD, LUP, KBU, QPA, HAF, and SHL, all of whom put in much time. The Central Texas ARC of Brownwood has elected AFJ, pres.; NYE, vice-pres.; UIH, secy.-treas. Nice publicity was received by Sherman ARC featuring RGP, POG, SGR, and IDZ. The Abilene and Odessa Clubs, through BKH and GUD, played a big part in the communication system set up to assist in the All-Woman Transcontinental Air Race. SRQ, now the NCS for NTX, accumulated 3250 points in the CD Party to keep this section in the running. TFB is organizing a Novice ragchewing net (NCT) to operate on 3720 kc. Tues. and Thurs. Traffic: (July) W5GUD 630, PAK 116, VRX 105, BKH 98, ARK 63, TFB 45, IWQ 27, SGR 22, RRM 20, RHP 19, SRQ 19, CWE 16, UFP 12, TGV 8, KP2 2, PYQ 2. (June) W5IWQ 19.

OKLAHOMA — SCM, Jesse M. Langford, W5GVV — SEC: AGM. RM: OQD. PAMs: GZK and ATJ. The Oklahoma C.W. Net opened for the winter session on Sept. 2nd and all are invited to bring their traffic to OLZ on 3682.5 kc. Monday through Friday from 1900 to 2000 CST. A slow-speed net will be started 'shortly' but normal net operation will be slowed to meet the operating speed of any who check into the net. ESB fell from his antenna pole the week end of August 2nd and suffered a broken shoulder and arm. SVR is active in OPEN and NTO Nets. RZE, Woodward, now is on 75 meters. PHR reports two of his Novices, UFG and UFT, now are General Class. HZZ is working on new mobile and emergency rigs. EHC reports a swell vacation in Colorado. UEK is back from vacation. WJP is working the bugs out of his 7-Mc. rig. UZG is de-TVing his 32V-1. WN5WEH is operating on 3.7 Mc. SWN is off the air because of business. TKC now has a shack by himself since EHC built a new radio room. QNK has 600 Lysec and is building modulator. RIE's new QTH is Oklahoma City. New QTH of QPK is Tulsa. PGN is now a new husband. MBN is having trouble with shorts in his 304TLs. ORH is working for a commercial user of microwaves. LXN will be more active with a reduced college schedule. GZK and ROZ still are doing a fine job with overseas traffic. Traffic: W5GZK 401, ROL 121, MFX 106, OPQ 97, PA 71, GVV 64, HZZ 64, PML 62, OQD 51, SVR 46, SLS 40, OQT 29, FKL 16, EHC 15, KY 15, RST 6, VVY 3.

SOUTHERN TEXAS — SCM, Dr. Charles Fermaglich, W5FJF — NY reports 21 Mc. rather interesting, sometimes good DX and sometimes short skip for W5s. SJA reports that PDE, a shut-in, recently got his Advanced Class ticket. ACL is busy working on his rig. NFX is active in S. Texas Phone Net and as OBS. He reports OJU is working for Collins in Dallas. TYI and EIV are planning 2-meter mobiles using converted ARC4s. RFG reports the arrival of a jr. operator in June. SDA is in the process of rebuilding the 1-gallon rig of HARC. SMG reports that LFG took a vacation to Laredo and now has new 6146 rig;

(Continued on page 100)

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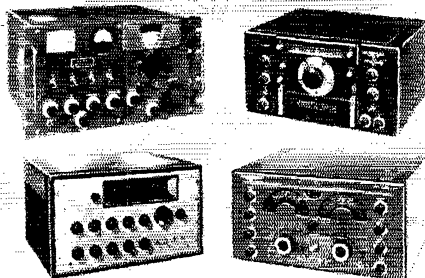
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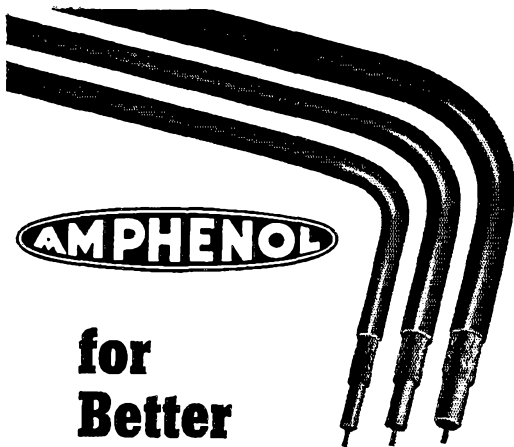
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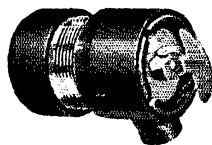
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QOC is redecorating the house and shack. DPA, Humble Oil & Refining Co., recently lent the HARC a shack and antenna farm to house DPA. NHB is building a new stronger antenna support mast out of pipe so antenna can tilt to ground. MN works H. & B. on 7150 kc. and has skeds with KG6FAA, 9TQD, and 3CUL. AQE is plagued with summer QRN. RID got new NC-183D and worked 8 new countries, bringing the total to 51. His rig is an 829B running 80 watts. Antenna is 68-ft. doublet. TQU is new NCS on SAEN; THU is Alt. NCS and 4RZU/5, secy. The SARC had an FB party at the Pearl Brewery Aug. 12th. ULN is active down in Texas City. FXN has been on vacation and visited 2BYM (6-meter man). VV is putting p.p. 4-65A on 6 meters. FXN will tackle a 4-150A rig for 220 and 430 Mc. soon. WN5UJC is new AREC member. STEN members recently received a letter of commendation from the FCC for excellent work done in an emergency. WN5TFW recently got General Class ticket. WN5UUV is active on 2 meters with good beam. DSB is active on Gulf Coast and MARS. It's not too early to make your plans for the 1953 ARRL National Convention to be held in Houston July 10-11-12, 1953. Address inquiries to HARC Convention Committee, P.O. Box 907, Houston, Zone 2. STEN held its annual picnic at Bellville Aug. 10th. A new club has been formed at Port Arthur Radio College called the Bill Kelgore Amateur Radio Club, in honor of its sparkplug, 4A1A/5, who has been continuously licensed for 30 years. MSS is pres. 6BVT/5, secy.; OUT, club reporter. Traffic: K5FKF 2308, W5MN 344, W4RZU/5 43, W5FJF 19, N1Y 9, AQE 6, NEX 1.

NEW MEXICO — SCM, Robert W. Freyman, W5NXE — SEC: PLK. RM: NKG, PAM: BIW. Nets: 7:00 A.M. Sun., 6:00 P.M. Tues. and Thurs., 3838 kc.; 6:00 P.M. Mon., Wed., Fri., 3633 kc. The New Mexico Hamfest will be held Oct. 5th in Los Alamos. CTG, RMR, and LDO all have new jr. operators. WN5WBI now is on with 75 watts from Santa Rosa. We regret to hear Tom and Betty, RLL and UKZ, are leaving the section. Both have been active on the c.w. net. 6FMZ, one of the old SBN gang, now is ORS in Albuquerque. 7GEU, ORS, also moved to Albuquerque. QNQ now is in California. LFH has put New Mexico on the v.h.f. map. MYQ is active on 20-75-meter phone with a Viking. RBX, QP, VDY, and NXE are new mobiles in Los Alamos. PXN has joined the Navy. VWU, QAG, RFF, and RQK are OES in Albuquerque and Sandia Park. Overall renaming of streets in Albuquerque is causing a flood of "change of address" memos to FCC, not to mention QSL headaches. WN5VRC now is on the air from Las Vegas with 70 watts. New Mexico traffic net has handled its first legitimate message to the North Pole (Fletchers Island).

CANADA MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — SEC: FQ. EC: EK. RM: OM. W4EBN was a recent visitor to VE1BC. W8NBK visited some of the Halifax gang recently. VO, BJ, and VH will spend the next year operating from VE8 at Nottingham Island. VE0G was a recent visitor to OM. FQ added a few new ones recently: 4WIMY, JY1OG, FL8MY, and FP8AM. Several of the boys worked FP8AM on 75 meters. Congrats to PP and OM on the arrival of new jr. operators. LY and FQ had a visit from VE5MI. Ex-1M2, from Chicago, recently visited the Halifax gang and while here his jr. operator went up for his ticket and passed with flying colors. AAX has new rig on 75 meters with T55 final. IL has been seriously ill and all are wishing Walter a speedy recovery. He recently retired from the Royal Canadian Mounted Police. AAW is a new 'phone station on in the Halifax Area. Ethel is using a surplus FR-12 rig. Notes from the Fredericton gang: RF is pleased that the gang came out ahead of the St. John gang on Field Day. GU is learning how to operate his new NC-183D. GJ is working on mobile rig. This report is being submitted by FQ as your SCM is away on his annual holiday trip. Traffic: VE1FQ 124, HC 90, SI 12, DB 7, LY 3.

ONTARIO DIVISION

ONTARIO — SCM, G. Eric Farquhar, VE3IA — It is with sincere regret that we record the untimely passing away of R.I. Sam was the Radio Inspector for the Toronto Division of the Dept. of Transport and an old-timer whose communication career began with the days of spark. We extend our sincere sympathy to his family. VJ is kept busy on the farm these days. Traffic originating from AJA for KW, some 34 miles distant, went the long route. Handled by VE1XX, who made a quick QSP to AHA, who in turn made delivery, got an answer and via the retrack route the message was delivered back to AJA five minutes after the first message was started, 4000 miles to go 63, elapsed time five minutes. Distance leads enchantment. Official note from Dept. of Transport: "Effective immediately licensees of amateur experimental stations with unrestricted radiotelephone privileges are authorized to use A3 and F3 emissions in the band 21,200 to 21,450 kc." SG reports new 3.5-Mc. Zepp works swell. DFE is heard on 3.5 and 7 Mc.

(Continued on page 102)

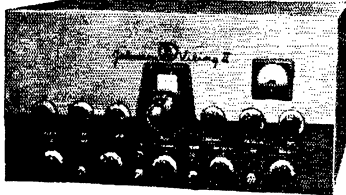
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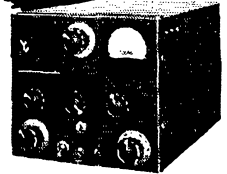
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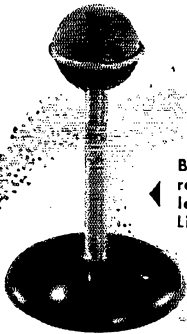
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W9GJY visited AVS. BPE recently acquired a pole from the power company. Congrats to EAM on topping the list for Canada in the April CD Party with a total of 27,740 points. Runners up were ATR, BUR, AVS, IA, and DU. We welcome to this section DXR, who is radio beacon operator at Burlington Channel. ATR visited DU and BMG at Southampton and Chesley Lake, respectively. AHA, of Toronto, has his call changed to NG. Congrats are extended the household of AUU on the arrival of a boy early in August. Traffic: (July) VE3WY 152, ATR 145, IA 69, BJV 49, BUR 29, EAM 28, EAU 20, SG 11, VJ 7, DFE 4, AVS 1. (June) VE3AHA 45, PH 12.

QUEBEC DIVISION

QUEBEC—SCM, Gordon A. Lynn, VE2GL—CA reports traffic and DX up this month and that he has worked several VKs, CD, holidaying in Cape Porpoise, Me., is eagerly awaiting approval of his operation of mobile rig down there and reports copying Official Bulletins from GL on his mobile receiver at that location. ADR reports from Anticosti Island, has an 813 on all bands, and is available for any network or other services. AO reports the passing of EV, after having been paralyzed for two and one-half years. He was one of the old-timers and his passing is felt by other old-timers as well as others who knew him. AO reports traffic picking up in spite of the heat. EC reports daily skeds with AEM, APE, AGP, VE, and ZG. APS, ARX, ANIL, and ANP are joined together in a local net on 75-meter c.w. in the St. Maurice Valley Region. PT is keeping the bands hot from his summer location in Rawdon. GK, running 4 watts on 75-meter 'phone in the mountains, is putting an FB signal into Montreal. MARC held a joint picnic with the Burlington (Vermont) Amateur Radio Club at Mallets Bay, Burlington, on Aug. 2nd. Traffic: VE2CA 50, AO 23, GL 11, EC 9.

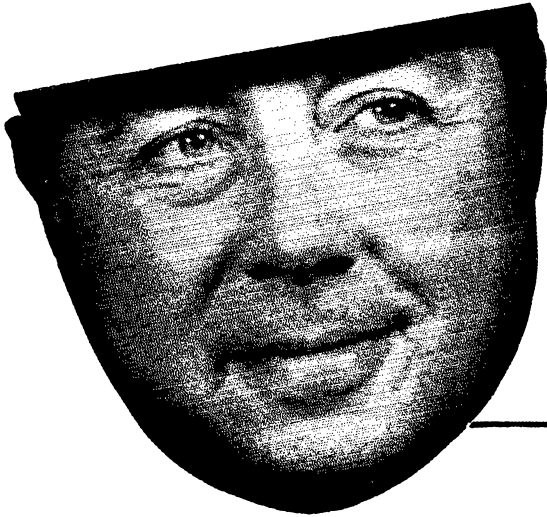
VANALTA DIVISION

ALBERTA—SCM, Sydney T. Jones, VE6MJ—Edmonton mobile units ran off with honors in the mobile contest at the Alberta Hamfest. EH and VK winning first and second places. Congratulations to the Calgary gang on a real bang-up hamfest July 5th and 6th. OD expressed the sentiments of the gang when he stated he wished the summer static would let up. MJ snagged a choice bit of DX when he worked FP8AM on 14-Mc. 'phone. DZ and his XYL made a quick vacation trip to sunny British Columbia. HX is active on c.w. after considerable trouble with the rig. EP is getting transmitter kit together. IY made a trip to the big city and visited the SCM. IX has moved QTH to Bedalia. A miniature hamfest was held at Forestburg recently. Visitors included JP, TH, IX, and HC. HM is working on new style 'phone patch and still leads the gang in handling northern traffic. New officers of APARA are EH, pres.; FB, secy.; HM, treas.; OD, act. mgr. EO was made a life member of the APARA in appreciation of his good work. Traffic: VE6HM 168, OD 51, GJ 18, MJ 11.

BRITISH COLUMBIA—SCM, WHF Moorhouse, VE7US—QC heads the traffic list with 60. He was in the hospital for an operation and now is back as Net Manager of AREC. DD and the Point Grey Club played host at a mobile-picnic which ended up at Swan Point, three miles east of Mission. AMJ purchased Globe Trotter transmitter at Newton. AQH/7, near Banff, is gas-generator operated. AC is in MLN on traffic as ORS/OBS, after holidays in the W6 Area. DH now is OBS along with BJ. LP is out of Nanaimo working. AQB is rebuilding. AQS rebuilt. ALJ and AIQ visited Nanaimo. ACW visited Vancouver. AOB visited the Island. AKD/M is in the interior. DD is going to the interior. FB visited the Island. UT/LG are at Estevan. ASA is on 80-meter c.w. with SF skeds. CB was heard on 5PX Net. Civil defense gradually is recognizing AREC value. TM tried "Rothman" modulation. BF moved to Nanaimo. JB is EC for District 6. ARRL stations holding appointments are AOB, AMJ, DH, TT, QC, AC, BJ, YM, AGQ, DP, LK, FG, ABB, YE, AAJ, PG, AFM, ID, CX, ALJ, ANK, EG, and JB. Traffic: VE7QC 60, DH 25, AOB 20, DD 8, AC 3, AMJ 3.

PRAIRIE DIVISION

SASKATCHEWAN—SCM, Harold R. Horn, VE5HR—The civil defense communication trial from Fort Qu'Appelle was run off July 22nd and was quite successful despite summer conditions. JW was in charge, assisted by LU, GL, and UQ. Mr. Frobe was quite impressed, as were members of the Legislative Assembly who were present, by the way traffic was handled and the manner in which communications can be made to any number of points should the need arise. BZ sends in a nice report as SEC with a good increase of AREC members. MC now is 48C, at Flin Flon, and likes the new QTH. Ex-GRP now is 5FC at Saskatoon. DD has returned from overseas. GR was transferred to Ottawa for a spell of duty. A contest is in the making for all VEs. Watch for further details through this column and SARL Bulletin. There are openings for appointments if you are interested. We need Official Observers badly. For further particulars ask or write the SCM. Traffic: VE5HR 33, GO 18, PJ 12, TE 12, FG 11, QL 5, DS 3.



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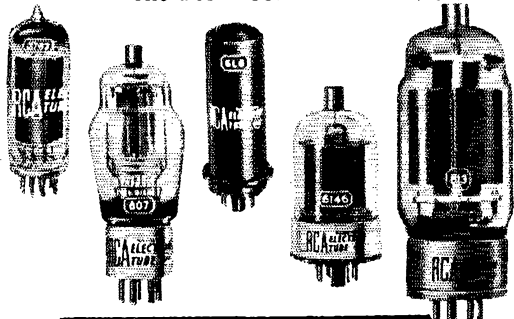
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"It Seems to Us. . ."

(Continued from page 9)

So try some of the contests this season. If necessary, you can always kid yourself as we did, and try a few calls just to see what happens.

There's much more activity than contests, of course. There are the CD Parties and LOnites, for League appointees and officials, the Code Proficiency Certificate qualifying runs, Frequency-Measuring Tests, special activities for v.h.f., Simulated Emergency Tests and, later, the ever-popular Field Day. In between all these, you can be working toward your WAC, WAS or DXCC certificates. "Operating an Amateur Radio Station" tells you all about them.

Give some of these a whirl this operating season and see if you don't have a whale of a time!

A-1 OPERATOR CLUB

We are pleased to announce the following additions to the ARRL A-1 Operator Club roster: W1AAE, BGA, BLI, BOR, CPV, HDQ, JNV, NAV, OAK, PXX, QJB, QR, TAT, VW, W2AOR, AQS, BXA, COT, COU, CTO, DJF, DS, EEE, ETS, PEO, QKS, RWE, VMX/1, WIK, YRF, W3BIP, CHV, CUL, JKO, MCG, OQF, PGB, PTZ, PWQ, QPQ, W4AFI, W4CMV, FCU, FDF, FPK, IE, KWA, LVV, MXU, NHX, NRO, OWS, PAS, W5CA, CGC, DNN/HC2OT, DRJ, EGK, FVO, GEL, KRX, KTL, MNR, NG, PTR, PXY, QDF, RAL, RFG, SAY, SQB, WZ, W6BIL, GAL, JZ, NGC, W7CZY, FIX, MID, PKX, W8CEG, CKX, DFC, DLZ, DOI, EOZ, EXZ FOR/4, HKT, IV, KS, MXO, NBK, UKV, YKC, ZLK, W9CVQ, DGA, JUJ, NZW, QLW, TT, YIX, W9AII, BJI, FID, GAR, QVA, ZJO, VEIGU, 3GP, 4RO, 5OC, 7CE, CE3AG, 5AW, DLIPM, 1RK, 7AH, E19J, EK1AO, G3AAM, 3BKF, 3GMT, 4CP, 4FN, GM3CSM, HB9EL, 9EU, HB9J, HC2JR, HZ1HZ, 11A1V, 1S1FC, KP4HU, KP4KA, KV4AA, KZ5AC, 5AU, 5AW, 5BL, 5CG, 5FL, 5GD, 5GM, 5LM, 5LR, 5NM, 5PC, 5RD, 5RM, 5UT, 5WA, 5WG, 5WJ, OH2RH, PA0LR, PY1ADA, 1IH, 7WS, SM5WI, TI2PZ, VK3CX, 3FH, 3YP, 4QL, V06A, VP5BH, VQ2AB, VS7NX, ZL2AFZ, 2GX, 3OA, ZS8MK, 4X4RE.

The A-1 Operator Club was designed to recognize and promote good operating in the amateur bands. To become a member one must be nominated for membership by at least two operators who already belong. An attractive certificate is awarded to each amateur who qualifies for membership. Every amateur should strive to make his operating merit nomination by following standard operating practice, by observing the rules of good 'phone operating, and by making his sending as clean and accurate as possible. Members should nominate every deserving operator after careful observation of his operating habits. The complete A-1 Operator Club rules may be found in the booklet *Operating an Amateur Radio Station* (sent gratis to League members upon request).

Strays

On July 31st, at W2HHX of Belmar, N. J., W2CDU was tuning marine frequencies assigned fishing vessels. A distress signal was heard from small boat *Flossie II* as she stood by the flaming trawler *Osprey* off Belmar. The *Flossie II* reported two *Osprey* crew members in the water.

Noting the location, W2CDU telephoned the Coast Guard at Spring Lake and cutters were immediately dispatched to the scene. The men afloat were rescued and the \$75,000 *Osprey* blew up without loss of life. Well done, OMs!

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(Continued from page 16)

output in such a way that the harmonic falls near the picture carrier frequency, and even then the interference is seldom observable unless the TV carrier strength is of the order of 100 microvolts or less at the receiver's antenna terminals. Only two modifications were made in the original wiring after checking in this fashion. It was found that there was a small amount of harmonic at the secondary terminals of the filament transformer (visible in a weak TV picture only when touching the terminals with a screwdriver serving as an "antenna") which originally were not by-passed. Installation of a 0.005- μ fd. ceramic at each terminal eliminated this. The second modification was the installation of a 2- μ h. choke in the high-voltage d.c. lead where it connects to the last plate-circuit by-pass condenser at the safety terminal, since it was found that weak interference was caused by a small amount of harmonic getting through this lead.⁸

The lead radiation and conducted harmonics are at such a low level that with the amplifier running at 750 watts input on a frequency just inside the low-frequency edge of the 28-Mc. band, delivering its power to a shielded dummy antenna, there is just-visible interference to a Channel 6 signal of less than 100 microvolts when a direct connection is made between the outside case of the system and one side of the TV Twin-Lead transmission line. On one occasion atmospheric conditions were such that a signal just about strong enough to hold sync could be received on Channel 2 from New York City, and with the same test no interference could be seen. This is not mentioned by way of bragging about the performance of this particular amplifier, but to point up the fact that harmonic radiation from the transmitter itself can easily be reduced to the negligible point by the simple methods we have been talking about in *QST* for quite some time, and that it requires no prolonged testing nor elaborate measurements if the job is done properly in the first place. About the only excuse for a check on this particular phase of TVI reduction these days is to make sure that some error of omission has not occurred inadvertently to allow radiation leakage.

Part of the set radiation story is that the shielding about the r.f. circuits is fairly good. The shields are made from ¼-inch aluminum with about ¼-inch overlap between pieces, with fastenings every two or three inches. Good bonding is essential; an almost invisible gap between the top cover and wall at one corner of the shield around the grid circuit let out quite a bit of

(Continued on page 108)

⁸ This did not occur with the mica condensers first used, one at the bottom terminal of the plate choke and one at the d.c. connection post. These were CM-45 case type, 470 μ fd. each, used as recommended in reference 7. We have not yet had an opportunity to investigate the series-resonant frequencies of the TV condensers, but simply installed them in place of the micas and kept the connecting leads as short as conditions would permit.



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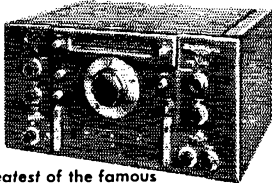
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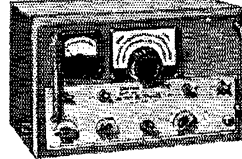
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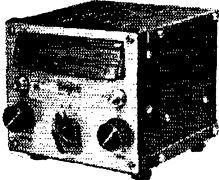
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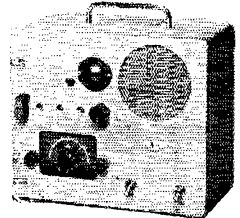
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harmonic until a probe showed where the trouble was. More exact fitting of the pieces fixed it. The solid shielding is unquestionably superior to screening, and a reasonable thickness of metal contributes a good deal, too. If the r.f. output cable is disconnected and the amplifier is operated without load with normal plate voltage (not by any means a recommended procedure, but we tried it for a brief test) thus building up an intense field inside the box, it is impossible to get a reading with a sensitive crystal wavemeter at the fundamental frequency anywhere on the outside of the case except for a slight indication directly over the tube plate, where there are ventilating holes in the cover. Ordinary mesh screening will not stand such a test. Also, mesh screening becomes less effective as the frequency is increased, and therefore tends to deteriorate at the TV harmonic frequencies, while the reverse is true of solid metal shielding. These considerations are most important, of course, only under really difficult conditions, such as operation at the low-frequency end of the 10-meter band, a weak TV signal on Channels 2 or 6, and a separation of only a few feet between the transmitter and TV receiver. In most cases screening will be entirely adequate, and sometimes more convenient to use than solid metal.

Construction Notes

The amplifier layout follows the principles outlined in January *QST* insofar as available space and the physical characteristics of components permit. Some things we should have liked to have done differently, but practical considerations got in the way. For example, it would be desirable to have the output terminal closer to the tube socket. However, it is even more necessary to have the output condensers of the network near the output terminal and to keep the switching leads reasonably short; at the same time there had to be a panel control for the switch. Even when you are willing to discard esthetic principles in panel layout it is still impracticable to run a control shaft through a variable condenser or variable coil assembly, so the output terminal, condensers, and switch were put where a control shaft could be run through without interference.

Complete dependence is placed on the chassis for ground returns. There is a school that argues for the grounding-at-one-point theory, and it seems like an eminently reasonable theory — so much so that at regular intervals over the past twenty years the writer has been banging his head against the stone wall of trying to make it work. Invariably it has led to trouble, principally in the form of instability in r.f. amplifiers that the method is supposed to help stabilize. Changing to chassis grounds has equally invariably straightened things out. Our present practice is to ground directly to chassis at the nearest possible point even if the "common" ground is only a half inch away. It is, in fact, difficult to have only one single ground on an r.f. circuit, and the difference in inductance between a chassis path and a

(Continued on page 110)

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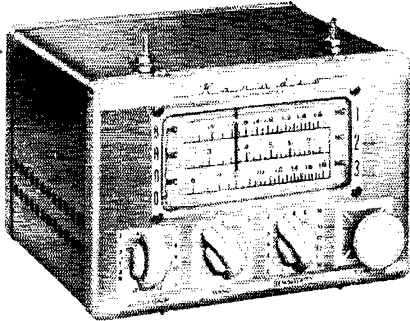
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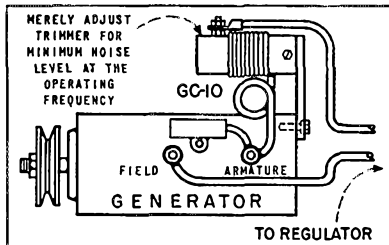
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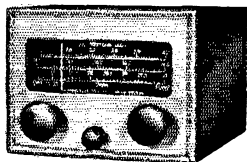
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"direct" wire lead is amazing, in terms of the cross couplings the wire lead can introduce. There may be times when the cross couplings are just right to give a desired effect, and perhaps we have been unlucky enough to have ours always work in the opposite direction. Nevertheless, we have the feeling that we know where we stand with a chassis ground, particularly when using metal of good conductivity such as aluminum.

The shields about the grid and plate circuits are both complete in themselves; no use is made of the panel for shielding. This is not to infer that the panel would be less satisfactory, but it was more convenient to do it that way since it was necessary to provide a lip at the top for fastening the top cover, and the separate front piece avoided the necessity for scraping the paint from the panel to get good contact. The two side pieces in the plate section have lips on all four edges, while the front and back pieces have lips only at the top; they overhang the chassis at the bottom and overlap the side pieces at each edge. To make a good bonding surface for the top cover these pieces should be accurately cut and bent. A sheet metal shop will do the job for you at little cost if you get the metal and mark it out exactly the way you want it fabricated. The shield about the grid circuit is constructed along the same general lines.

A 2-inch-deep chassis was used because, as the amplifier was originally planned, it allowed plenty of room underneath. When the fan was added later, it projected below the chassis and so some small pillars were mounted on the chassis to serve as legs when the unit is set on a flat surface such as a table. A chassis depth of 3 inches would be better. There is no bottom plate on the chassis because it is completely unnecessary; the shielded wiring takes care of any r.f. that might be underneath.⁹

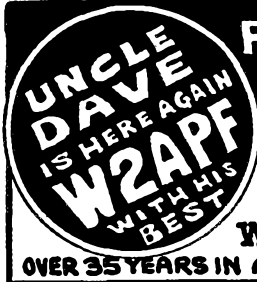
The choke, $RF C_5$, in the d.c. grid lead is not needed for harmonic filtering. The two-terminal strip was provided in case a combination of fixed and grid-leak bias was to be used, in which case the strip would serve as the mounting for the grid leak. So far we have used only fixed bias (from a supply using a VR-150) and the choke was used simply as an "extra-insurance" method of completing the d.c. circuit.

Tuning Pointers

With 150 volts bias a grid current of about 25 ma. seems to be optimum, although it is quite uncritical — values from about 15 to 30 ma. give very little difference in plate efficiency. Optimum screen voltage (from a fixed source in our case) is in the neighborhood of 400 with these driving conditions, and the screen current runs 50 to 75 ma., depending on the plate voltage.

(Continued on page 118)

⁹ The absence of a bottom plate has seemed to startle some visitors to Hq. who have seen the amplifier, as has also the absence of a conventional line filter for the a.c. supply to the filament transformer. But there is no point in using either if they are not needed — which is definitely the case with the construction described here.



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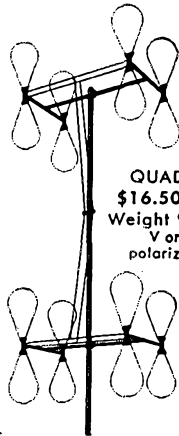
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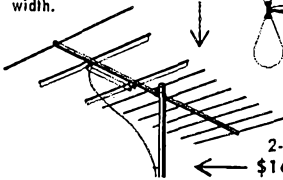
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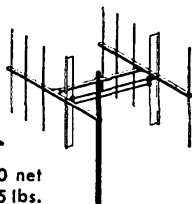
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 Weight 9 lbs.
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 Twin-driven broadband, hi-gain can be stacked up to 40 elements; 11.6 db Gain; 27.0 db Front to back ratio; 18° Beamwidth.



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It was mentioned before, and should be emphasized again, that there are two essential points in the operation of an amplifier of this or equivalent design: the coaxial line into which it works must be closely matched at its terminating end, and the variable inductance should be adjusted *only* with no or very small plate power. Not more than two or three hundred volts should be used at the most. Such a voltage is sufficient, after becoming familiar with the amplifier's operation, to determine the proper tank settings for the desired loading at full plate voltage. With fixed screen voltage the plate current does not increase in exact proportion to the plate voltage, so the plate current at 300 volts that will be equivalent to, say, 300 ma. at normal plate voltage will have to be learned from experience. Provision should be made for reducing the screen voltage also, if the screen current with low plate voltage exceeds the rated maximum value of 100 ma.

It is advisable to operate with a tank *Q* of about 10, or fairly close to that value. This means that the amount of "in-use" capacitance in the plate tank condenser will depend on the plate voltage and plate current actually used. The chart in the transmitting chapter of the *Handbook*, which is based on a *Q* of 12, is close enough. Determine the proper value of capacitance and estimate the setting of the tank condenser based on the known values of maximum and minimum capacitance and the fact that the capacitance variation with rotor setting is practically a straight-line relationship. Then find the combination of output capacitance and tank inductance that resonates the circuit and provides the desired loading at or close to the predetermined value of tank capacitance. Increasing the output capacitance or increasing the tank inductance, or both, while maintaining resonance, will lighten the loading on the tube, and vice versa. At the extremes of the range it may not be possible to use the optimum values; at the low-frequency end, 3500 kc., practically all the coil and all the tank condenser will be needed to resonate the circuit, while at the high-frequency end the total input capacitance will not be low enough to reach the theoretically-required value even with the tank condenser at minimum. At this end of the range a low ratio of plate voltage to plate current is helpful, and one of the good features of the 4-250A is that it works well with a low ratio and at the same time has low output capacitance.

The neutralizing circuit, if used, should be adjusted for minimum reaction of plate tuning, under actual operating conditions, on the grid current. The approximate setting can be found with all voltages off by coupling a grid-dip meter.

(Continued on page 114)



STRIKE WHILE THE IRON IS HOT!

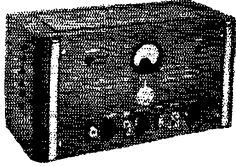
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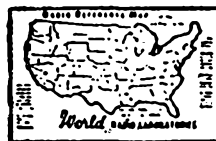
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oscillating at the operating frequency, to the plate tank coil and checking the grid coil with a crystal wavemeter. The condenser should be adjusted for minimum r.f. in the grid circuit with the plate and grid tanks resonated. Final touching up can be done after checking the operation with voltages applied to the tube. A value of 220 μ fd. at C_1 proved to put the neutralizing-condenser setting in the right range. If neutralizing is not used, this condenser may be increased to 0.001 μ fd. or more for better by-passing at the lower frequencies.

SS Secrets

(Continued from page 17)

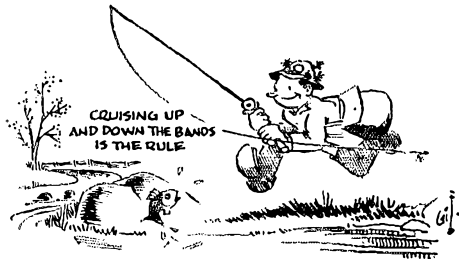
larly at various hours of the day for a couple of weeks prior to the contest — making note of propagation conditions and in general determining what bands could be expected to be "hot" at what hours of the day. Most important, however, seemed to be the scheme of working against an average, with a change in band indicated whenever the average wasn't maintained.

Do you believe in "work-them-as-they-come," or do you fill up on sections first? Or, when do you begin looking for sections?

Work as many stations as fast as you can was the consensus. Don't worry about missed sections until the latter part of the contest. Of course, if you happen across a rare section, it may pay off to wait and try to nab him. Some of the 'phone men mention that they keep an eye on net frequencies in order to pick up the rarer sections.

Do you work a particular section of each band, or do you believe in cruising up and down?

Without exception, everybody cruises up and down the bands.



Do you believe in calling CQ SS repeatedly, or do you go looking for those who are calling CQ?

While these fellows all admit that someone has to answer CQs, they feel that the way to run up a big score in the SS contest is to call CQ continuously. Indirectly, this leads you back to the equipment discussion — in order for your CQs to pay off you've got to have a good signal which, of course, requires an efficient transmitter and a respectable antenna system.

How long are your operating sessions? How do you decide when you are "saturated" either for a particular band or for a particular operating session?

(Continued on page 116)

It's Here... at NEWARK

National's New HRO 60

The Latest and Greatest of a Famous Series

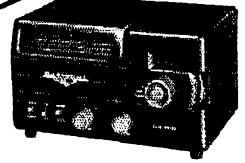
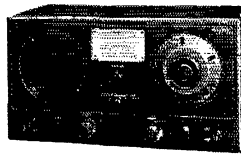
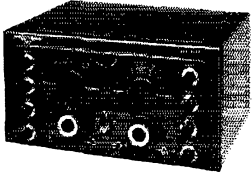
MODEL HRO-60. Features dual conversion on all frequencies above 7 mc, plus 12 permeability-tuned IF circuits. Coverage: 50-430 kc, 480 kc-35 mc and 50-54 mc. Edge-lighted scale with one range in view at a time. Switching is done automatically when coil set is plugged in. Sensitivity of 1 μ v or better at 6 db signal-to-noise. Selectivity variable from 8 kc overall to about 1200 cps at 40 db. Voltage-regulated HF oscillator and S-meter amplifier. Negligible drift after warm-up. Provision for crystal calibrator unit. High-fidelity push-pull audio (\pm 2 db, 50-15,000 cps) with phone jack. Accessory socket for Select-O-ject. Size, 19 $\frac{3}{4}$ x10 $\frac{1}{8}$ x16 $\frac{1}{2}$ ". With 4 coils, less speaker. Wt., 84 lbs.

98F323. NET.....483.50
98F307. HRO 60TS 10" speaker NET.....16.00



FOR EXCEPTIONAL SELECTIVITY AND SENSITIVITY

National



MODEL 183D. All-new receiver with dual conversion, sharp IF and new miniature tubes. Continuous coverage from 540 kc to 31 mc plus 48 to 56 mc for 6-meter reception. Features 2 tuned RF stages, 3 stages of IF, voltage regulated osc. and BFO. Main tuning dial covers range in five bands. Six-position crystal filter. New-type noise limiter. High fidelity push-pull audio. Size, 19 $\frac{3}{4}$ x10 $\frac{1}{8}$ x15". Less speaker. Wt., 65 lbs.

98F311. NET.....369.50
98F305. Model NC-183TS 10" speaker. NET.....16.00

MODEL NC-125. Covers 560 kc to 35 mc in 4 bands. Features edge-lighted scale with Amateur, police, foreign, ship frequencies clearly marked. Sensational National "Select-O-ject" built-in. Exceptional sensitivity on all bands. S-meter reads S9 at 50 μ v signal. AVC, ANL, jack for phono or NBFM adapter. Voltage regulated, stabilized oscillator. Audio flat to 10,000 cps. Size, 16 $\frac{1}{2}$ x11 $\frac{3}{4}$ x8 $\frac{1}{4}$ ". Less speaker. Wt., 36 lbs.

98F300. NET.....149.50
98F301. Model NC-125TS 6" speaker. NET.....11.00

MODEL HFS. Versatile unit for fixed or mobile operation. Can be used as complete receiver in itself or as VHF converter with any receiver tuning to 10.7 mc. Covers entire HF spectrum from 27 mc to 250 mc in 6 bands—receives AM, FM and CW. Two-gang main tuning condenser, panel-controlled antenna trimmer condenser and 6 sets of plug-in coils tune the receiver. Requires power supply. Size, 16-9/16x8 $\frac{3}{4}$ x8 $\frac{1}{2}$ ". Wt., 25 lbs.

98F315. NET.....142.00
98F316. Model 5886 AC power supply. NET.....22.43

MODEL SW-54. Outperforms receivers twice the size and twice the price. Covers entire frequency range from 540 kc to 30 mc in 4 bands. Features sensitive and selective superhet circuit, using new miniature tubes. Slide-rule general coverage dial with police, foreign, Amateur and ship bands clearly marked. Unique plastic bandsread dial is adjustable to assure logging accuracy over entire range. Built-in speaker and power supply. Size, 11x7x7" Wt., 15 lbs.

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Most of the champs let the length of an operating session and length of time spent on an individual band be determined by that QSOs-per-hour average. However, many of them also follow the policy of operating for 50 minutes and then resting for 10. Some of them use this 10-minute rest period for having a cup of coffee and glancing over their log and check-lists. Apparently no one ever relaxes completely!

Do you concentrate your activity in the congested areas of the bands, or do you deliberately stay away from the QRM?

Generally speaking, the fellows stick with the congested areas, but try to stay out from under the really heavy QRM. A few, knowing they have exceptional signals, pay no attention to the status of the QRM but blast away wherever there are contacts to be made. The lower-powered gang works the edges of the congested areas.

—♦♦♦—

Sound easy? Well, that's how last year's winners said they did it! And if this information helps your score at all this year, you should give thanks to W1ATE, W3DGM, W3LTU, W4KFC, W6CUF, W6QEU, W7PGX, W7PUM, W8IOP, and W9RQM — all of whom contributed generously to this symposium.

B.F.O. for Mobile

(Continued from page 26)

the subchassis wiring of automobile receivers is pretty darned compact and since the whole thing is subject to vibration, you should make sure your shielded wire is held down at suitable spots so it won't jar over and ground one of the internal receiver circuits. Spotting solder here and there on the braid to ground points will keep it from moving around.

After installation, you'll need to retrim the last i.f. transformer in the auto receiver, since it is thrown off when you add the net reactance of the b.f.o. unit to the rectifier diode plate. This can be done by ear; tuning in a signal and peaking the trimmer on the i.f. transformer; or with a meter on the a.v.c. line. Then you should make final adjustment of the b.f.o. frequency by switching on the converter and receiver, tuned off any signal; switch on the b.f.o. and set its frequency by means of the screwdriver adjustment in the top of the can. You'll hear a "swish" as you tune through the frequency; set the trimmer to the center of this "beat." Variation of the frequency during operation offers no advantage here as it does in a communications job, since there isn't enough selectivity to make use of off-center b.f.o. tuning.

If you're interested in figures, the following apply to the present installation, using a 20,000 ohms/volt meter to measure a.v.c. voltage. With no signal, only noise output from the converter, and b.f.o. off, the voltage is about 1.2. Switching on the b.f.o. with the "gain" control at maximum

(Continued on page 118)

Lafayette

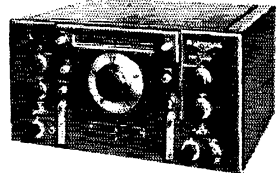


Paul Says

Now that we're all getting ready for another big season of DXing, rag chewing, rebuilding equipment we'll need. Many such items are listed here and we have many others in stock. Drop us a line or stop in and talk over your future requirements.
Paul Vasquez WN2NIJ

WN2NIJ

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SW 54	49.95
NC 125	149.50
NC183D	369.50
HRO 60	483.50
HFS	142.00

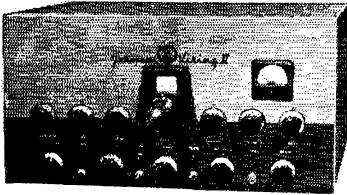
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HQ-129X	199.50
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ZU12-20 20 ft. mast	\$ 7.35
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ZU1234-40 40 ft. mast	20.41
ZU12345-50 50 ft. mast	33.38



NEW! JOHNSON VIKING II

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10Y5	5	28.45	16.73
10Y6	6	25.70	15.11
10Y7	7		
10Y8	8		
10Y9	9		
10Y10	10	13.85	8.14
10Y11	11		
10Y12	12		
10Y13	13		

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Type	Chan-nel	List	NET EACH
10Y7S	7		
10Y8S	8		
10Y9S	9		
10Y10S	10	27.70	16.29
10Y11S	11		
10Y12S	12		
10Y13S	13		

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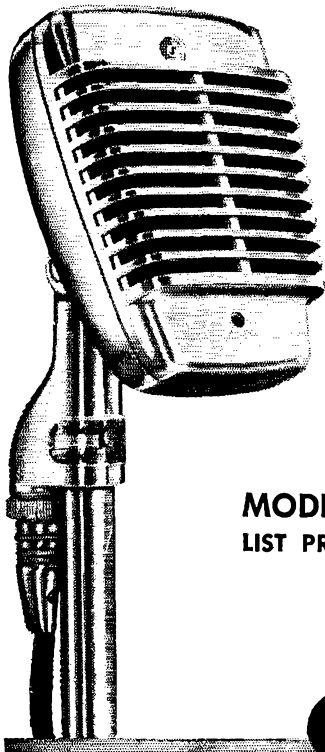
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(variable plate resistor at maximum) causes a rise to 2.1 volts — just enough to cause a very slight drop in background noise in the speaker. Turning the gain down to minimum causes a further rise to over 4 volts, which is ample for the strongest incoming signal. Voltage applied to the oscillator plate is variable from 40 to 65, and over that range the plate current varies from 1 to 2 ma.

The a.v.c. is always in the system, but its effect can be minimized by use of the gain control. A switching arrangement to cut out the a.v.c. might be feasible in some cases, but not in the present one where the a.v.c. line is fed back to the converter, through the noise limiter installation, so that a.v.c. action is needed. While the c.w. reception isn't identical to that you get at home, neither is mobile voice reception — there just isn't enough selectivity built into the auto radio.

Try this little gadget — it will add a great deal of utility to your converter-auto radio mobile installation.

YL News and Views

(Continued from page 41)

were W5s BKG DUR EUG KQG NCH PWN QXR RMH SFT TSE TYX UKT VNR, KZ5AC and KZ5GQ. . . W3CDQ enjoyed a visit from IACD, the first Italian amateur to contact the U. S. on 100 meters in 1925. . . Some new YLs are W1VXC, June, Rumford, R. I.; WN5VYI, Jewell, El Dorado, Ark.; W7HOD, Ethel, Springfield, Mo.; W9RGK, Gay, Urbana, Ill.; and WN9SPN, Rose, Beloit, Wis. . . W5FPB reports that a check of members of the Sandia Base Radio Club and other Albuquerque area amateurs revealed ten husband-and-wife teams and two YLs who haven't yet converted their OMs. . . W5s BKG FWH IPR NWR PTR RWX and TSE attended the Seventh Annual Convention of the South Texas Emergency Net. W5TSE won the big prize — a mobile transmitter. . . W0GOJ, Alice, is now KH6AJD. . . While traveling with her famous OM, Tex (W2CKD), W2EHR, Marguerite Beneke, has been enjoying FB QSOs with her little three-watt transmitter. Such cross-country touring gives Marguerite many opportunities to meet YLs.

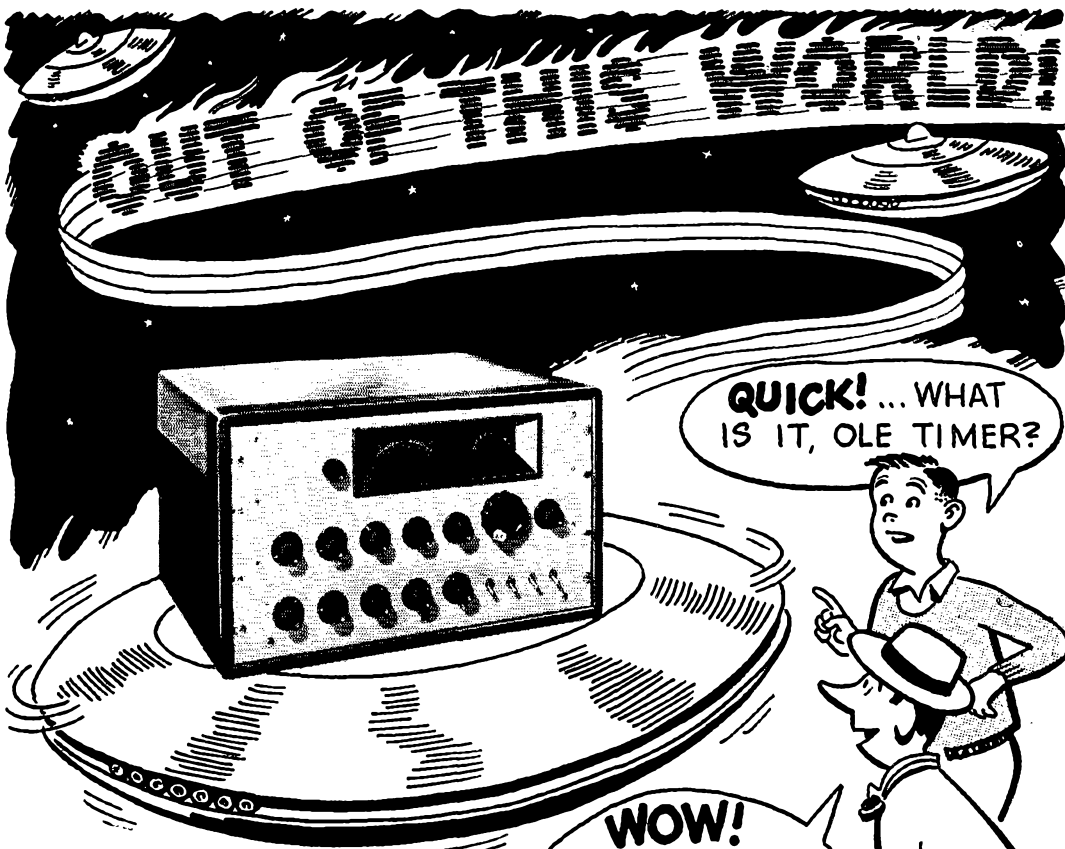
Miscellany

Our query in July re YLs eligible for the Extra Class license via the "grandfather clause" approach was misinterpreted by some. Haven't heard about any YLs accordingly eligible, but we are finding out how many of the girls are actually grandmothers!

— . . . —

Continuing the project launched in the September issue, we are pleased to introduce Madeline Greenberg, W2EEO, YLRL Chairman of the Second District. Licensed in 1950, Madeline was elected president of the N.Y.C. YLRL this year, and her OM, Arthur, W2CYK, was elected to the same office in the N.Y.C. Radio Club. Daughter Sylvia, W2GPK, and son Martin, K2ACM, make the Greenbergs another all-ham family (see p. 49, August QST), with the prospect of an "addition," Sylvia's fiancé, KN2AAO. Madeline works 20, 75, and 80 in her Bronx QTH, using a rig cleverly concealed in cabinets in the living room. In the summer she operates portable from Wading River, Long Island. The second-district YLs are finding W2EEO a competent and enthusiastic chairman.





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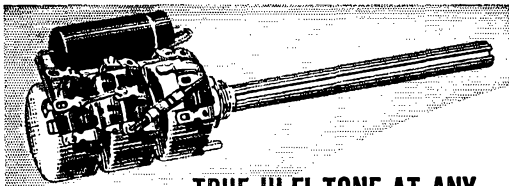
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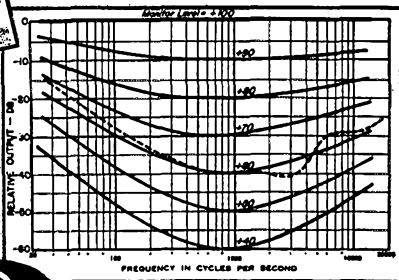
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GARDINER & COMPANY

STRATFORD

NEW JERSEY

What Price Precision?

(Continued from page 30)

2) Rotate C_8 through its range and see if the standard can be zeroed to WWV. If it can, that's all there is to it.

3) If C_8 is all in, and zero with WWV not yet reached, pad up C_9 with additional silver-mica fixed values.

4) Conversely, if C_8 is all out, and zero with WWV not yet reached, reduce the value of C_8 .

Generally, the set-up shown will correct for crystal errors of as much as 2 cycles at 100 kc. Further, it will do this if the rock is either high or low. L_2 , C_8 and C_9 are arranged in such a manner that they series-resonate at 100 kc. with a total of 420 $\mu\text{fd.}$ in use. At this point, zero correction is exerted on the crystal. If the crystal is high, increasing C_8 makes the circuit inductive and drops the crystal frequency. If the rock is low, decreasing C_8 makes the circuit capacitive and raises the crystal frequency. With a 6-millihenry coil in L_2 , corrections through 5 cycles high are possible, providing the C_8 - C_9 combination is increased to about 0.0018 $\mu\text{fd.}$ Similarly, 5 cycles low can be corrected by eliminating L_2 and adjusting the C_8 - C_9 combination until the rock zeros in.

Normally, DT-cut 100-kc. crystals are supplied within plus or minus 2 cycles. It is wise, if possible, to have them 2 cycles high as delivered because DT cuts generally age low, and will then come closer to 100 kc., flat, as they reach maturity. The crystal used in the final version of the WØEG standard is a James Knights type G9 DT cut, oriented for zero temperature coefficient at 60 degrees C, and ground for a flat 100 kc. at exact series resonance. It is sealed into an evacuated 6V6 envelope, and costs in the neighborhood of \$30.00.

Temperature Control

As stated before, stable operation of any standard cannot be realized unless the crystal, and possibly the frequency-correcting components, are maintained at a constant temperature. Thermostatically-controlled ovens are the most common means of doing this, and the "starve and feast" variety, where heater power is either on or off, are the most common. The WØEG standard uses a two-stage oven—actually an oven within an oven. The crystal is mounted in the inner oven, with L_2 , C_8 and C_9 being mounted in the outer chamber, which also contains the entire crystal compartment.

Mercury-contact thermometers, K_1 and K_2 , Fig. 5, are used as thermo-sensitive controls for turning the heat off and on. These units are preset at 60 degrees C. (140 degrees F.) and look like short laboratory thermometers, except that they have no temperature scale, and fine wire contacts spaced about 1/2 inch extend through the wall of the capillary tube into the center hole. As mercury rises in the tube, the contacts are short-circuited, and heater power is turned off

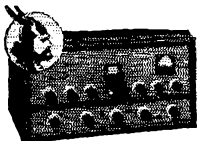
(Continued on page 122)



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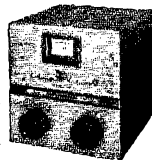


JOHNSON VIKING II TRANSMITTER KIT

130 Watts CW, 100 Watts AM Phone Output. Full output on 160, 80, 40, 20, 15 and 10-11 meter bands. Incorporates all desirable features of predecessor Viking I, PLUS all TVI suppression features. Tubes: RF section, 6AU6 Osc. 6AQ5 buffer doubler, 6146 output amp. Modulator, 6P 807s, 6AU6 speech amp., 6AU6 driver, 2-5R4 HV rect., 5V4G Lo-volt. rect., 6AL5 Bias Rect. All parts furnished, including fully shielded cabinet, punched chassis, wiring harness, wire, solder, hardware, instructions. For 115 Volt 50-60 cycle operation.

Viking II Xmitter Kit.
Complete with Tubes
NET..... **\$279.50**
Wired & Tested **\$329.50**

VIKING VFO KIT



Designed for maximum operational flexibility with Viking I or similar Xmitter. Only two controls: Freq. control drives 5" dial calibrated in freqs. for 160, 80, 40, 20, 15 and 10 meter bands. Also Band-switch. Viking I osc. stage used as kF Amp. or doubler. Clean keying and stability. Provision for Keying either VFO alone, or Xmitter alone, or both together. Plugs cables for direct connection to Viking I, matching cabinet. Very simple to assemble **Viking VFO Kit, complete less tubes \$42.75**
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No. RC-W31S Square face, less alarm..... **\$6.50**
No. RC-W31R Round face, less alarm..... **\$6.50**



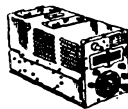
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805.....	4.25	1619.....	.35

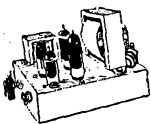
40 METER VFO ARC-5/T22 TRANSMITTER



Converts easily to hot VFO or 50 Watt CW Xmitter. Range 7 to 9.1 Mc. Beautifully constructed of high quality components. Consists of 1626 (or 12J5) triode var. osc. driving 2-1625 (similar to 807), beam tetrodes in parallel, 1629 tuning indicator, ant. coupling and loading coils. Alum. Case 12 x 7 x 3 3/4" wide. With Tubes, Xtal, wiring diagram, conversion suggestions, less power supply. **BRAND NEW. No. 15087..... \$24.95**

BARGAIN!

10-WATT AM MODULATOR



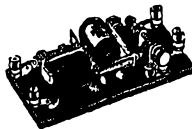
Ideal for mobile or fixed rigs where space is limited. Will modulate 807, 6L6, 6V6, 6AQ5, 7A7 or similar finals. Uses 12AU7, 6AU6 and 2-6AQ5 tubes. A handful of power, only 3 1/2" wide x 6 3/4" long (including knob) x 4 3/4" high. Terrific buy, limited quantity! Less tubes. **\$12.95**
No. 99-S.....

BRAND NEW

DUAL BLOWERS



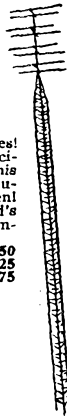
AC Shaded pole motor, 2850FPM velocity, 2800 RPM operation. Dual multi-blade fans. Dual outlet blowers. Quiet, continuous duty. 115 V 60 cy. motor. Black lacquer finish. Wt 11 lbs. No 15107
Each **\$14.85**



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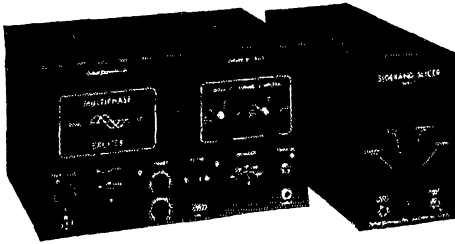
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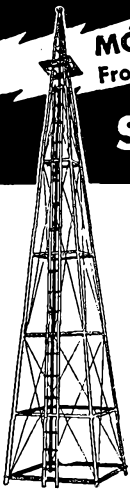
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\$1060.00. Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change ... so order now! Send check or money order ... or write for free information.

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FREE INFORMATION
AND PHOTOGRAPHS

VESTO CO., Inc.
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North Kansas City, Mo.

by the control relays K_2 and K_4 . These relays are of the so-called "sensitive" type, and will operate on a direct current of 1 milliamper through a 1000-ohm coil. The operating current is actually 3 ma. to insure positive functioning. The relay contacts will handle $\frac{1}{2}$ ampere at 115 volts.

The half-wave instrument rectifiers D_1 and D_2 are spark eliminators, protecting the thermostats. They are polarized across the relay coils to present maximum resistance when control voltage is applied. They then short-circuit the reverse-polarity voltage generated by the collapsing magnetic field present immediately after the control voltage is removed. These rectifiers damp out all "contact opening" spark in the thermostats and permit 3 ma. to pass through the mercury column with no bad effects. More than 3 ma. per relay at 3 volts should not be used.

Pilot lamps I_2 and I_3 are across the oven heaters, and wink on and off as these circuits operate. The bridge rectifier supplies d.c. for operation of the heater relays. Any good dry-disc unit delivering about $\frac{1}{4}$ ampere at 3 volts will do. Resistor R_{17} is a heavy bleeder which keeps the d.c. output quite constant, and permits independent operation of both heater relays from a common supply. Condenser C_{15} flattens the peaks of the rectified voltage enough so the control relays won't chatter.

The temperature boxes are made of heavy metal, $\frac{3}{8}$ -inch aluminum, with the heaters wound around the outside. An inch of thermal insulation is used on all sides of these boxes, and the thermostats are mounted tight against the heater windings, and let into channels sawed into the sheets of thermal insulation (Celotex). Outside dimensions of the crystal chamber are 6 inches wide, 6 inches high, and $6\frac{1}{2}$ inches deep. Inside dimensions of the outer chamber are 8 inches high, $10\frac{1}{2}$ inches long and $8\frac{1}{2}$ inches deep. The entire standard is mounted on a $10\frac{1}{2}$ × 19-inch relay rack panel and extends 14 inches behind it. It weighs approximately 40 pounds.

In operation, the interior of the outer chamber is maintained at 58 degrees C., plus or minus 0.05 degree, over an ambient temperature range of 10 degrees to 35 degrees C. The heater serving this chamber operates at a cycle of approximately 15 seconds on and 15 seconds off. The interior of the crystal chamber stays at 60 degrees C., plus or minus 0.01 degree, over the same variations in ambient temperature. Its heater operates on a cycle of approximately 20 minutes on and 5 minutes off. The heavy metal boxes filter out the heat cycle and maintain the interior of the boxes free from any material temperature variations from that source.

Conclusion

As presently constituted, the WØEG standard has been well worth the work put into it, and frequency stability is such that variations in WWV transmissions introduced by instability of

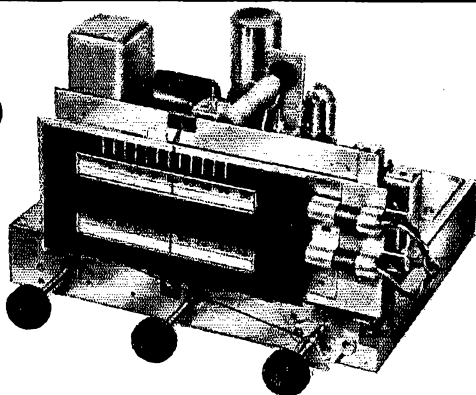
(Continued on page 124)

MUSIC-LOVERS FROM COAST TO COAST HAVE THANKED US FOR THIS BARGAIN

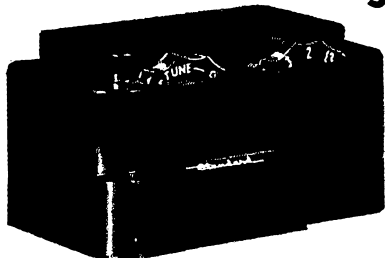
PILOT FM-AM TUNER

REGULARLY \$89.95 **\$42.95**

CLOSEST COMPARABLE MODELS ARE \$30 to \$50 HIGHER and lack several of the features of this never-to-be-duplicated value — offered at far less than dealer's cost! We've sold hundreds at this low price (which allows you to spend more on your amplifier and speaker). Compactly designed and exceptionally well built, the set contains separate tuning condensers, built-in antennas and pilot lights for AM and FM. Superhet AM circuit, ratio detector FM with 225 kc wide linear response. 10 tubes, AC operation. 20-15,000 cycle output to any amplifier, radio or TV set. Four position selector switch: FM/AM/PH/TV. 11 x 6 x 9½" Shipping wt. 8½ lbs. Immediate delivery. Just 200 left!



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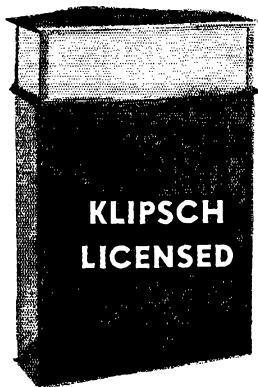


LIST
\$35.00

Sale
\$12.95

Model B-51 Standard Coil TV booster — by the makers of the world's most widely used TV tuners. Factory cartoned and sealed, fully guaranteed. Top quality single stage booster with printed high frequency circuits for improved performance on all channels. Average gain 6 to 7 volts on low channels and 5 or 6 volts on high channels. Extremely low noise factor. Continuous one-knob tuning; channel selector switch for off-on and by-passing 300 ohm lead-in to set. 6AK5 tube employed as a tuned input, tuned output RF amplifier, selenium rectifier in power supply. Modern design, dark brown plastic cabinet, 8 x 4½ x 4½". 110V. 60 cycle AC. Ship. wt., 5 lbs. **ONLY 75 AVAILABLE.**

CORNER HORN ENCLOSURE \$132.50*



Folded corner horn cabinet for music lovers and laboratories who desire the utmost in low frequency reproduction. This is the first time a genuine Klipsch designed enclosure of this type has been offered within \$50.00 of this low price. Finished in a medium brown mahogany lacquer, hand-rubbed, alcohol and heat resistant. Front and top are first quality 5-ply selected gumwood, 39 x 27 x 32". Wt. 150 lbs. Model RS-1.

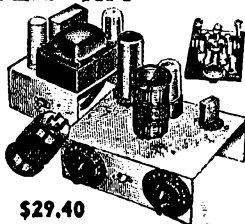
*Add \$15.00 for crating for shipment.

Model RS-1A top enclosure shown in photo, for housing mid-range horn, crossover and tweeter. Designed and finished to be mounted on top of RS-1. Adds 10" to height of enclosure. Complete frame and top ready for attaching grille cloth.

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NOVICE TRANSMITTER KIT

with POWER SUPPLY — 2 band operation. Especially designed to provide ease of assembly and operation; simple antenna system and tuning. Untuned Pierce type crystal oscillator (6V6 tube); tuned output amplifier (6L6 tube); foolproof pictorial wiring diagrams; power input 25 w. Complete with tubes, standard CW key, power transf., choke and 5Y3 rectifier tube. Power supply suitable for other uses.

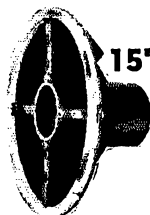


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BARGAIN-PRICED

15" COAX SPEAKER

2 lb. ALNICO MAGNET



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Separate low and high frequency units with 2 mfd., 200 V paper condenser dividing network. 15" woofer, 5" coaxially mounted tweeter. Ideal for low cost console, music system etc. 70-15,000 cycles. 8 ohms. Ship wt. 12 lbs.

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the ionosphere are readily detected. Most of the crystal aging worked out during the first 60 days of operation, and drift settled to a more or less constant rate of minus 2 parts in 50 million per week, at the end of four months. The total cost of the unit, a large percentage of which was Government surplus, was approximately \$150.00.

From the foregoing, it will be seen that one can spend as much or as little as he desires on a frequency standard, and that the cost of generating the ultimate in precise radio frequencies is considerable. Further, it will be seen that the law of diminishing returns accounts for the fact that a standard capable of holding one part in a hundred million costs somewhere between ten and a hundred times more than one capable of holding one part in one million. However, it will also be seen that adequate precision can be attained for a comparatively small cash outlay, plus some careful work.

Inasmuch as some rather uncommon items were used in the final construction, a list of dealers carrying such equipment is appended:

1) The 60-degree fixed mercury-contact thermometers used in the WØEG standard are obtainable from Herbach & Rademan, Inc., 1201 Arch Street, Philadelphia 7, Pa. These people can also supply sensitive relays adequate for temperature-control purposes. Both items are Government surplus, and cost approximately \$1.00 per item. Precision thermometers spreading 4 degrees, 58-62 degrees C., over approximately 4 inches are also available from this company.

2) Mercury-contact thermometers, 40 degrees C., are available from TAB, 6 Church Street, New York 6, N. Y. These people are also a possible source of sensitive relays.

3) Special mercury-contact thermometers, made to the customer's specifications, are obtainable from Mac Electrical Devices, Wyncote, Pa., and cost from \$7.00 to \$15.00 each.

4) The iron-dust core for L_1 is obtained from the Lenkurt Electric Company of 1105 Old County Road, San Carlos, Calif. It is known as their Type P1750-12A assembly; cost, \$2.64 each.

A Novice Test Meter

(Continued from page 35)

resistance can be determined by the formula

$$R_m = 100 \frac{1 - 0.75}{0.75} = 100 \frac{0.25}{0.75} = 100 \times 0.333 = 333.3 \text{ ohms.}$$

The accuracy will depend upon the accuracy of the 100-ohm resistor and the reading of the meter.

I made the 1000-ma. shunt with No. 18 wire wound around a pencil as a form. After removing the pencil, I fed each end of the wire back through the inside of the coil to add stiffness. The wire for the other two shunts can be scramble-wound around a pencil and doped with Duco cement to hold the turns in place. Be sure to remove the pencil before the cement sets.

(Continued on page 126)

- 4 E 2 ----- \$8.75
2 MTR—4 ELEMENT YAGI
- 8 E 2 ----- \$20.50
2 MTR—TWO 4 ELEMENT
YAGI
- PD 3 E10 ---- \$24.95
PLUMBER'S DELIGHT
INCLUDES T MATCH
10 MTR—3 ELEMENT
CLOSE SPACED
- 3 E 10F ----- \$42.40
FOLDED DIPOLE
10 MTR—3 ELEMENT
CLOSE SPACED
- 3 E 10T ----- \$41.80
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10 MTR—3 ELEMENT
CLOSE SPACED
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INCLUDES T MATCH
15 MTR—3 ELEMENT
- 2 E 20T ----- \$47.95
INCLUDES T MATCH
20 MTR—2 ELEMENT
- 6 E 10-20T --- \$98.95
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Complete catalog on request: Dept. Q102

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HY-LITE Antennae INC.

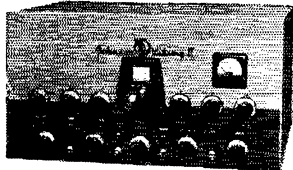
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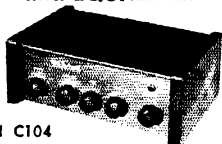
NEW DELUXE TRANSMITTER KIT JOHNSON VIKING II

100 WATTS ON PHONE
130 WATTS ON CW



Every desirable feature has been included in this outstanding transmitter: BAND-SWITCHING to all amateur bands, from 160 through 10 meters... TVI suppression... 100% AM modulation... PARALLEL OUTPUT 6146 tubes... PUSH-PULL 807 MODULATORS. Supplied complete with pre-punched chassis, copper-plated steel cabinet, tubes, hardware, assembly instructions, and all necessary parts and components.\$279.50

McINTOSH PHONO PREAMPLIFIER and EQUALIZER



Model C104

An extremely flexible unit designed for the most discriminating and acute listener. Provided with five inputs and selector switch, it accommodates crystal pickup, FM-AM tuner, low level microphone, as well as high level and low level magnetic pickups. A 3-position switch selects the three recording characteristics most often used. In addition, the C104 features treble and bass boost and attenuation, each with separate controls. Connectors are furnished for obtaining power from the main amplifier. A master power switch and volume control completes the attractive brown hammetone panel. Supplied complete with tubes and connectors.

In Mahogany-finish Cabinet.....\$57.50
Less Cabinet 49.50

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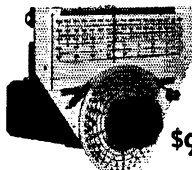
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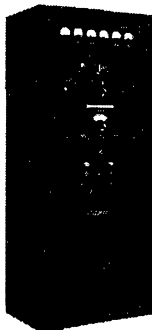


less spkr. \$420
speaker \$20

COLLINS 32V-3 Transmitter



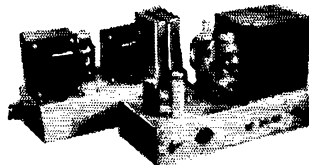
\$775



COLLINS KW-1 Transmitter \$3,850

Write for complete data and specifications

THE ORIGINAL WILLIAMSON HR-15 AMPLIFIER KIT



The famous, original Williamson HR-15... still acclaimed the leader... in kit form, with the original Partridge output Transformer. Assemble this Kit, and in 3 hours or less, enjoy the finest sound you ever heard. Operates from a tuner, phono-preamp, crystal pick-up, or other signal source. Absolute gain is 70.8 db with 20 db of feedback. Frequency response: $\pm .5$ db, from 10 to 100,000 cps. Output impedances to match all speakers from 1.7 to 109 ohms. Kit is complete with 5 tubes (1-5V4, 2-6SN7, and 2-5881) (or 807 if requested). 2-Punched Chassis, 2-Resistor Mounting Strips, Sockets, Partridge WWFB Output Transformer, Assembly Instructions, and All Other Necessary Parts for Amplifier and Power Supply.....\$76.50

HR-15, as above, but with Partridge CFB Output Transformer (Hermetically Sealed)\$90.00

PARTRIDGE OUTPUT TRANSFORMERS — Available Separately. WWFB. \$26.00 CFB..\$40.00

HR-15T WILLIAMSON Kit — Furnished as above, with TRIAD Transformers and Chokes\$69.50

NOTE: HR-15 and HR-15T Kits may be had with British KT-66 Output tubes for \$3.00 additional.

SUPERIOR POWERSTATS

Smooth, efficient voltage control, 0-135 volts output from 115 volt AC line. Models also for 230 volt input. Write for free literature. Models for table and panel mounting.



Type 20, 3 amp.....	\$12.50
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1126, 15 amps.....	46.00
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The MODEL 10 is a new, compact unit measuring only 3" in diameter and 2 1/16" deep. It is rated at 1.25 amps. (150 watts/165VA), and is continuously variable to deliver 0-132 volts with 120 volt 60 cycle input.....\$8.50

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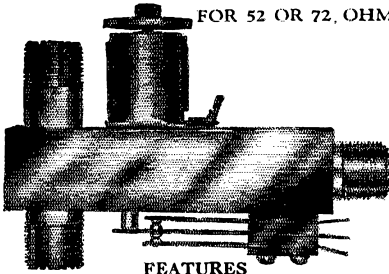
RADIO COMPANY, INC.

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NOTE: In view of the rapidly changing market conditions, all prices shown are subject to change without notice and are Net, F.O.B., New York City.

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FOR 52 OR 72, OHM LINE



FEATURES

1. Causes negligible change in s.w.r. up to 100 Mc.
2. Handles power up to 1000 watts.
3. Fits standard connectors for co-ax.
4. No chatter. Specially built for "Silent operation".
5. Over-all length 4 3/4". Over-all width 3".
6. Externally mounted SPDT switch operated by relay can be used for opening B+ of receiver when transmitting, or for other control purposes. Add to prices below \$1.00.
7. When in transmit position a built-in shorting connector grounds receiver antenna lead. This protects receiver against injury from r.f. and reduces to a minimum the capacity coupling between receiver and relay contacts. Add to prices below, \$1.00.

AC Types (all voltages) Amateur Net.....\$10.50
 DC Types (all voltages) Amateur Net..... 9.50
 See your distributor, but if he has not yet stocked Dow Co-ax Relays, order now direct from factory. Send check, money order, or will ship C.O.D. Prices are Net, FOB shipping point: Warren, Minn., or Winnipeg and Montreal, Canada.

Dealer Inquiries Invited

THE DOW-KEY CO., INC. Warren Minnesota
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mobile specials

10-METER WHIP ANTENNA

96 inches tall, made of chrome silicon steel of exceptionally high tensile strength. Bend it to 90° and it will still come back to original upright position. Taper ground with corrosive resistant finish. For base below, or any standard base. 96" Whip Antenna - Regularly \$6.75
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SWIVEL BASE AND SPRING

Oil-tempered heavy spring steel - tough enough to take it! Not affected by shock, extreme temperature or vibration. Flexible lead though center of spring maintains constant electrical impedance. Instant response to contact with overhead obstructions. Has 3/8" threaded fitting to receive mast stud.

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WHIP AND BASE COMBINATION

Another great Arrow Special. Order both whip and base above, together and save still more!

COMBINATION ABOVE, SPECIAL..... 7.00

MALLARD HI-Q 20 Loading Coil, Net.... 8.95

MALLARD HI-Q 75 Loading Coil, Net..... 7.95

ARROW ELECTRONICS, INC.

82 CORTLANDT ST., NEW YORK 7, N. Y., DIGBY 9-4714

Calibration for voltage and current should not be necessary if the resistors are accurate. It is merely a matter of multiplying the reading by the appropriate factor, i.e., 1, 10, 100 or 1000. However, a calibration chart for the resistance readings will be needed, as described in the *Handbook*. The high-resistance range goes up to about 0.5 megohm, while the limit of the low-resistance range is approximately 1000 ohms. On the low-resistance range, the zero-adjust rheostat, R_3 , should be adjusted so that the meter reads full scale with the test prods open, before making a resistance measurement. On the other hand, for measurements in the high-resistance range, the adjustment should be for a full-scale reading with the test prods *shorted*.

The unit can be dressed up by labeling the switch positions and the pin-jack terminals with decals. A pair of test prods with leads at least 3 feet long and 'phone-tip plugs for the prod wires and battery leads finish up the job.

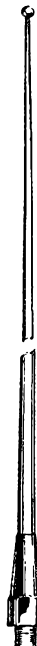
Eliminating Intersignal Noise

(Continued from page 87)

of the receiver and the a.v.c. terminal of the codan to the receiver a.v.c. line. Tune in a station that is just above the noise level, and set the level control so that the codan just passes a clean signal. Now detune the receiver slightly, and the signal will cut out. Retune, and the signal will return. Interrupting the carrier by shorting antenna and ground will also silence the a.f. With a little practice, it will be possible, most of the time, to tune any band from top to bottom, with the receiver silent except when a carrier of predetermined height above noise level is tuned in. When a signal fades very badly, it will be necessary to set the codan at the lowest intelligible level, or to disable it, to prevent interruptions in the transmission. Although designed for 'phone work, a codan is sometimes helpful in c.w. work also, provided the a.v.c. system has a sufficiently-long time constant. It is sometimes possible, by very careful setting, to adjust the codan so that it will pass only modulation peaks of the incoming signal, rejecting all the rest. This difficulty, which is common with triode-controlled codans, and uncommon with pentode types, can be remedied by slight readjustment of the codan level.

Performance of this codan leaves little to be desired. During nine months of operation, it has needed no servicing, and still contains the original tubes. It is of particular value on the higher frequencies, where intersignal bedlam tends to be quite severe. When used with a stable receiver and carefully adjusted, it is a great aid to accurate tuning. It does not, however, cause any real increase in selectivity.

Although designed for use on a.m. signals, this codan works well with n.f.m. signals, and, with slight readjustment, on standard f.m. transmissions.



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YOUR
OWN*

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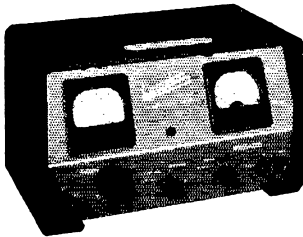
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- Type 105-B Micrometer Frequency Meter (0.1 to 175 mc)

Name.....

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City.....Zone.....State.....

Sugar-Coated S.S.B.

(Continued from page 39)

the 'scope is coupled to the output as in carrier-type a.m. As pointed out in numerous articles, the final pattern with a single-tone modulation should resemble an a.m. carrier without modulation.

To sum up, you might consider single sideband this way: Take any voice frequency — say, 1000 cycles — and let this represent the human voice. Feed it to a mixer to "convert" it to 3900 kc. That would make the net frequency 3901 kc. Now remove the r.f. carrier, but leave the audio signal up there at 3901 kc. We have now accomplished what single sideband does. The receiver picks up the signal at 3901 kc., adds a 3900-kc. carrier from the h.f.o., "converts" or "detects" it down to 1000 cycles, and you hear it in your 'speaker. Now, I ask, how simple can you get?

A final paragraph might be written to deal with the "die-hard" 'phone man who says, "To heck with all this. I'm not going to junk my expensive carrier rig just for a silly fad." And believe me, there are plenty of guys on the hands who say just that. Well, take it from this die-hard: Two months ago I was one of you. And I had my eyes opened. You will, too. No matter what you may say today . . . just as surely as the sun rises and sets, the day is not far off when a carrier will be an illegal part of a 'phone signal . . . especially since the spirit, if not the letter, of present FCC regulations prohibits the transmission of useless energy. *The carrier has got to go. The carrier is dead. Long live the sideband.*

Rectifiers

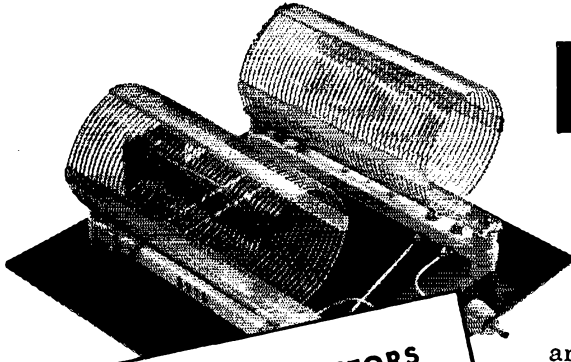
(Continued from page 42)

type has two anodes and a single cathode or filament. Most types for voltages above 500 are of the half-wave type. Rectifier filaments may be supplied by a separate step-down transformer, as shown in Fig. 6A, or, in the case of lower-voltage supplies, from an appropriate winding on the high-voltage transformer, as Fig. 6B.

The pulsations in the d.c. output shown in Figs. 2B and 3B can be smoothed out by the use of a filter consisting of chokes and condensers.

Answer to QUIST QUIZ on page 10

Because it won't work. Regardless of the frequency swing, sidebands will appear removed from the carrier frequency by the modulating frequency. With greater frequency swing, sidebands appear at two and three times the modulating frequency as well. For example, if a 1000-cycle tone is used to modulate an f.m. transmitter, sidebands will appear ± 1000 cycles from the carrier when the swing is only 50 or 100 cycles. As the swing is increased, the 1000-cycle sidebands will increase in amplitude, and detectable sidebands will also appear at ± 2000 and ± 3000 cycles. In the reception of an f.m. signal, the receiver bandwidth must be great enough to pass the sidebands. The only known approaches to spectrum economy with 'phone signals are restricted speech range and single-sideband transmission.



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These bifilar balun inductors are specially designed for use with Collins 32-V series and similar transmitters—see "The Impedance Matcher" as described in CQ Magazine for May 1951. Two coils mounted on an 8" square plate serve as a compact, highly efficient all-band (80-10 meters) unit for matching feed line systems to both transmitters and receivers. Full instructions included with each inductor.

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*Trade Mark



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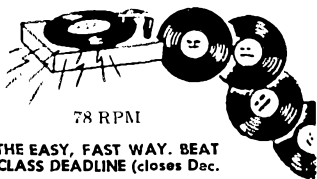
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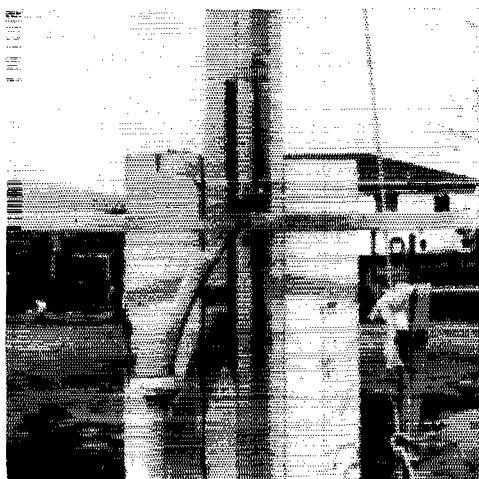
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40-Meter Vertical

(Continued from page 46)

The exact dimensions of the broad-band vertical are: outside elements, 30 feet 4 inches; center element, 30 feet 3 inches; with the elements spaced 15 inches and in the same vertical plane. The tops of the three conductors are tied together with a 1-inch aluminum strip, and the two outside elements are tied together at the bottom with another strip. The feed point is the 1-inch gap between the center element and the bottom strip, as can be seen in the photograph.

One thing should be pointed out. Anyone constructing a similar antenna, and using wire or different-diameter tubing, will find that the elements must be longer to resonate in the 7-Mc. band. The thinner the elements, the more closely the length will approach that given by the formula for a quarter-wavelength antenna.



A close-up view of the base of the vertical shows the 300-ohm line in its garden-hose housing.

Strays

As one little electron said to another little electron when they bumped into each other on the grid: "I don't know you from atom!"

— Hoffman Transmitter

W9LQP would remind mobileers that serious burns can result if gas escaping from an uncapped storage battery were accidentally ignited.

To prevent damage while soldering, VE3AOZ wraps watersoaked pipe cleaners around the pins of polystyrene coil forms or the leads of crystal rectifiers.

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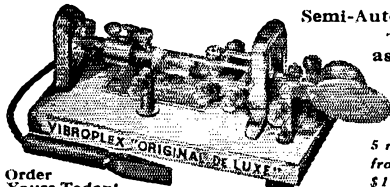
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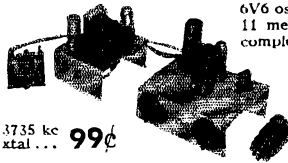
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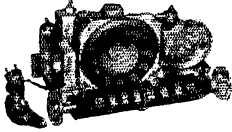


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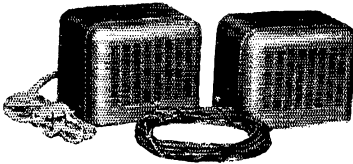
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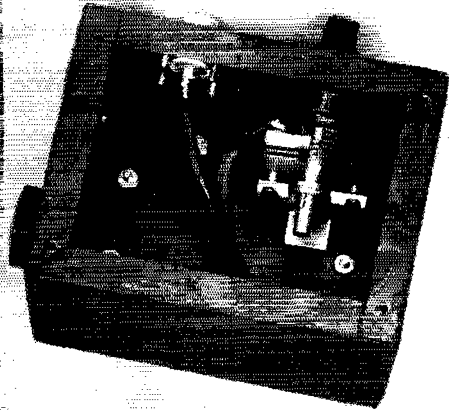
Baltimore 18, Md.

50-Mc. Antenna Coupler

(Continued from page 68)

If the transmitter is well designed as to TVI prevention, the antenna coupler may be all that is needed in many locations. If the TVI problem is severe, the installation of a low-pass filter in the line between the rig and the coupler may be necessary. Most filters now on the market are not satisfactory for 50-Mc. use, as their cut-off frequency is lower than this. Filters for the v.h.f. man will be treated in a subsequent issue of *QST*.

— E. P. T.



Bottom view of the 6-meter antenna coupler.

DX Contest Results

(Continued from page 58)

Minnesota	W8FJR..... 4770-30-53-A-16
W0EDX..... 24,476-58-142-C-27	W8SMC..... 2808-26-36-B-10
W0TKX..... 1701-21-27-B-8	W8ZJM..... 1980-22-30-B-10
W0RXL..... 576-12-16-C-11	W8NXP*..... 1428-17-28-B-7
W0VIP..... 576-12-16-B-4	W8FCX*..... 1050-14-25-A-20
DELTA DIVISION	W8AJH..... 54-3-6-B-2
Arkansas	W8AJH..... 12-2-2-C-1
WSHFQ..... 11,223-43-87-C-20	W8GUH..... 12-2-2-A-1
Louisiana	HUDSON DIVISION
WSJVF..... 45,975-75-211-C-52	<i>E. New York</i>
WSKC..... 10,584-42-84-B-15	W2DSU..... 22,605-55-140-B-52
WSBMM..... 1944-18-36-B-7	<i>N. Y. C. - L.I.</i>
WSCEW..... 420-10-14-B-	W2WZ..... 26,510-55-162-C-31
Mississippi	<i>No. New Jersey</i>
WSZD..... 15,312-44-116-C-40	W2APU..... 34,452-59-198-B-52
WSCKY..... 765-15-17-A-12	W2GNO..... 16,698-16-121-B-23
Tennessee	W2ATE..... 5508-34-56-B-11
W4DOH..... 61,236-81-265-C-56	W2ZKH..... 3375-25-45-A-
W4FKA..... 624-13-16-B-11	W2ZVS*..... 3348-18-62-B-16
GREAT LAKES	W2JMC..... 3150-25-42-B-12
Kentucky	W2NYN..... 2016-21-32-C-30
W4SID..... 6105-37-55-C-52	W2CGJ..... 714-14-17-B-7
W4KZ..... 1025-18-19-B-7	MIDWEST DIVISION
Michigan	<i>Iowa</i>
W8VOD..... 15,750-50-105-C-24	W0NWX (W0JDV)..... 70-5-5-C-
W8DUS (W8s RAE, UPN)..... 3286-31-36-C-20	<i>Kansas</i>
Ohio	W0YZL..... 225-5-15-B-2
W8JIN..... 75,423-93-272-C-58	<i>Missouri</i>
W8BHW..... 49,532-75-223-C-10	W0CUV..... 12,642-45-93-C-34
W8LO (W8CLR)..... 30,888-72-143-C-64	W0ANF..... 10,647-39-91-C-33
W8BRA..... 19,488-56-116-B-	W0BCF..... 8892-39-79-C-
W8AJW..... 14,168-56-85-A-	W0GEK*..... 4968-23-72-B-31
W8BF..... 7011-41-57-C-	<i>Nebraska</i>
	W0BBS..... 7385-35-71-C-22
	W0CKL..... 5301-31-57-C-30
	W0MGV..... 4620-28-55-C-16

(Continued on page 154)

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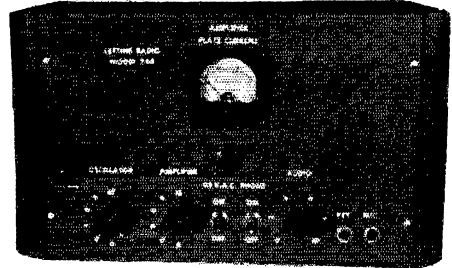
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<i>Connecticut</i>		<i>Arizona</i>		
W10DW.....2442-22-37-B-18	W1AW.....100-5-7-C-	W7PZ.....1215-15-27-B-	W7MOW*.....600-10-20-B-12	W7ENA*.....54-3-6-A-1
W1FTX.....27-3-3-B-2	<i>E. Massachusetts</i>			
WIAFZ.....84,252-84-341-C-75				
W1AXA.....9840-41-80-B-24				
<i>W. Massachusetts</i>				
W1CND.....33,055-55-203-B-30	W1CLX.....6132-28-73-B-12	<i>San Diego</i>		
W6CTP.....20,608-56-125-B-40				
W6CHV.....7350-35-70-B-20				
WEST GULF DIVISION				
<i>Northern Texas</i>				
W5BGP.....35,112-66-180-B-43	W5KJL.....5589-27-69-C-29	W5RJP.....5124-28-81-B-32	W5PXT3.....1998-18-37-B-20	W5AWT.....360-10-12-B-6
W5BFT.....12,276-47-87-A-	W5IFZ.....7260-33-74-B-	<i>Oklahoma</i>		
W5ALB*.....16,137-33-163-B-36				
W5GZK.....5202-34-51-B-29				
W5TYE/*.....252-7-12-A-11				
<i>Southern Texas</i>				
W7HIA.....39,480-70-188-C-40	W7AHX*.....5589-27-29-B-25	W7MLJ.....2907-17-57-C-30	W7HXG*.....1581-17-31-B-3	W7LNG.....336-7-16-B-7
<i>Washington</i>				
W7DL.....41,406-67-206-C-	W7PQE.....3519-23-51-B-30	W7AJS.....3300-22-50-B-14	W7HAD.....2109-19-37-B-20	
PACIFIC DIVISION				
<i>Nevada</i>				
W7JUU.....10,836-42-86-C-30	W7KIO.....5940-33-60-B-22	<i>Santa Clara Valley</i>		
W6YX (W6 VUV, TOT, WZD, AOF, JHT).....21,900-50-156-C-34				
<i>East Bay</i>				
W6NIG.....102,951-93-370-C-90	W6VYZ.....51,129-69-247-C-90	W6PYH.....36,642-62-197-C-35	W6LDD.....7938-27-98-C-50	W6IDY.....5952-31-64-C-20
W6PBJ.....4347-28-50-B-18	W6JDO*.....1800-15-40-B-17	W6EJA.....168-4-14-B-4	W6MVQ (W6UZX) 34,362-69-166-C-	
<i>San Francisco</i>				
W6ATO.....1395-16-31-C-15	W6GPB.....96-4-8-B-2	<i>San Joaquin Valley</i>		
W6BYH.....360-10-12-B-2				
ROANOKE DIVISION				
<i>No. Carolina</i>				
W4GXB.....4530-30-51-B-8	W4WEN.....4200-28-50-B-18	W4NC*.....819-13-21-C-	W4AEH*.....96-4-8-B-	
<i>Virginia</i>				
W4ESK.....149,517-111-449-C-	W4OM.....57,388-84-237-C-75	W4VAL.....63-201-B-50	W4KFC.....420-10-14-A-2	W4GOL.....324-9-12-B-15
K4WCC.....192-8-8-C-1				
ROCKY MOUNTAIN DIVISION				
<i>Colorado</i>				
W0NWW.....15,942-46-109-B-60	W0SBE.....14,490-46-105-C-80	W0AZT.....450-10-15-C-4	<i>SOUTHEASTERN DIVISION</i>	
<i>Alabama</i>				
W4HA.....5916-34-58-C-18	W4FMO*.....60-4-5-A-4	<i>E. Florida</i>		
W4EEO.....528-11-16-B-8	W4TRA.....84-4-7-B-24	<i>W. Florida</i>		
W4BGO.....25,047-69-121-B-35	W4TKL*.....54-3-6-A-3	<i>Georgia</i>		
W4NLY.....1836-18-34-B-30				
SOUTHWESTERN DIVISION				
<i>Los Angeles</i>				
W6AM.....64,428-78-276-C-47	W6JU.....9090-30-101-C-17	W6FSJ.....720-10-24-C-	W6SUO*.....240-8-10-B	W6BPD (W6FOZ).....792-12-22-A-6
<i>British Columbia</i>				
VE7VO.....37,062-71-174-C-52	VE7BF.....26,796-58-154-B-80	<i>Manitoba</i>		
VE4RO.....31,212-68-153-C-60				
<i>Saskatchewan</i>				
VE5CX.....54-3-6-A-4				
AFRICA				
<i>Algeria</i>				
FA8BG.....1512-12-42-A-2				
<i>French Morocco</i>				
CN8FX.....740-8-30-A-				
<i>Tangier</i>				
KTIDD.....10,556-14-257-B-22	KTIUJ.....984-8-42-A-	<i>Union of South Africa</i>		
ZS6DW.....51,948-36-481-C-				
ASIA				
<i>Japan</i>				
JABAB.....141-7-21-C-	JA2DV.....36-2-6-C-	<i>Turkey</i>		
TA2EFA.....138-6-25-C-7				
EUROPE				
<i>Belgium</i>				
ON4YB.....2418-13-63-A-7	ON4CC.....972-9-36-A-3	<i>Denmark</i>		
OZ7SM.....5899-17-116-A-18	OZ7BG.....750-10-25-A-	OZ7G.....308-7-15-A-	OZ3EA (OZ6BC).....4275-15-99-A-18	
<i>England</i>				
G2PU.....15,000-25-200-B-15	<i>Finland</i>			
OH6NR.....540-9-20-A-				
<i>France</i>				
FR8K.....14,841-17-291-A-45	FTAS.....96-4-8-C-	<i>Italy</i>		

(Continued on page 136)



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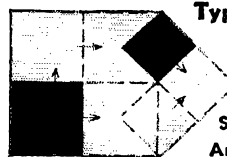
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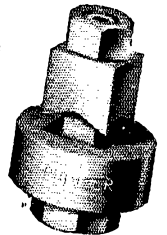
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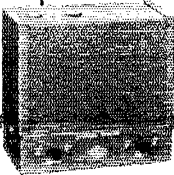
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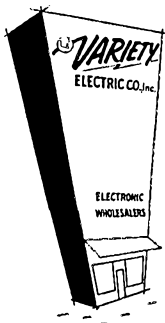
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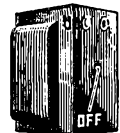


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<i>Germany</i>	VK3LN.....4914-13-126-A-30
DL4NV.....5970-15-135-B-20	VK3LC.....1470-10-50-A-6
DL4LL.....1632-12-47-C--	VK3CE.....1320-11-40-A-6
DL4LU.....1122-11-34-B-12	VK3FO.....1122-11-34-A-3
<i>Iceland</i>	VK3FHH.....870-10-29-A-9
TF3SF.....828-12-34-A--	VK4HD*.....441-7-21-A-6
<i>Italy</i>	VK2JZ.....9-1-3-A--
HBV.....15,776-17-311-B--	<i>Hawaii</i>
<i>Netherlands</i>	KH6IJ.....159,432-52-1002-C-44
PA0BRG.....162-6-9-A-15	KH6AEX.....135,576-56-807-B-51
<i>Portugal</i>	KH6MG.....120,612-57-703-C-45
CT1SO.....5929-19-105-B-20	KH6ABF*.....3203-16-174-A-16
CT1UO.....767-15-17-A--	KH6DK.....7483-24-101-A-9
<i>Spain</i>	KH6EX*.....4650-12-130-C-12
EA2CA.....7012-14-169-A--	KH6OL.....3088-16-65-A--
<i>Sweden</i>	KH6PM.....2600-10-87-B-5
SMSWJ.....2745-15-61-B-9	<i>New Zealand</i>
SMSPA.....630-10-21-B--	ZL1HY.....14,976-24-208-A-19
SM7VH.....132-4-11-A--	ZL1MQ.....11,625-25-155-A-27
<i>NORTH AMERICA</i>	ZL3AB.....176-4-15-A-2
<i>Alaska</i>	<i>Niue Island</i>
KL7WC.....5016-19-81-B-12	ZK2AA.....2832-16-59-A-
<i>Barbados</i>	<i>SOUTH AMERICA</i>
VP6SD.....157,990-61-884-B-72	<i>Argentina</i>
VP6WR.....57,772-41-448-A--	LU4CE.....1500-15-34-A-6
<i>Costa Rica</i>	LU8AM*.....315-15-7-B--
T1ZTG.....18,381-33-187-C--	<i>Brazil</i>
<i>Cuba</i>	PY2CK.....10,780-22-165-C-13
CO2BC.....2712-12-77-A-8	PY4RJ.....5208-12-125-B--
<i>Guantanamo Bay, Cuba</i>	PY6BP.....3528-12-98-C--
KG4AF.....15,148-14-364-C-16	PY2ADT.....1144-11-104-B-5
<i>Guatemala</i>	<i>Chile</i>
TG9AD.....66,861-57-393-A-11	CE4BX.....426-6-2A-A-5
<i>Greenland</i>	<i>Colombia</i>
OX3WX.....2370-15-53-A-15	HK1DW.....3366-17-66-A--
<i>Mexico</i>	HK1FE.....135-5-10-A--
XE2W.....93,869-59-539-A-21	<i>British Guiana</i>
XE1QB (XE1SA).....30,030-42-241-A-20	VP3HAG.....7756-14-186-A--
<i>Puerto Rico</i>	<i>Peru</i>
KP4DU.....21,141-29-243-A-60	OA1E*.....819-7-40-A-11
KP4KD.....285-5-19-A-1	<i>Uruguay</i>
<i>Virgin Islands</i>	CX3BT*.....189-7-9-A-2
KV4AQ.....20,352-32-212-A--	CX7BA.....165-5-11-A-1
<i>OCEANIA</i>	CX2BP*.....96-4-8-B--
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VK4FP.....5083-13-131-A-19	

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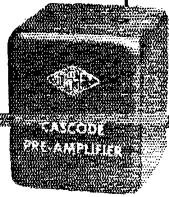


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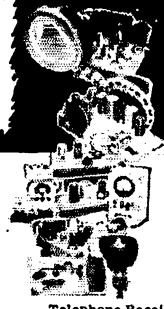
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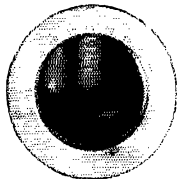
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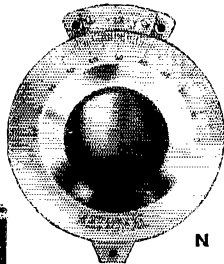


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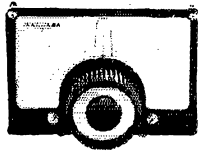
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MALDEN, MASSACHUSETTS

How's DX?

(Continued from page 57)

Bill's XYL sports the tag KH6AQZ and she lends her talents to the Honolulu post of Globe Wireless. Stateside oldtimers may know KH6CB better as IALY ('21), W1BAT and W1RV W4FVI calls attention to the fact that KX6AF and W4FVI/KX6 were manned by AACSS and ATC personnel and he found it impossible to take along the logs or make transcripts of same when he left the atoll. Bill suggests QSL-troubled parties drop a line to a currently active KX6 in the event that whereabouts of said logs may still be ascertained. He emphasizes that he maintained a strict 100-per-cent QSL policy while hamming in the Marshalls VR2AS got back on the air with a W6OKK contact after repairing extensive station damage wreaked by an itinerant typhoon. W6OKK says Ws should appreciate a source of steady juice — ZL1AHA's power company customarily knocks off for maintenance at odd hours of the day or night.

Europe — G8KP came up with the highest non-OZ score in May's Danish Jubilee Contest sponsored by EDR. OZ7BG took home-country honors. OH2YV, OK1HI, SM5DW, PA0VDV and F9DW gave G8KP his stiffest competition LZ1DP's letter to W2APU contains data on Bulgarian amateur regs: There are three classes of license — Class C (10 watts, u.h.f. c.w.); Class B (50 watts, all-band c.w.); and Class A (250 watts, all-band c.w. and 'phone) — but very few licensees. There are no Class As yet because the first exams for the classification are set for this month. LZ1DP will take the test for his Time to set your sights for the Sixth All-European DX Contest to be held in early December — details next month WIAPA had a 6BQ7 delivered personally to F9BO. Gil's neighbor, father of W1s QAU and QOT, visited Paris and took the bottle along W6s AM and MA report the most gracious hospitality extended by hams of eight European countries visited Sorry we can't accept U.S.S.R. SWL cards, still leaking through, for DXCC credit. One received by W3AG jibes with the date and time of his only TG6 QSO DL4LQ finds that LX1BO, who has worked over 600 Ws on 10 'phone, is on the engineering staff of widely heard Radio Luxembourg LJ2J closed down in Norway and is back in Va. Charlie welcomes QSL queries to the "Where" address but there should be few. He'll undoubtedly add a W4 call to these formerly held: W5QML, W6FZQ, W7JHS and W2API.

South America — This CE7Z business receives clarification by way of an RCC (Chile) letter to W1RWS. All Chilean stations in the Antarctic region were set up off Palmer Peninsula — at O'Higgins Base or Gonzales Videla Base (63°19'S—57°55'W and 64°48'S—62°50'W, respectively). O'Higgins stations with licenses now effective are CE7Zs R S T U and V; Gonzales Videla, CE7Zs W X Y and Z. QSL cards for all CE7Z stations may be sent via Radio Club of Chile W6EAY, W9LI and the rest of us regret to hear of CE3DZ's serious ill health. Alfredo's outstanding signal is an "old reliable" on DX bands — we all pull for an early recovery, OM.

Hereabouts — Even a daily gazette would have trouble keeping up with developments on St. Pierre. Everybody and his brother have been visiting the place and therefrom cavorting about the ham bands. W6ATW reports that curiosity got the better of one native there who procured his own call, FP8AP, to become the first year-round FP8 since FP8BX. As noted by W4RNP, Gus runs 20 watts to an 807 on crystal frequencies 7032 and 14,064 kc. W6EAY found three different FP8s banging away within 50 kc. of each other on 20 one day Charlie "C.W." Clemens, W4DZR and ex-KZ5CW, will be remembered by traffic pushers of the old school as a crack op at WAR, WLM, WTE and W3CXL Don't give up on those HH QSLs — mail may just be a bit slow down there. WIAPU's HH2LD pasteboard came through after almost three years a-waiting Shut-in W1NKW reports a bad break. Al's logs and QSLs were destroyed by fire; over a thousand 10-meter DX QSLs went up in smoke.

Jeeves wonders if authorities on St. Pierre aren't somewhat suspicious of ordinary tourists who arrive strangely unencumbered with the usual radio paraphernalia.

The Radio Amateur's LICENSE MANUAL

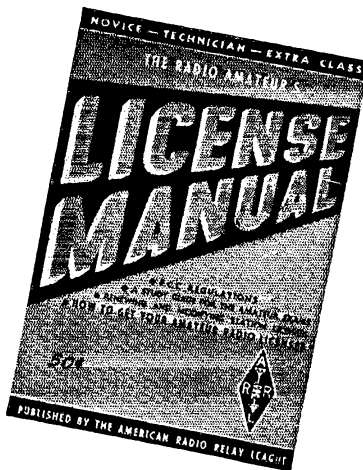
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In any condition. Also top prices for: ARC-1, ARC-3, APR-1, APR-5A, etc.; TS-34 and other "TS-" and standard Lab Test equipment, especially for the MICROWAVE REGION; ART-13, BC-348, BC-221, LAE, LAF, LAG, and other quality Surplus equipment; also quantity Spares, tubes, plugs and cable.

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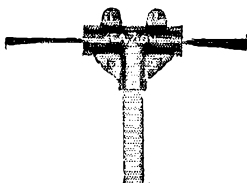
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A mechanical aid to good electrical matching. The type 3WA is dimensioned to allow the coax and center of the antenna to form a natural match when assembled. See the improvement over other methods of assembly. Types 3W and 4W make ideal junctions for stubs or harmonic traps. Made to fit RG/8U or 11/U. Wt. 4 ozs.



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Two

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MC-53
2-6-10/11

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3-BAND MOBILE CONVERTERS designed by RME

Here is radio frequency conversion at its finest, not only complete three-band coverage, but also a gain increase of about 25 db added to the gain of your car radio with either the MC-53 or the MC-H4.

A noise clipper is built into these units as standard equipment, ready to wire to the car radio. The vhf MC-53 uses an OB2 voltage regulator, and the MC-H4 a special high stability oscillator circuit.

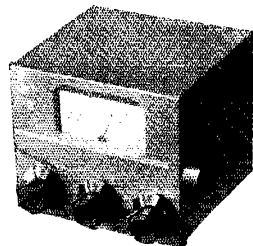
Each unit has a 25 to 1 worm gear tuning drive with side cabinet control knob.

A lot of gear in a compact space, rigidly mounted. Must be used to be appreciated. Now priced at only \$66.60 at your jobber for either the MC-53 or the MC-H4.

Examine them
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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 quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

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.

QSL's: 100, \$1.95 up. Samples, 10¢. Grüeth, W3FSW, 1042 Pine Heights Avenue, Baltimore 29, Md.

MOTOROLA used communication equipment bought and sold. WSBCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

SUBSCRIPTIONS: Radio publications a specialty. Latest Call Books, \$3.00. Earl Mead, Huntley, Montana, W7LCM.

QSL's-SWL's: Meade W0KXL, 1507 Central Avenue, Kansas City, Kans.

QSLs, SWLs: America's Finest! Samples, 10¢. C. Fritz, 1213 Briar-gate, Joliet, Ill.

QSLs: Brownie, W3CII, 3110 Lehigh Ave., Allentown, Penna.

SELL: BC610 with speech, TVI proof, \$500. F.o.b. Trenton, N. J. HRO5011 one month old, four coils, \$380. F.o.b. Will trade. R. K. Lamb, 887 Bellevue Avenue, Trenton 8, N. J.

QSL's, SWL's: Super-gloss, 10 colors. Four card stocks. Seven styles. Samples, 10¢. Almar Printing Service, Farragut, Iowa.

QSL's: Fluorescent QSLs radiant and glowing with quality-control. QSLs Kromekot in color and up. Kamlow maps, DX QSLs. Samples rushed, 10¢. Uncle Fred, Box 36, Lynn, Pa.

QSL and SWL cards. Samples, W1SQF, Minner, Candia, N. H.

PHONE patch schematics, practical discussion, \$1.00. Nichols, W1MRK.

WANTED: Cash or trade, fixed frequency receivers 28-42 Mc. W9YIV, Troy, Ill.

HEATH V-5A VTVM, 18 ranges, brand new, accurately calibrated, \$39.50. WSAXI.

QSLs, SWLs: High quality. Reasonable prices. Samples. Write to Bob Teachout, W1F5V, 40 Elm Street, Rutland, Vermont.

WANTED: Marconi multiple tuner, coherer, spark coil, magnetic detector, etc.; DeForest responder, coherer and other early equipment; Marconi grams, Modern Electric; Electrical Experimenter and early Call Books and text books of wireless. Franklin Wingard, Rock Island, Illinois.

SACRIFICE: Johnson Viking, Johnson VFO, NC-183; 829B, micro-phones, xtal, keys, TUBE unit, tubes, steel cabinets, many parts. Name your own price. W0SGG, 635 East Willamette, Colorado Springs, Colo.

FOR Sale: Complete station approximately \$300.00. Write WSACC, Junction, Texas.

MICROWAVE test equipment wanted. Weston Laboratories of Weston 93, Massachusetts, will make you a high cash offer on any microwave test equipment, particularly such numbers as: TS-13, TS-120, TS-45, TS-35, TS-147, etc. To those more interested in trading, we offer any new standard ham item or a combination of cash. Write giving full description for prompt reply.

FOR Sale: Motorola P-69-13 communications mobile receiver. Perfect condition. With xtal, \$25.00. W10BR.

QSL's: World-map! US-map! Samples 10¢. Tooker, Lakehurst, New Jersey.

WANTED: Transmitter V.F.O. receiver, test equipment, etc. George A. Laine, W2NXP, 222 E. 7th St., Brooklyn 18, N. Y.

McEACHRON, new address: 112 Hiawath, Clarendon Hills, Illinois.

TRADE: One Revere 88 movie camera /12.5 lens and telephoto lens carrying case and Universal 8 mm projector for low-power rig or what have you. L. E. See, WN4WED, 5721 63rd St., Jacksonville 5, Fla.

QSL's? State-maps? Rainbow-maps? Cartoons? Largest variety QSL samples, 25¢. Sakkers, W8DED, Holland, Michigan.

NATIONAL NC-173, speaker, excellent, \$135.00; Cesco phone patch, new, \$10.00; 6 volt mobile power supply for HRO receiver, new, \$17.50; crystals, mounted, 80, 40 c.w.s., each \$1.00, ten for \$7.50; complete set parts for 300 watt fone c.w. xmitter, all bands, superb components, rare bargain, \$125.00, everything guaranteed satisfactory. F.o.b. Indianapolis. Write to W9DPL, Howard Severald, 2431 E. Riverside Drive, Indianapolis 23, Ind. Tel. Winthrop 2184.

QSLs-SWLs: Distinctive samples, 10¢; returned. Harms, W2JME, 225 Maple Ave., North Plainfield, N. J.

TVI-proofed 70 watt transmitter, separate bias supply, 10 thru 160 Mc. \$70. H0129X, not a scratch, \$130. Speaker, \$10. BC459A, \$15; BC453B, \$20, all perfect. 5 meter receiver, \$6.00. Write for list. Plate-filament transformers, chokes, variable condensers, carbon microphones, etc. Not surplus. O'Brien, 48 Prospect, Westwood, N. J.

Pole transformers: 1 1/2 and 3 KVA, uncasead: 2100 58 or 2 for \$15; 2300 c.t. \$12.50; 4400, \$15; 4400 c.t., \$25. W2MKL, Keeseville, N. Y.

10, 15 and 20 meter beams, aluminum tubing, etc. Perforated aluminum sheet for shielding. Radcliff's, 1720 North Countyline St., Fostoria, Ohio.

SELL: Hallicrafter AM-FM tuner, Model S-78-A has phonograph outlet. Used only two months. \$75.00. Loyal Nash, Route #1, Cumberland Center, Woodville Road, Falmouth, Maine.

FOR Sale: Collins 32V2 and 75A1 in like-new condition. Receiver has several desirable modifications. Cash only. Invite inspection. No shipping. W1E2G, Paul Barrabee, 53 Morseland Avenue, Newton Centre 59, Mass.

FOR Sale: Collins 30K-1 amateur 500 watts bandswitching transmitter with 310A exciter unit, \$850.00 cash f.o.b. San Diego 16, Calif. Robert C. Stieringer, W6BLV, 4902 34th St.

SACRIFICE: Deluxe 750 watt phone station. Beautiful performance, appearance, construction. Completely TVI-proofed. Finest components. Transmitter and Super Pro receiver built into 6 foot Wilcox commercial airport cabinet; castor rack with attached linoleum-top operating table and well. 2B13's blower-cooled, 805 modulators. 2 kw powerstat control input, 300 to 32V series and difference speech driver; phone patch, all relays, meters. 30" cabinet contains auxiliary power supplies. Spare 813's, external antenna coupler, other features. Pictures on request. Price \$675, or \$525 without receiver. S. W. Ellner, W2TC, 14 Colonial Road, W. Hempstead, L. I., N. Y. Phone: Rockville Centre 6-1773.

ENGINEERING and scientific books. Catalog available. Educational Aids, Dept. 4010, Box 248, Temple City, Calif.

TURNER #33D dynamic mike like new, perfect condition, 12 ft. cable, \$15. George M. Clark, Jr., W2JBI, 819 Red Road, Teaneck, N. J.

FOR Sale or swap: KW components: 4-125A's in final. Want ART 13 transmitter. All letters answered. Also for sale or swap: BC610-F purchased, factory-new, converted to 10 by same. Coverage 10 through 160 inclusive, \$500. or Collins 32V series and difference SWP-1-4 meg. Command transmitter, black crackle like new, for ART-13, dynamotor. Wanted: Black crackle wrap-around for Collins ART-13. K. C. Horne, W0GCP, Steelville, Mo.

QSL's by Petty, W2HAZ. Samples 10¢. Petty, 17 Southard, Trenton, N. J.

TRANSMITTERS, two meter phone, pre-assembled kits, \$34.50, write for specifications, LW Electronic Laboratory, Route 2, Jackson, Michigan.

WANTED: Collins 32G transmitter. Give price and condition. E. I. Felder, W5FSS, Tylertown, Miss.

NOVICES! For sale: converted 80 meter ARC-5 with power supply, 75 W4H, input, 500 watts. Weight 50 lb. Name and address. Jerrold Viking I in A11 condition. Write, giving all needed info and price. W4VHH, 1606 Thomas Ave., Charlotte, N. C.

SELL: BC-1004 Super Pro, perfect, \$175; BC455, \$7.00; HC453, \$10.00, held phones FE-8-R, \$20 pair; Triplet 625-NA, \$25. WNJUAT, 137 Lehigh St., Wilkes Barre, Penna.

DON'T fail! Check yourself with a time-tested "Surecheck Test" similar to the F.C.C. tests. Novice, \$1.50, General, \$1.75, Advanced, \$2.00. Amateur Radio Supply, 1013 Seventh Ave., Worthington, Minnesota.

ATTENTION Ham! Your station call in attractive 3-inch wood letters, base-mounted and beautifully finished in red, white, black, or in natural wood for only \$1.00 per set. Send your call to: Pioneer Enterprises, Box 474, Grandville, Michigan.

30 Watt mobile converted by Motorola 20-meters W.A.S. Can be changed to 10 or 75 meters. Complete installation, \$125. WITHM, Brizzolari, RFD #2, Dunbarton, N. H.

WANTED: 32V2. Please state lowest price. For sale: Revere tape recorder and radio combination. Presto model K disc recorder. Box 382, Newark, N. J.

FOR Sale: QST in binders from 1946 to 1952, together or separately. Best Offer, W2NQW.

FOR Sale: Monitoradio FM 6 volt 30-50 Mc with squeel adapter and Master antenna complete. \$65 or make offer. Merle Helma, Box 152, Brookville, Indiana.

NEED: QST for December 15 and May 1916. Will pay any price. Have hundreds of old call books, radio catalogs, text books, ARRL Handbooks and 20 issues of QST and QST to sell or trade for what? Holst, W9MD, 2553 Winnemac Ave., Chicago 25, Ill.

HALLICRAFTERS, S40B, like new, 50 hours use, \$80.00. All inquiries will be answered, local deal preferred. Jordan Polly, 2852 Brighton 6th St., Brooklyn 35, N. Y. KN2AZL.

FOR Sale: SX71, with speaker, like new and clean, \$150. RCA 2E24, \$2.50 each; QST, \$3.00 per year, years 1937 to 1949; BC455, \$8.00; Triplet VOM 2400, \$20.00; Michael J. Marshall, 455 Washington Ave., Dumont, N. J.

SELL: Harvey-Wells TBS-50C with APS-50 power supply. Like new, \$15.00 for both or best offer over it. W7OHH, Richard V. Lindborg, Route One, Missoula, Mont.

ACCURATE component tester; new measuring bridge design book-carrying case and Universal 8 mm projector for low-power rig or what have you. L. E. See, WN4WED, 5721 63rd St., Jacksonville 5, Fla.

SELL: Quantity of new 3rd meters, new transmitting tubes, TV picture tubes, crystals. Send for list to W2RTM, Stratton, 443 Saratoga Rd., Scotia 2, N. Y.

VIKING I, line filter, B&W lowpass filter, TVI treatment, xtal mike, coax relay, 5 hrs. use, \$250.00; HQ129X, perfect, R9'er, speaker, \$140.00. W9ULJ, 1425 Garden, Park Ridge, Ill.

WANT medium power RF amplifier; tube tester, 10 meter or 3 band converter for auto radio. W4TLE, Owens, Va.

AMPHENOL folded dipole antennas are available once again: 10 meter, \$4.85; 20 meter, \$5.60; 40 meter, \$7.35; 80 meter, \$10.70. Get yours now! Don't forget that we take your old equipment of standard manufacture in trade for new, and we also offer terms. Ask for our latest used equipment list. Write Carl, W1RFT, at Evans Radio, P. O. Box 312, Concord, N. H.

SELL: 10-meter mobile installation, transmitter complete with control head, cables, Electro-Voice mike, and new Eicor 425 volt 375 ma 6 volt dynamotor. Also new Morrow 2BR converter, \$195.00 for both, 45 watt 80 and 40 meter bandswitching cw xmitter with power supply, \$35.00. W4OSN, 7136 Lone Oak St., Spartanburg, S. C.

FOR Sale: Hammarlund HO-129X, original cartons, with speaker, \$139, F.o.b. New York. Also, Lettine 240, like new, \$55. Coils, crystals, for 10 meters. Irwin Hyman, W2DJQ, 11 West 87th Street, New York, N. Y.

RUN of QSTs, in good condition, 1924-1927. A few gaps. Also have some Popular Radio and Radio News. Write B. F. Ames, 4321 5th Ave. N., St. Petersburg 2, Fla.

SELL National 183T less spkr, for sale at \$249.00. RME-45 with speaker, Spotless, \$125. R. Long, 184 L. Street, So. Boston, Mass.

MODEL 12 teletype receivers. Single table, \$30; double, \$45. Mr. Dukas, Cortland 7-2253, New York, N. Y.

SELL QST, best offer, June, Sept., Oct., Nov., Dec. 1922; Jan., March, Apr., May 1923; Jan., Feb., March, Nov. 1924; Ten issues in 1925, May and Sept. missing. All issues 1926 through 1951, bound. Radio; Jan. thru Dec. 1936; Jan. thru Dec. 1937-1938; Jan. thru Dec. 1939-1940, Aug. & Sept. missing; Jan., Feb., March, April, all bound, R.9, Dec. 1943. All issues, 1934-1935, bound; CO, all issues, 1945, 1946, 1947, 1948, 1949, 1950, 1951; Jan., Feb., March, Apr., May, 1952, all bound, Short Wave, All issues, 1948, bound, Mr. Gerald Trousil, 20840 Erie Road, Rocky River, Ohio.

NEW crystals for all commercial services at economical prices; also grinding or replacement crystals for broadcast, Link, Motorola, G. E. and other commercial types, no amateur. Over 17 years of satisfaction and fast service. Eddson-Electronic Company, Phone 4-3901, Temple, Texas.

WANTED: All types of receiving and transmitting tubes. Surplus receivers and transmitters. Williams Electronics Co., 168 Washington St., New York City, N. Y.

SELL: Power supply, heavy duty, on steel chassis, 350V DC at 200 MA; 5V.3A., 6V.5A., 24V.3A., AC, complete with tubes, \$39.50. VFO, 7 Mc. output with calibrated dial showing harmonic relations including 28 Mc. band, with tubes. Will operate from above power supply and drive kilowatt with ease \$32.50. Sell both units for \$70.00 lot. Will ship C.o.d., F.o.b. Jenkintown, Penna. W3KB.

SELL Hallicrafters SX-71 receiver with R-46 speaker, \$155.00. F.o.b. Champaign, Ill. Richard Rice, W9LOC, 816 W. Maple.

NEEDED: Impedance chart Kenyon T-495 modulation transformer. Also: parts for sale or swap. Write for list, F. C. McDaniel, Jr., W6PMM/4, 55 Power Road, Thomason Park, Triangle, Virginia.

SELL dual Johnson RotoMatic Beam; 4 element ten, 3 element twenty; complete with rotor, direction indicator control box, matches, changeover relay, 100 ft. control cable and 25 ft. aluminum tower. Used five months. Perfect condition, \$225.00, W4BSO, Grafton, Va.

TELETYPE multiplex perforated tape transmitters, \$30. Model 21A midget tape printers, \$50. Control relays 12,000 ohms, \$1.95. T. Clark Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. (Tel. Richmond 2-0916).

OPERATION frostbite! Coming soon.

OSLS, Arthur Harrison, 8001 Piney Branch Road, Silver Spring, Maryland, Samples 6¢.

SELL or trade: Westinghouse transformer 460 volts primary, 115 volts secondary at 1000-v. Ideal to obtain 28 volts output with 115 volts primary for surplus equipment. Want high voltage power transformer [or good BC-459.] W3PVZ, Burnham, Penna.

WANTED: Someone with money and vision to buy radio collection comprising complete history of radio, including rare and exclusive old items. Write W6LMM, Box 132, Wrightwood, Calif.

FOR sale: Link 30-watt 10-meter mobile transmitter. Dashboard control box, Shure carbon microphone, all connecting cables and original dynamotor, \$40.00. Conset 10-11, \$15.00. JAN 832's in original cartons, \$5.00 each, 6 for \$25.00. F.o.b. Andover, Ohio. David Bell, W8GUE.

POWER-plate transformer 3300 V.C.T. approx. 400 Ma., 2.5 v.c.t., 12.6V., windings, Measures 8 x 8 x 8. Also 2 HF175's, one 967 & 1, GC-873 tubes. Best offer or swap. W3SMN R.D.-3, Bristol, Penna.

WANTED: New or good condx power xformer or complete power supply for BC-142 rcvr and technical manual for same. Have Lyco Model 401 clamp modulator to sell or swap. Jim Collins, W5QDO, Box 1424, Beaumont, Texas.

FOR Sale: Complete 1 Kw. transmitter, built to commercial standards in closed rack, Remote Collins 310B-1 drives pp 813's. Coils for 80, 20, and 10. D-104 mike, self-contained speech amplifier and self-contained pp 805's modulator. Best cash offer as unit. W9DGM, 1636 S. Biltmore St., Indianapolis, Indiana.

WANTED: Used Viking transmitter. W6CDP, McMillan, Paynesville, Minn.

WANTED: ART-13, ATC, TCS, SCR-694 and their cables, controls, power supplies; RA-62, RA-34, DV-12, PE-237, PE-103, PE-104, BC-1306, BC-610-E, BC-348, BC-342, BC-312, BC-221, LM, BC-639, Panadaptors, technical manuals, test equipment. Cash, trade, Arrow Appliance, Box 19, Boston 1, Mass. (429 Broad, Lynn, Mass.)

SELL: Model WV-97A RCA Senior Voltohmvt, Used very little, \$55.00. Set Millen absorption wavemeters, cover 3-140 Mc. In case, \$15.00. Used 4-125A, \$15.00. Bob Joy, W0EAN, R.F.D. #1, Hardin, Mo.

WANTED: Collins J2V2, State condition and price in your first letter. D. J. Meade, W2JVC, 111-25 202nd St., Hollis 12, N. Y.

WANTED: All types of aircraft radios, receivers and transmitters. Absolutely top prices. W2KWU, 308 Hickory St., Arlington, N. J.

AUTOMATIC Keyer TG0 code type machine with 3 rolls of tape, good condition, \$75. Worn Mod. 5100R photo electric alarm, like new, \$40; PE103 dynamotor, complete with cables, relays and filters, in original crates, \$20 each; 750-1000 watt gasoline powered 110V-60 cycle, single phase light plant, used less than one hour, only \$170; BC650 and BC620 mobile FM 2 band transmitters, complete with tubes and 6V pv. supply, like new, \$25.00 each; mobile mast base, AB 15/GR, only \$4.00. All prices are F.o.b. Earl L. Mantor, 210 Dickens Ave., North Lake, P.O. Melrose Park, Ill.

FOR Sale: NC-173, W8WFEV.

MUST SELL 250-watt fone/c.w. transmitter. Complete with enclosed rack and dolly, crystal microphone and Meissner VFO. Will deliver and set up within 100 miles. Time payments are possible. Fred Fish, W1OAX, South Coventry, Conn.

WANTED: Electro, Importing, Wireless Specialty, DeForest, Marconi apparatus, early crystal detectors, early hand-keys, "Ultimate" bug key, QSTs before 1921, Electrical Experimenters, Wireless Age, Modern Electrics. Please describe items fully and price wanted. Louis Rizoli, W1AAT, 100 Bay View Ave., Salem, Mass.

FOR Sale: 1500 volt components, 17 1/2" Bud Deluxe cabinet, typewriter, new 813. Local deal preferred. Samkofsky, W2VSF, 527 Bedford Ave., Brooklyn, N. Y.

FOR Sale: Complete ham station 10 through 80, 125-watt xmitter and extra 4-65A final tube. Bud VFO. Xtal mike, BC459 and 696 with power supply, 10 meter beam and rotor, NC173 receiver with speaker, Triplex WGM. Selling because no time to operate. Best offer over \$300. F.o.b. Granger, Texas. Write for details. W5SSN, Box 488, Granger.

FOR Sale: Collins J10B1 exciter, \$210; BC221 frequency meter, AC powered, \$90; newly converted prop-pitch motor, never used. Cash only. J. E. Hood, W4UIM, 662 Riverside Dr., Orangeburg, S. C.

SELL BC-779B (Super Pro) power supply and VHF 152, all in rack, 160 through 2 meters, \$150. W1RVL, Fairbrother, 29 Alden Street, Greenfield, Mass.

FREE tube, sell filament transformers, 5VCT, 20,000 V insulation, emergency broadcast receivers complete with 1000 hour battery pack, 1.875 KVA single phase 60 cycle, 1800 rpm; 120V generators with 125 VDC exciter, all new, unused, 12" TV chassis with all tubes. Want: 20M rotary beam, good 35mm camera. W2PUK, 79 Sunset, Glen Ridge, N. J.

FOR Sale: SX42 and R42 speaker; Precision oscilloscope, Model 500; Electro Model B, DC power supply; any reasonable offer accepted. E. N. Bessinger, 141 Choate Ave., Buffalo 20, N. Y.

WANTED: Old Western Electric radio and telephone equipment. T. L. Talleaire, 1121 Edwards Road, Cincinnati 8, Ohio.

BARGAINS: Extra special Motorola P-69-13 Mobile receivers, \$29.50; Globe King, \$315.00; HT-9, \$199; HRO-50, \$275.00; Lyco 600, \$109.00; HRO-7, \$199.00; Collins 75A2, \$325.00; 75A1, \$275.00; HRO-5T, \$175.00; SC-71, \$159.00; SX-42, \$199.00; HRO Senior, \$119.50; RME 2-11, \$99.50; EME-45, \$99.00; Meissner L-X shifter, \$59.00; S-40A or SX-16, \$69.50; VEH-152, \$59.00; HF-10-20, \$59.00; Globe Trotter, \$79.50; Meissner Signal calibrators, \$24.95; MB611 mobile transmitters, \$19.95; 90800 exciter, \$29.50; RCA chanalyser, \$69.50; XE-10, \$14.95; Gonset 10-11 converter, \$19.95 and many others. Large stock of trade-ins. Free trial. Terms financed by Leo, W6GFO. Write for catalog and best deal to World Radio Laboratories, 740-44 West B'way, Council Bluffs, Iowa.

HALLICRAFTERS SX-42 receiver in good condition, \$98.50. Hickok 209 Lab VTCVOC, \$88.50. H. M. Jernigan, c/o B. M. Chandler, 1020 Cherry St., Jacksonville, Fla.

AM moving. Must sell 800-watt phone transmitter now in use, Collins J10-C VFO, ME-1 90800 exciter, P.2, 813's final, P.1, 805 modulator, 6B4G's speech amplifier with clipping, 2 in commercial scope in rack. Has separate power supplies for all units, cased in new 7 1/2 ft. Bud rack; Drake low pass filter, Elicido 1.5 KW Brute Force filter, D-104 mike, 4 spare 813's. Make me an offer. L. Evans, W5RRL, Box 331, Paris, Texas.

SALE: BC-348 converted AC. Write for complete details. W0QES, 1811 Chandler S.W., Cedar Rapids, Iowa.

SNOOPERSCOPE, Infrared, sees-in-dark tube, \$4.98; Power supply kit for Snooperscope, \$6.98; Wanted: Autoayns, selysins, TS equipment. Sell your surplus tubes and equipment. Free Tabogram. "TAB" 111 Liberty St., New York City 6, N. Y.

SELL: Mobile Lyco 129B 10-11 meters. Used, \$15.00. WITZA, 208 Ashley Ave., West Springfield, Mass.

SELL: HT-19 xmitter, complete, 450vdc regulated power supply assorted meters, switches, relays, tubes, 3¢ stamp for particulars. W. Laudeman, 3841 Lansdowne Ave., Cincinnati 36, Ohio.

FOR Sale: Meissner FM tuner, \$30.00, W4KKEI.

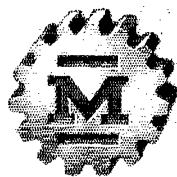
FOR Sale: Complete ham station: HO-129X, Subroco 75T, All band xmitter, 150-watts fone or c.w.; Meissner signal shifter, UHF 152A, Antenna tuner, SP44 Panadaptor and BC-221 A.C. All equipment perfect. Will sell BC-221 and Panadaptor separately, \$500.00 or best offer. W8JBB, P. O. Box 87, Franklin, West Virginia.

SELL: New BC454, \$12.00; used BC-455, \$12.95, new BC-459 (VFO), \$19.95; used BC-457(80M) crystal controlled, \$10.95. All completely modified w/jacks, power plugs, etc. AC power supply for receivers, \$9.00. AC 75 watt power supply for transmitters (March QST), \$25.00. Vernon Slichter, Grangeville, Idaho.

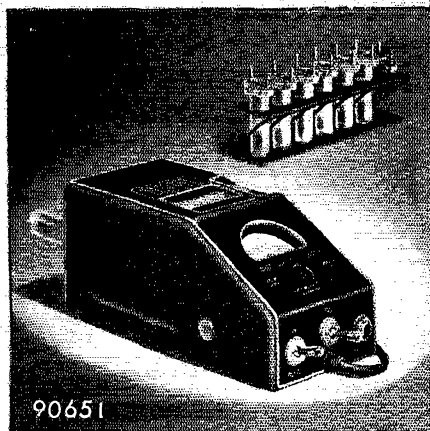
FOR Sale: Gonset Tri-band converter, \$35.00; Stancor ST-203A mobile power tubes and carbon mike, \$40.00; 400 v.c.t. 350 Ma. dynamotor \$25.00; control box and connecting cables \$5.00; All practically new and in perfect working order. W1OER.

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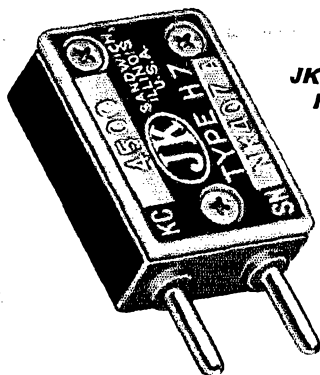
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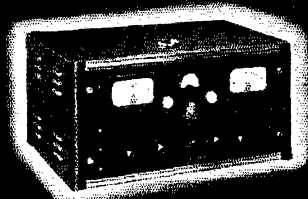
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keeping communications **ON THE BEAM**



**JK STABILIZED
H-7 CRYSTAL**

FREQUENCY & MODULATION MONITOR



*the JK
FD-12*

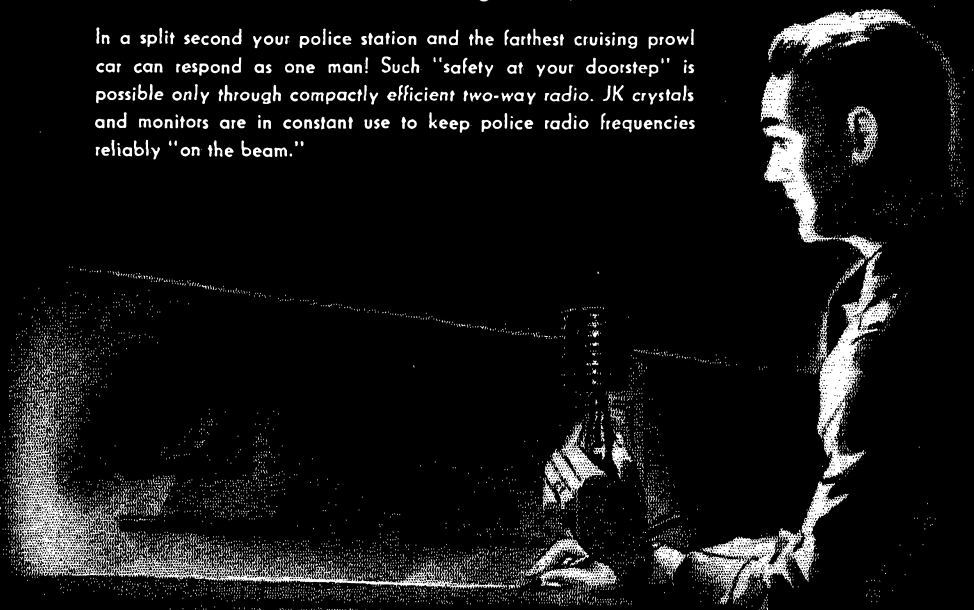
Monitors any four frequencies anywhere between 25 mc and 175 mc, checking both frequency deviation and amount of modulation. Keeps the "beam" on allocation; guarantees more solid coverage, too!

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The H-7 crystal is in common use with two-way police radio systems. Frequency range: 3 to 20 mc. Water and dust-proof, it is pressure mounted, has stainless steel electrodes. Just one of many JK crystals made to serve EVERY crystal need!

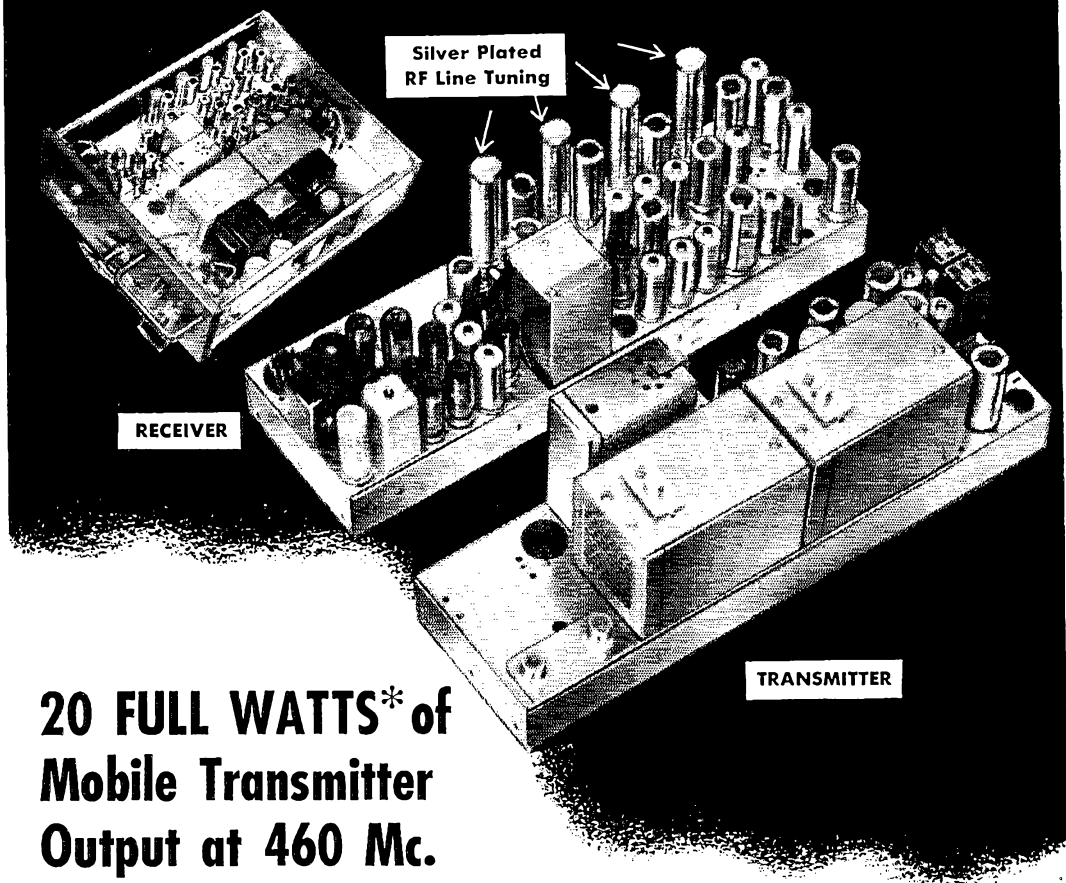
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NC-125



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with the famed
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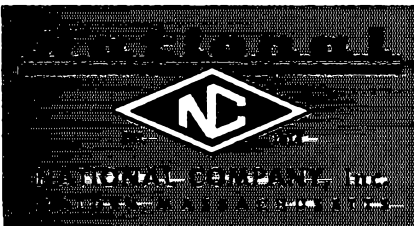
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