January 1953
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QST

devoted entirely to

amateur radio

In This Issue—

AMATEURS TEAM UP TO BUILD C.D. GEAR

PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

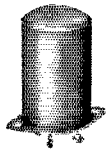
for MINIATURIZED COMPONENTS

from STOCK

The rapid miniaturization of military and portable civilian gear has required audio components of smaller and smaller dimensions. This specialization is recognized in the case of transformers for transistorized circuits. The "H" series of miniature and sub-miniature units described below are hermetic military types for severe environmental conditions. For commercial applications, non-hermetic types are available against specific orders.

MINIATURE AUDIO UNITS...RCOF CASE

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	DC in Pri., MA	Response ± 2db. (Cyc.)	Max. level dbm	List Price
H-1	Mike, pickup, line to grid	TF1A10YY	50,200 CT, 500 CT*	50,000	0	50-10,000	+ 5	$16.50
H-2	Mike to grid	TF1A11YY	82	135,000	50	250-8,000	+21	16.00
H-3	Single plate to single grid	TF1A15YY	15,000	60,000	0	50-10,000	+ 6	13.50
H-4	Single plate to single grid, DC in Pri.	TF1A15YY	15,000	60,000	4	200-10,000	+14	13.50
H-5	Single plate to P.P. grids	TF1A15YY	15,000	95,000 CT	0	50-10,000	+ 5	15.50
H-6	Single plate to P.P. grids, DC in Pri.	TF1A15YY	15,000	95,000 split	4	200-10,000	+11	16.00
H-7	Single or P.P. plates to line	TF1A13YY	20,000 CT	150/600	4	200-10,000	+21	16.50
H-8	Mixing and matching	TF1A16YY	150/600	600 CT	0	50-10,000	+ 8	15.50
H-9	82/41:1 input to grid	TF1A10YY	150/600	1 meg.	0	200-3,000 (4db.)	+10	16.50
H-10	10:1 single plate to single grid	TF1A15YY	10,000	1 meg.	0	200-3,000 (4db.)	+10	15.00
H-11	Reactor	TF1A20YY	300 Henries-0 DC, 50 Henries-3 Ma. DC, 6,000 Ohms.					12.00



RCOF CASE

Length 1 25/64
Width 61/64
Height 1 13/32
Mounting 1 1/8
Screws .....4-40 FIL.
Cutout .....7/8 Dia.
Unit Weight .....1.5 oz.

SUBMINIATURE AUDIO UNITS...SM CASE

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	DC in Pri., MA	Response ± 2db. (Cyc.)	Max. level dbm	List Price
H-30	Input to grid	TF1A10YY	50**	62,500	0	150-10,000	+13	$13.00
H-31	Single plate to single grid, 3:1	TF1A15YY	10,000	90,000	0	300-10,000	+13	13.00
H-32	Single plate to line	TF1A13YY	10,000***	200	3	300-10,000	+13	13.00
H-33	Single plate to low impedance	TF1A13YY	30,000	50	1	300-10,000	+15	13.00
H-34	Single plate to low impedance	TF1A13YY	100,000	60	.5	300-10,000	+ 6	13.00
H-35	Reactor	TF1A20YY	100 Henries-0 DC, 50 Henries-1 Ma. DC, 4,400 ohms.					11.00

SM CASE

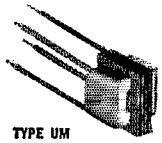
Length 11/16
Width 1/2
Height 29/32
Screw .....4-40 FIL.
Unit Weight .....8 oz.

SPECIAL

ULTRA-MINIATURE UNITS TO SPECIFICATIONS ONLY

UTC ultra-miniature units are uncased types of extremely small size. They are made to customers' specifications only, and represent the smallest production transformers in the world. The overall dimensions are ½ x ½ x 7/16" ...Weight approximately .2 ounces. Typical special units of this size are noted below:

Type K-16949 100,000 ohms to 100 ohms...6 MW...100 to 5,000 cycles.
Type M-14878 20,000 ohms (1 Ma. DC) to 35 ohms...6 MW...300 to 5,000 cycles.
Type M-14879 6 ohms to 10,000 ohms...6 MW...300 to 5,000 cycles.
Type M-14880 30,000 ohms (.1 Ma. DC) to 3,000 ohms...6 MW...300 to 5,000 cycles.



TYPE UM

* 200 ohm termination can be used for 150 ohms or 250 ohms, 500 ohm termination can be used for 600 ohms.

** can be used with higher source impedances, with corresponding reduction in frequency range. With 200 ohm source, secondary impedance becomes 250,000 ohms... loaded response is —4 db. at 300 cycles.

*** can be used for 500 ohm load... 25,000 ohm primary impedance . 1.5 Ma. DC.

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Diamond Anniversary

SPECIALLY DESIGNED AND BUILT, G-E 5-Star Tubes will help keep you on the air unfailingly. They're shock-proof . . . extra-dependable . . . long-lived . . . with *far fewer shorts and heater failures than* standard receiving tubes.

MIAMI, FLA., POLICE, in a two-year test of G-E 5-Star Tubes for emergency communications, needed to replace *only 1 percent —proof of superior tube reliability!*

AIRLINES INSIST ON 5-STAR TUBES for passenger safety. Unattended communications relays, because of these tubes, can function for long periods without maintenance. New military electronic equipment owes much of its dependability to 5-Star types.

SEE YOUR G-E TUBE DISTRIBUTOR for complete facts! Every socket where you plug in a 5-Star Tube, is one more step toward *assured* operation of your C.D. system in the event disaster should occur. *Tube Department, General Electric Company, Schenectady 5, New York.*

STANDARD TYPES	REPLACE WITH THESE 5-STAR TYPES
2C51	*GL-5670—h-f medium-mu twin triode.
2D21	GL-5727—thyratron.
5Y3-GT	GL-6087—full-wave rectifier.
6AK5	GL-5654—sharp-cutoff r-f pentode.
6AL5	GL-5726—twin diode.
6AQ5	GL-6005—beam power amplifier.
6AS6	GL-5725—dual-control sharp-cutoff r-f pentode.
6AU6	GL-6136—sharp-cutoff pentode.
6BA6	GL-5749—remote-cutoff r-f pentode.
6BE6	GL-5750—pentagrid converter.
6C4	*GL-6135—medium-mu triode.
6SK7	GL-6137—remote-cutoff r-f pentode.
12AT7	GL-6201—high-Gm medium-mu twin triode.
12AU7	*GL-5814—medium-mu twin triode.
12AX7	*GL-5751—high-mu twin triode.
12AY7	*GL-6072—low-noise medium-mu twin triode.
.....	GL-5686—beam power amplifier.

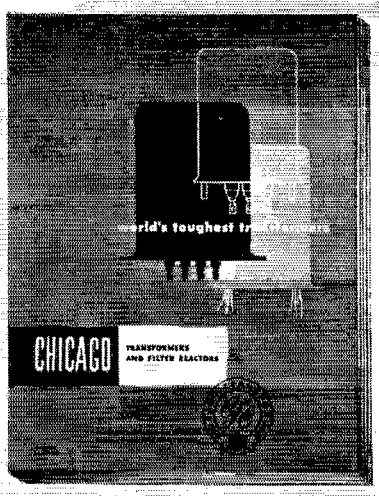
**Slight electrical difference*

● ***SUB-MINIATURE G-E 5-STAR TUBES,*** as well as regular 5-Star types, are listed in new Booklet ETD-548-A, which contains a reference table of ratings and characteristics. Ask your G-E tube distributor for a copy, or write direct to General Electric at the address given at the left.

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

166-1B1



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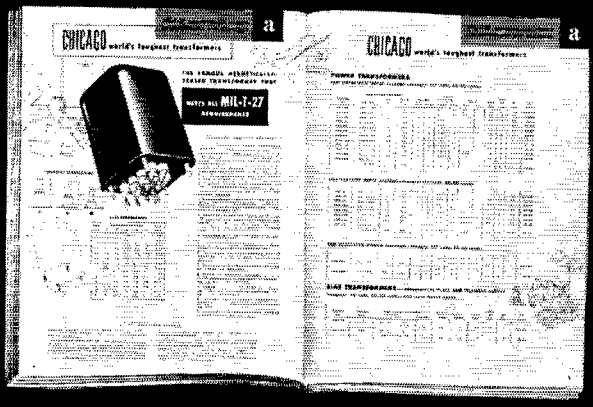

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QST

JANUARY 1953

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OFFICES

38 La Salle Road
West Hartford 7, Connecticut

TEL.: 3-6268 TWX: HF 88

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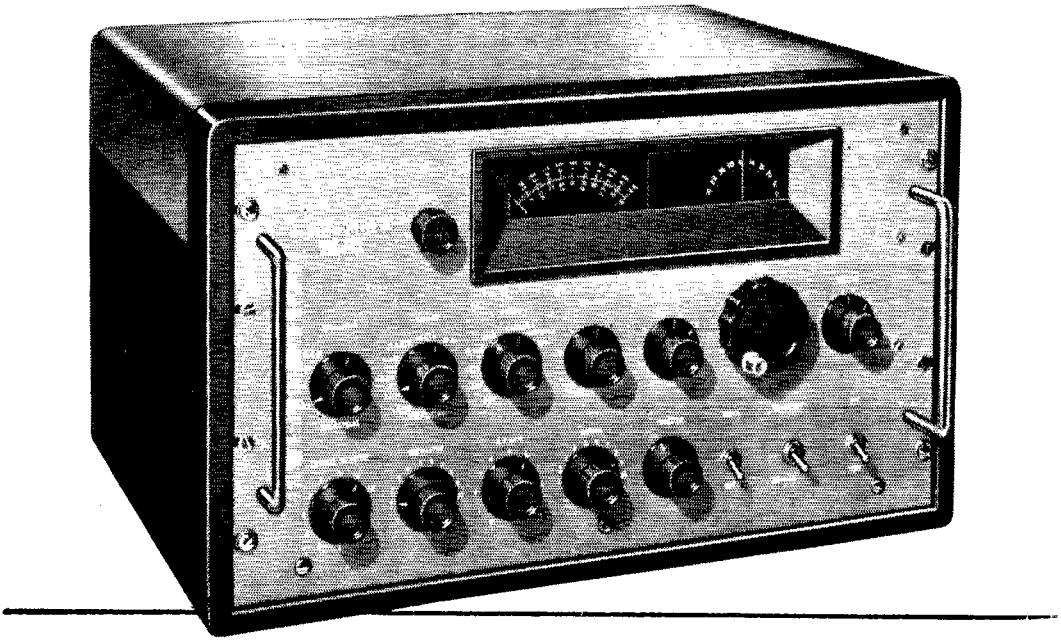
INDEXED BY
INDUSTRIAL ARTS INDEX

—CONTENTS—

FINALLY! NO MORE TV

New Hallicrafters

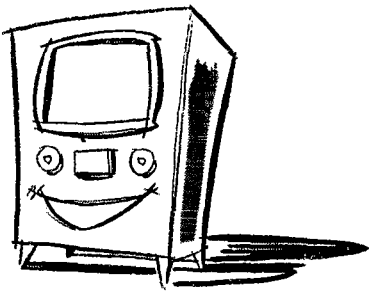


check these features

- 100 watts carrier power with high level (Class AB2) modulation on any band.
- Continuous coverage, with overlapping bands, from 1.7 to 30 mc.
- Compact, efficient design. Amazing for its power. The HT-20 is 20½" long, 11¾" high and 16¾" deep.
- Weight of transmitter, in cabinet, 105 pounds.
- All transformers and chokes operate "cool"—maximum temperature rise of 40 degrees. This means fewer replacements, long operating life.
- Operates equally well from relay rack or in cabinet on table top.
- Uses 117 volts, 60 cycle AC.
- Moderate cost.

HARMONIC PROBLEMS!

HT-20 is



T.V.I. proofed!*

Here's the news you've been waiting for—a medium power transmitter (100 watts) that solves the problem of harmonic radiation in the television channels. The Hallicrafters HT-20 is the answer. Completely tested in the lab and in the field, here is a transmitter that is truly T.V.I. Proofed*.

This is not simply a revamped design, but completely new circuitry to meet this problem. Physically, too, the entire transmitter is new from the massive, two-piece, completely rigid chassis to the electrical air cooling system of the final amplifier tube.

See this newest Hallicrafters—get the complete story of the finest transmitter, dollar for dollar, on the market today. Or write Hallicrafters direct for full details.

---

* **T.V.I. PROOFED**—means that this transmitter has circuitry specifically designed to eliminate spurious and harmonic energies that result in television interference.

hallicrafters

World's leading manufacturer of precision radio, television

CHICAGO 24, ILL.

Section Communications Managers of the ARRL Communications Department

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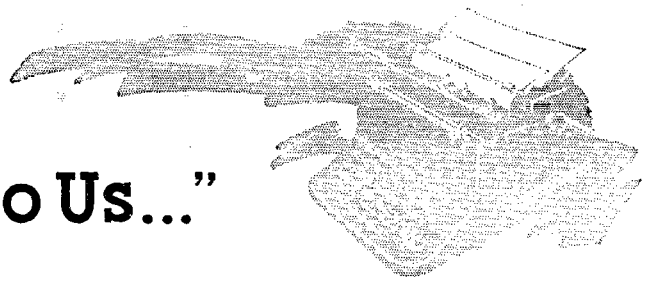


"It Seems to Us..."

THE YEAR IN REVIEW

Each year we wonder if the events of the previous twelve months were sufficient in importance or number to warrant recounting of the highlights on this page; but when we start jotting them down, each year seems even busier than those gone before.

Nineteen Fifty-Two saw additional heartening progress in TVI. The Commission announced its own policy, centering on formation of local interference committees but coupled with the very encouraging announcement that many manufacturers had agreed to custom-remedy situations when receivers were at fault. League warnings to industry about potential interference problems at 21 Mc. stirred up a beautiful hornet's nest, for the first time really reaching the big brass of many companies with the over-all seriousness of the amateur plight. Phil Rand, becoming formally associated with our staff, lectured at industry and service meetings as part of an educational campaign. Net result of these and similar activities: excellent!

The ARRL adopted new instruments of government, and got a new president: Goodwin L. Dosland, WØTSN, replacing George W. Bailey, W2KH, who had held the post for 12 years. Membership again showed a pleasing increase. Interest in contests and awards continued high; another new record was set for Field Day participation. Some DX records on v.h.f. and up were broken. Civil defense plans took more definite shape, and mobile activity reached new highs. The new Amateur Extra Class license exam was tackled by hundreds of more-aspiring amateurs, in addition to those who qualified under the "grandfather" clause proposed by FCC. Novices continued rolling in in considerable numbers, although it is too early to determine whether this license is actually increasing the permanent growth of amateur radio or is simply a means of newcomers being able to start earlier. The League prepared and distributed hundreds of thousands of a new-amateur promotional booklet, the results of which are just beginning to be felt.

But it was in the regulatory field, as seems to be the custom in recent years, that most 1952 developments occurred. We got operating privileges in our Atlantic City 21-Mc. band (and our VEs got voice privileges therein); we also had our last contacts in 14,350–14,400 kc. We got n.f.m. on all amateur voice sub-bands above 3.8 Mc.; the Radio Amateur Civil Emergency Service; reciprocal operating privileges with Canada; a third-party message traffic agreement with Cuba; Lebanon, Japan and Netherlands West Indies stricken from the forbidden list; and nighttime operating privileges in 1800–2000 kc. shared bands for the boys along the Gulf Coast. Practically without exception, these matters originated with, or at least were actively promoted by, ARRL.

The Commission had pending (in early December, as we write) numerous additional ideas: opening 75- and 20-meter voice bands to General and Conditional Class amateur (opposed by ARRL); opening 7200–7300 kc. to 'phone (favored by ARRL); opening 7175–7200 to Novices (suggested by ARRL, with the subsequent request that the band be enlarged to 7150–7200); opening most c.w. bands to radioteleprinter (opposed, with request that RTTY be limited to a small segment of 40 meters as originally proposed a year earlier by the League); opening 100 kc. at each end of 21 Mc. to voice (the League's view is a proposal to permit 'phone in 21,250–21,450 kc.); opening part of 21 Mc. to Novices (opposed); elimination of special call signs for amateurs (opposed); and the one which caused in amateur ranks the biggest uproar in years — establishment of exclusive calling and answering channels in our bands (opposed!).

On its own, the League requested a band for mobiles 3775–3800 kc.; expansion of the 20- and 10-meter voice bands; opening part of 50 Mc. to duplex and (temporarily) to Novices; and retention of the Advanced Class as a permanent part of the amateur licensing structure. All this unfinished business as the year drew to a close foretold a 1953 similarly occupied with regulatory developments and an already-bulging *License Manual* perhaps even further fattened.

But let's not spend time in armchair predictions; let's tackle each event or problem that 1953 may bring us and give it the best we have. In that way we can be sure that it will be an exciting and rewarding one for amateur radio.

A HELPING HAND

The Boy Scout organization is currently engaged in a program to stimulate greater youth interest in radio, a project which has had full ARRL coöperation inasmuch as the natural channel is of course amateur radio and particularly the Novice Class license. To attract more newcomers to the hobby, BSA during the months of January and February is conducting a listening contest, urging Scouts to use their or friends' short-wave receivers (or build or buy one) to eavesdrop on the ether and familiarize themselves with high-frequency communications procedures. Accent will naturally fall on the amateur bands (though intercepts of other services count for the boys, too). What we're working up to saying is that undoubtedly many amateurs, particularly those on voice, will be receiving SWL cards from Scouts eagerly pursuing their new-found interest. The extent of amateur QSO response may well make or break that interest. So, knowing the typical lack of enthusiasm exhibited by the average amateur upon receipt of a short-wave listener's heard report, we'd like to ask that, particularly for this laudable promotional effort, you take special pains to mail a QSL (assuming the report checks with your log). Remember, *you* were once a beginner. And the card you mail may be just the helping hand the Scout needs to spur his interest.

DOCKET 10237 SETTLED

Calling and Answering Frequencies Abandoned

Just at press time the FCC announced final action in Docket 10237. The idea of permanent calling and answering frequencies for normal operation has been completely dropped, which accords with the request of ARRL. The proposed new text for §12.156 on emergency operation has been modified to eliminate specific bands designated in advance, and to eliminate a compulsory listening period, which also accord with ARRL requests; in fact, the final text, which will become effective February 2nd next, is with only slight editorial changes, the same as proposed by the League in its comment (page 32, October *QST*). Details next month.

Quist Quiz

During the past several days, our friend **A** has been hearing an American short-wave b.c. station in the middle of the 20-meter band. Should he sit still and gripe, or should he report it to ARRL?

(*Please turn to page 130 for the answer*)

Strays

"Why fight it? It's bigger than all of us." So contends W2KDB in recommending that germanium crystals be forthwith officially dubbed *geranium*.

—•••—

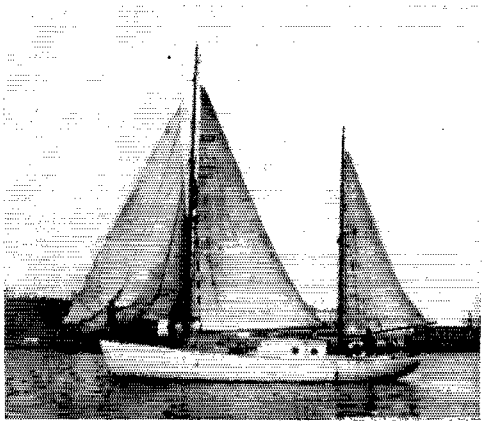
Glenn (W4BFQ), James (W4EPI), Bynum (W4NMB), George (W4SLG), Larry (WN4WZF) and Tom (W6ZTG) are the brothers Diggs — one real ham family!

—•••—

"Woodpecker Attacks Television Aerials," reads a headline in a recent Cleveland paper. This undoubtedly lends support to those who maintain that TV is strictly for the birds.

—•••—

New Zealander Dr. Thomas R. A. Davis, accompanied only by his wife, his two sons and a crew of two, sailed 10,000 miles from Wellington to Boston in his 48-foot ketch *Miru* while placing considerable reliance on contacts with amateurs. A 30-watt transmitter and Eddystone receiver, operated under the call ZK1AN/MM,



The *Miru* enters Boston harbor after her five-month voyage from "down under." (*Photo by W1BB*)

were squeezed aboard — the Doctor has been a radio enthusiast for many years.

"Doctor Tom" undertook the perilous voyage to take advantage of a $3000 fellowship awarded him at Harvard's School of Public Health. Among the stations who contacted and assisted the *Miru* during its five-month passage were:

W1s AVY BB BDM BNS CPI DBE JAK LBH LIB MB ME SIB TOP, W2s DZH HQB IAW IKE/1 KW PFL RWJ VFM YEF ZDB ZI ZM, W3s BET CPL CRR GH KFQ NNQ QEP QHS, W4s AAM BRB CQG/3 FV MT MVP NV OGX OPS RHC RSF RWM US VMU WS.

Dr. Davis was "guided in" to dock at the Science Museum, Charles River Basin, where a gala Boston welcome for the *Miru* polished off an extraordinary achievement in seamanship.

— *W1BB*

Harmonic Radiation from External Nonlinear Systems

Sources, Characteristics, and Methods of Detection

BY MACK SEYBOLD,* W2RYI

THE old filter-builder, Ralph, W2CVF, had been passing comments during many sessions of the Gloater's Club. Most of the boys on the 29-Mc. net were right in there pitching with him: "How can a guy spend two or three years out there in West Orange chasing microvolts with a butterfly net!" Or, "All you have to do down here in Englewood is put the rig and filter in a couple of dishpans back-to-back, and you're on the air! Why fiddle with the plumbing in the kitchen sink?"

Ralph would agree that there was a remote possibility that sinks might be involved in TVI. We all would agree that some sinks might be above suspicion, but, of course, there are different kinds of sinks — big ones and little ones, clean ones and rusty ones, city sinks and country sinks.

It finally took Santa Claus to get Ralph to believe in kitchen sinks. On Christmas Day, in 1951, W2CVF went on the air to pass along his season's greetings and to find out who had been able to cash in on the softened-up holiday atmosphere for double-conversion superhets. The atmosphere didn't stay soft for long in West Englewood that day, however. Channel 2 was taking a beating from the most filtered transmitter east of the Hackensack.

How could a horrible thing like this happen to an ardent disciple of Phil Rand, Russ Valentine, and George Grammer? How could it happen to the chief baiter of K2CR and W2RYI for bigger and better filter designs?

Ralph admits that he remembered the kitchen sink as soon as the unusual occurred. Actually, the plumbing wasn't involved, but it was the same proposition in a more refined category. Santa Claus had seen to that! The most recent change in the household was a Christmas present to the up-and-coming junior operator, a crystal set for the pleasure of a Christmas toy, and possibly the beginning of a devious road to scientific achievement or fun and fortune on the amateur bands.

No sweeter demonstration of nonlinear systems could have been prepared on the laboratory work bench: a 29-Mc. harmonic-free transmitter, an efficient crystal rectifier on an isolated receiving antenna, and a television set tuned to a holiday show. Ralph suspected the crystal and, sure enough, when the cat's-whisker was lifted from the galena, TVI ceased entirely.

* c/o Tube Dept., RCA Victor Div., RCA, Harrison, N. J.

• This article is the first comprehensive treatment of a type of harmonic generation that represents the last barrier — and often a nasty one — to completely TVI-proof operation in fringe areas. When shielding and filtering on the transmitter, and high-pass filters on the TV receiver don't do a complete job, external rectification is the probable reason. The author, an outstanding worker in the anti-TVI field from the beginning of postwar TV broadcasting, presents here the results of a thorough study of the problem and describes new methods for its detection and elimination.

Case Histories

Not all amateurs have had the dubious pleasure of encountering harmonics radiated from external nonlinear systems. Many in the TV areas have found the phenomenon at work in the first r.f. stage of TV receivers, where a strong amateur signal can swing the grid beyond linearity and produce multiple harmonics of an original pure signal. A few amateurs have isolated other devices that proved to be the cause of harmonics seemingly radiated from carefully shielded transmitters, but the complexity of the problem has baffled careful workers, and many sources of spurious radiation are yet to be discovered.

Table I lists some of the many sources from which harmonics produced in external nonlinear devices were strong enough to interfere with television reception. There are probably hundreds of locations where harmonics are produced at a level too low to develop visible cross-hatching, but are strong enough to measure with simple equipment. From the evidence at hand, it is somewhat perplexing that more of the interfering variety have not been reported. Perhaps, in time, some of the low-level producers will develop into efficient rectifiers, and stronger harmonics will be radiated. This development may be particularly noticeable in cases similar to the one listed in the table wherein corroded TV antenna fittings were found to be at fault. Corrosion conditions are accelerated in humid regions, especially where salt spray is in the atmosphere. Some industrial centers have a slightly acidic atmosphere, which also enhances corrosion.

Signal Strength for Interference

As usual with TVI problems, a harmonic entering a receiver at a frequency near that of the picture carrier will not produce cross-hatching unless it is at least 1/100 as strong as the TV carrier. A harmonic measuring 100 microvolts at TV-antenna terminals might never be seen on a kinescope located within walking distance of a TV transmitter. The same level of harmonic measured at a fringe-area receiver, however, could very well be equal in strength to the picture carrier, and could produce cross-hatching as black and white as the picture elements. If all amateur transmitters were completely single-signal radiators, the fringe-area boys would still have more TVI problems than the amateurs in the primary coverage areas, because harmonics from external rectifiers are produced with equal facility in both areas.

Basically, any rectifier can produce harmonics if a signal is fed to the cathode-anode circuit. The low-order harmonics are the strongest, and the high-order harmonics become progressively weaker unless some common resonant circuit accentuates a specific multiple of the fundamental frequency. A good rectifier is one which has the largest ratio of forward-to-reverse-direction current flow. A device having a low rectification ratio will be less efficient as a harmonic producer, the ultimate being a pure conductor which passes current equally well in both directions, producing no harmonics, or a nonconductor which will not pass current in either direction.

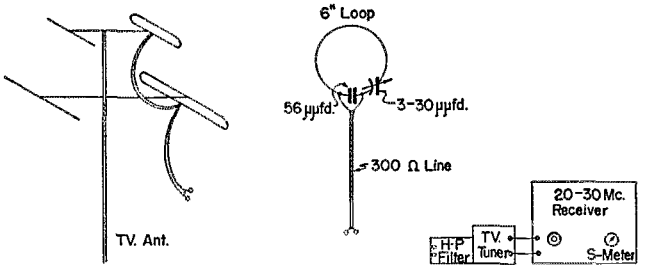


Fig. 1 — Double-conversion arrangement for identifying and measuring harmonic signals.

TABLE I
TVI from Nonlinear Systems

Year	*Amateur Station*	*TVI-Producing System*
1947	W1DBM, W1DF, W2LV, W2MYH, W2RYI, etc.	1) Harmonics produced in TV-receiver front end, in addition to heterodyning, blocking, etc.
1948	W2RYI	2) 1st r.f. stage of communications receiver
		3) Modulator plate-filament circuit
1949	W1DF	4) Evidence from aluminum mast and guy wires
	W2RYI	5) BX sheath touching another BX cable
		6) Clean-out poker hanging from pipe
		7) Rectifier in a.c.-d.c. broadcast receiver
		8) Germanium r.f. probe on TV antenna
1950	W8HP	9) BX sheath touching hot-air duct
	W2PEX	10) Corroded joint on aluminum window frame
	Not given	11) (W2RID) Rider editorial on corroded TV antenna
	W2RYI	12) Faucet-sink joint
	Not given	13) W2UOL's story about a hearing aid
1951	W2RYI	14) Bathtub drain-link mechanism
	W2CVF	15) Son's crystal detector

Rectifiers are called nonlinear devices because of the marked discontinuity in the graphic presentation of their conduction characteristics. Triodes and pentodes are also nonlinear devices because the output is not exactly proportional to the input, and a graph illustrating the operating characteristics discloses a curved line. The range in which an amplifier is normally used is represented by such a limited portion of the curve that it is almost a straight line, and the harmonic output is extremely low. If the range is increased by applying a large input signal, the portion of the curve used no longer approximates a straight line, and the output signal, therefore, is not an exact reproduction of the input signal. The resultant wave-shape is a composite of strong harmonics.

Natural-Born Rectifiers

Nature is a prolific producer of rectifiers. Oxides and other corrosion products of metals will frequently pass current better in one direction than in the reverse. The efficiency of most of these compounds is low, but some of nature's products are excellent rectifiers. Lead sulphide is the galena crystal of early radio fame. Silicon and germanium diodes are employed in many modern applications. Copper oxide and selenium, produced under controlled conditions, are utilized extensively for power rectification.

Because corrosion of such metals as iron, copper, and aluminum proceeds uncontrolled in nature, the rectification ability of the corrosion by-products from these metals varies immensely. If the material can pass current slightly better in one direction, however, and if it is part of a circuit arrangement in which r.f. signals can be admitted and released, harmonics will be produced. The strength of the harmonic is a function

of the r.f. voltage applied, the efficiency of the rectifier, and the resonant frequency of the system.

All of the elements required to produce a harmonic-generating system are present in the houses and structures in the vicinity of amateur stations. If a house could be observed with Superman's X-ray eyes, the metallic structure standing there would be identical to the conductors that a radio wave would recognize as it passes through the maze of pipes, wires, ducts, and fixtures. An r.f. signal produces standing waves on the various elements of this complex receiving antenna, and wherever a rusty or corroded joint has formed between pipes or lines crossing each other, rectification takes place. The harmonics produced are reradiated by the same metallic maze.

If a joint is an efficient rectifier, if the r.f. voltage applied is high enough, and if the resonant frequency of the metallic structure is appropriate, a nearby TV antenna may receive a harmonic signal sufficiently strong to interfere with the picture. The poker joint listed in Table I produced a 1000-microvolt 57-Mc. signal on the feeder of a TV antenna located 30 feet from the joint and 80 feet from the 28.5-Mc. transmitting antenna.

Because manufactured rectifiers are usually the most efficient, any equipment containing them may be suspected of producing harmonics. The access of r.f. signal to equipment rectifiers is the limiting factor in TVI production. Other tubes, vacuum and gas, triodes and pentodes, can also produce harmonics if sufficient r.f. reaches them in the equipment suspected.

Locating Nonlinear Devices

Table II lists some of the places where trouble may be encountered. Locating natural nonlinear joints is sometimes difficult. Watching the interference pattern on a TV receiver while pushing exposed pipes, air ducts, BX cables, etc., may disclose the location of a joint. The intensity of the interference changes rapidly as the joint is jarred by pushing the pipe or pounding the floor or wall behind it.

When brute-force methods fail, more exacting techniques are required, especially when the system is located between floor and ceiling, or sealed behind plaster walls. Fig. 1 shows a 6-inch pick-up loop fed into a TV tuner. Readings are taken on the S-meter of the communications receiver tuned to the output of the tuner. As a joint is approached with the loop, the S-meter on this double-conversion equipment will indicate an increase in signal strength. The loop will not always pin-point the source, however, because the harmonic signal may be radiating from a considerable length of metal, such as pipe or BX, comprising the joint circuit.

As a matter of fact, the complexity of the circuits involved led to the experiments at W2RYI to learn more about the behavior of harmonic-producing joints. If a nonlinear system cannot be located by direct methods, knowledge of its characteristics is helpful in the detective work necessary to isolate and eliminate the source of the trouble.

The groundwork for these experiments had been laid in 1947, '48, and '49; completely shielded transmitters and conservatively designed low-pass filters were used, and the worst of the natural nonlinear systems were eliminated. All vacuum and gas tubes in exposed power supplies and control circuits had been by-passed, as shown in Fig. 2 and Table III. Some of the preliminary search for nonlinear joints had been conducted with a portable broadcast receiver. Inasmuch as these external rectifiers will mix signals as well as produce harmonics, the sum and difference frequencies of two signals transmitted from antennas in the back yard are produced in the nonlinear house circuits. Simultaneous transmissions on 27.0 and 28.4 Mc. produced a 1400-kc. signal which could be picked up on the battery portable. In this instance, too, the general location of the rectifying joint could be determined.

Another phenomenon proved helpful early in the proceedings. A small 60-cycle voltage normally present on the BX sheath modulated the harmonics produced in joints common to the BX cable, and the hum could be heard in the double-conversion set-up or could be seen as

TABLE II
Nonlinear Systems

Manufactured:

Amplifiers	Fluorescent lamps	Phonographs
Battery chargers	Hearing aids	Power supplies, regulators
Diode probes	Intercoms	Radios
Electronic control devices	Modulation indicators	TV receivers
Field-strength meters	Neon bulbs	Toy trains (d.c.)

Corroded joints in conjunction with:

Air ducts
Bathroom, kitchen, and laundry fixtures and equipment
BX cable
BX boxes, switches
Ceiling and wall fixtures, chandeliers
Chains
Conduits
Furnace and hot-water installation
Ground clamps: power line, telephone, radio, TV
Gutters and roof drains
Guy wires and lanyards
Lightning arrestors and lightning rods
Metal fences
Metal-mesh lath for plaster and stucco
Metal towers and masts
Outside power and telephone lines and equipment
Pipes: gas, steam, water, sewer, and vents
Radiators and registers
Receiving antennas — radio and TV
Re-enforcement rods in concrete
Telephone installation
Thermostat system
Transmitting antennas
Sheet metal roofs and structures
Stove pipes
Structural steel beams and framework
Wiring: bell, intercom, power and light

horizontal bands having variable intensity in the interference pattern. Joints common to water and gas pipes did not exhibit the modulation, so one more bit of information was available to aid in isolating rectifiers.

Eliminating Joints

Several techniques were used at W2RYI to eliminate nonlinear joints after they had been

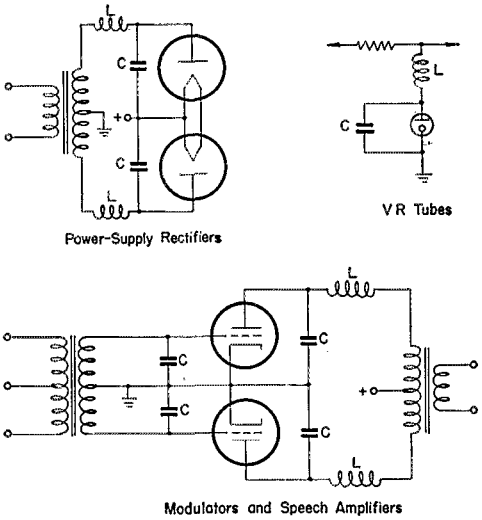


Fig. 2 — By-pass filters for exposed tube circuits where rectification can occur. $L = 30$ μh.; $C = 1000$ $\mu\mu$fd.

located. When possible, the junction was insulated or separated mechanically. Several BX-box connectors had to be scraped and soldered. The water connections to the kitchen sink were inaccessible, and neither insulating nor soldering could be accomplished without ripping up the wall, so a third method was required. Where the pipes emerged under the sink, short copper straps were connected to by-pass the iron-enamel-rust pipe junction.

How long can an effective shorting strap be? How far away from the transmitter can difficulties be expected from harmonics produced by nonlinear systems? What effect does pipe length have on production and radiation of harmonics? Does a joint produce harmonics in direct proportion to transmitter-power input? These were some of the questions that needed answers in the form of specific data, and the experiments were performed to obtain those data.

Tests with Artificial Joints

A 1N34 crystal diode was utilized to simulate a relatively efficient rectifying joint. The measurements were taken on the double-conversion set-up after it was calibrated with a borrowed signal generator; a well-filtered TV receiver was used to reveal the interference effects. The receiving antenna used for the measurements was of the high-band, low-band type, with folded dipoles and reflectors. This antenna was located 15 feet off the ground and 50 feet from the discone transmitting antenna. The artificial nonlinear systems were also placed 50 feet from the discone, and were located 20 feet behind the TV antenna. The picture carriers of Channels 2, 4, and 5 from New York averaged 1000 microvolts at the feeder terminals while measurements were being taken, which makes the threshold of interference with this particular set-up approximately 10 microvolts.

Fig. 3 shows the effect of transmitter power input upon harmonic output of the 1N34 system. The dotted lines represent exact proportionality between transmitter power input and harmonic signal output. The deviation exhibited is small enough to indicate that the measurements were reasonably accurate and that the voltages applied to the crystal were not causing breakdown or saturation. Extrapolation of the data for these curves shows that the power input to the final amplifier would have to be reduced to 0.003 watt to stay below the threshold of interference with an isolated nonlinear system of this efficiency.

Fig. 4 shows the effect of various lengths of wire connected to the crystal diode. Here, as in Fig. 3, the rectifier was placed at the end of a half-wave conductor, but the wire appendage connected to the other diode terminal was shortened progressively as the readings were taken. It is possible that there were changing lobes in the radiation pattern, but the major effect of appendage length is clearly shown. That second harmonic comes whompin' out at a wide variety of appendage lengths, and the third harmonic is not far behind!

The optimum conditions for harmonic production occur when the rectifier and appendage are connected at a point of maximum voltage at the fundamental frequency and the appendage is one-half wavelength at the harmonic frequency. It is reasonable to expect the optimum level of the second harmonic to be 6 db. above the opti-

TABLE III
Procedure for Analysis of Harmonic Radiation

1) Shield transmitter
2) Filter all supply and control leads
3) Use low-pass filter on transmission line
4) Check harmonics with shielded dummy load (lamp in a sealed tin can)
   a) Load inside transmitter
   b) Load at output of low-pass filter
   c) Load at end of coax transmission line
5) If harmonics are produced only when antenna is connected, attenuate the fundamental and check harmonic-to-fundamental ratio
   a) Reduce coupling to final tank
   b) Try a high-pass filter in series with the low-pass filter
   c) Run the final at 60 to 70 megacycles if possible
   d) Couple a 50- to 80-Mc. self-excited 807 to the final tank
6) If signals at TV frequencies are not coming out of the transmitter and antenna, and if radiation at the amateur fundamental frequency is required to produce harmonics, look for external nonlinear systems.

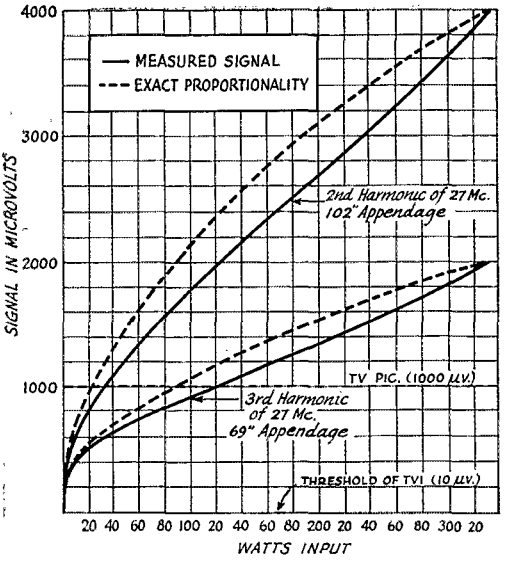


Fig. 3 — Effect of power input on harmonics produced by artificial joint.

mum 3rd harmonic. It is interesting, however, to note that a strong 2nd harmonic is radiated at a wide range of appendage lengths, whereas a strong 3rd is produced in a restricted range.

A set of conditions in which a strong 3rd harmonic exceeded the 2nd is shown in Fig. 5. A 3rd-harmonic appendage was moved along a fundamental ½-wavelength conductor. A reasonably strong 2nd harmonic was available at a number of positions, but in a region between two and three feet from each end of the conductor the 3rd harmonic radiation exceeded the 2nd by a voltage ratio of 4 to 1. Knowledge of the conditions under which higher-order harmonics can exceed the strength of lower-order radiation is valuable in sifting evidence of nonlinear systems, especially when the systems concerned are concealed in walls or ceilings.

Fig. 6 is similar to Fig. 5, except that a 2nd-harmonic appendage was employed in taking the radiation data. Naturally, the 2nd harmonic was easily produced, but it was somewhat surprising to find that the relatively low-level end-point radiation of the 3rd harmonic was not exceeded at other positions along the conductor.

Other combinations of conductor and appendage were tested, but the three described above give the basic characteristics of the systems. Various-sized loops with a crystal inserted were tried. Reasonably strong signals were produced, but loop circumferences varying from 16 feet down to a few inches produced no extreme resonances. The largest of the loops produced harmonic output in the 1000-microvolt range.

Interference Tests

A feeder signal of 4000 microvolts collected on an antenna 20 feet from the radiating system can be expected to produce about 2000 microvolts at 40 feet, and 1000 microvolts at 80 feet. Interference to the TV receiver at W2RYI was, of course, appreciable during the tests of artificial nonlinear systems, and occasional complaints came in from around the neighborhood when the signals were kept on for more than a few seconds during the major-program hours. No attempt was made to determine the exact sphere of influence, but some interesting tests were run with Paul Schneider, W2CYZ, to estimate the range of interference.

Paul's house is located 900 feet from W2RYI. At that distance, the signal from the artificial nonlinear system should have been able to produce about 100 microvolts on his TV feeder. We had planned to take the equipment over to check the level, but after looking at the interference pattern on his receiver, we decided the measurements were unnecessary. When W2RYI was operating on 28 megacycles, with the artificial nonlinear system 50 feet from the discone, and Paul's TV receiver 900 feet away tuned to Channel 2, the cross-hatching in the picture was objectionable.

In the reverse direction, when W2CYZ was transmitting and the nonlinear system was 20 feet from the TV antenna at W2RYI, no visible interference was produced — but that was easy to fix! A 1N34 crystal clipped in series with an 8-foot wire loop across the TV feeder at W2RYI was all that was needed to generate enough harmonic output from Paul's harmonic-free signal to massacre Channel 2. Numerous other combinations of crystal and TV feeder were tried using the signal from 900 feet, and most of them

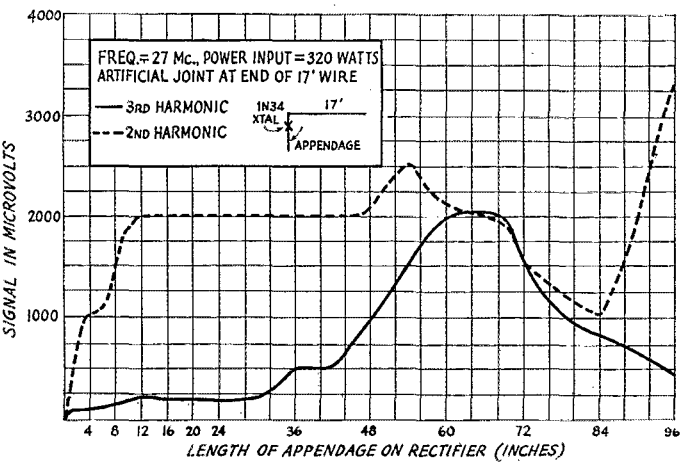


Fig. 4 — Harmonic radiation as a function of appendage length.

produced objectionable interference. Two combinations that were particularly bad were set up to simulate conditions that could actually occur in standard TV installations. One represented a rusty lightning arrestor; the other, a corroded TV antenna.

The "lightning-arrestor" joint consisted of a 1N34 diode clipped to one side of the 300-ohm line about 10 feet from the receiver. An 8-foot appendage from the diode was strapped to the water main where it emerged from the ground.

TABLE IV

Some of the harmonics from the "artificially-corroded" TV antenna located 50 feet from the transmitting antenna. TV feeder is 35 feet long. Input to transmitter = 50 watts.

Harmonic Frequency Mc.	*Transmitter Frequency*							
	28 Mc.		*14 Mc.*		*7 Mc.*		*3.5 Mc.*	
	μv. Sig.	*Harmonic*	*μv. Sig.*	*Harmonic*	*μv. Sig.*	*Harmonic*	*μv. Sig.*	*Harmonic*
56	5000	2nd	2500	4th	20	8th	« 1	16th
59.5	—	—	—	—	—	—	« 1	17th
63	—	—	—	—	5	9th	« 1	18th
70	—	—	800	5th	5	10th	« 1	20th
77	—	—	—	—	2	11th	« 1	22nd
84	1500	3rd	1000	6th	5	12th	« 1	24th
182	—	—	20	13th	—	—	—	—
196	20	7th	8	14th	—	—	—	—
210	—	—	5	15th	—	—	—	—

The "corroded antenna" had an artificial joint that represented one of the many that can develop from weathering. The joint selected was located between the feeder terminal on the low-band folded dipole and the adjacent bolt from the steel support arm. A 1N34 diode clipped between these two points produced heavy Channel 2 interference in the tests with the signal from W2CYZ, and demonstrated the effectiveness of nonlinear joints that can develop on TV antennas.

The artificially corroded TV antenna was also utilized to make measurements of the intensity of high-order harmonics produced by an efficient rectifier These measurements, shown in Table IV, indicate that the high-order harmonics are comparatively weak. Analysis of the data also indicated that the 35-foot TV feeder was not sufficiently long at 3.5 and 7 Mc. to develop optimum fundamental voltage on the rectifier. The optimum transfer of amateur fundamental signal to harmonics available at the receiver terminals occurs with a length of TV feeder that is resonant at the amateur fundamental, placing a voltage maximum at a rectification point common to both the feeder and a harmonic-resonant element in the TV antenna.

Another optimum condition for nonlinear production of harmonics occurs when an amateur transmitting antenna has a rectifying joint. An "ideal" system would be available if a rectifier were substituted for the insulator at the end of a half-wave doublet, with a wire lanyard ½ wavelength for the second harmonic. Some day, someone is going to experience an exact duplicate of this condition — an old insulator with soot and rust and corroded copper wire — but almost any antenna or supporting structure is capable of developing a corroded joint at a point close enough to the optimum to produce potent harmonic signals.

If an artificial joint 50 feet from a transmitting

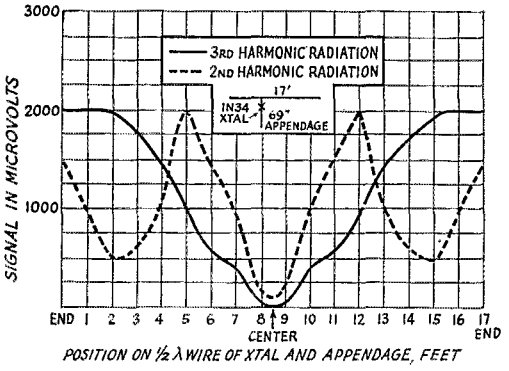


Fig. 5 — Harmonic intensity as a function of the position of the third-harmonic appendage along a half-wave conductor. Frequency, 27 Mc.; power input, 320 watts; transmitting antenna 50 feet from harmonic-generating system; receiving antenna 20 feet from system.

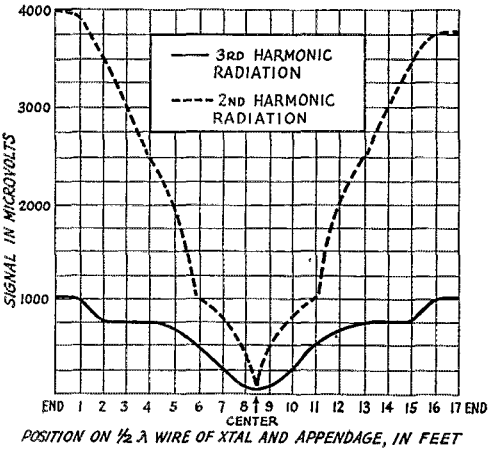


Fig. 6 — Harmonic intensity as a function of the position of the second-harmonic appendage along a half-wave conductor. Same conditions as Fig. 5, except that appendage length is 102 inches.

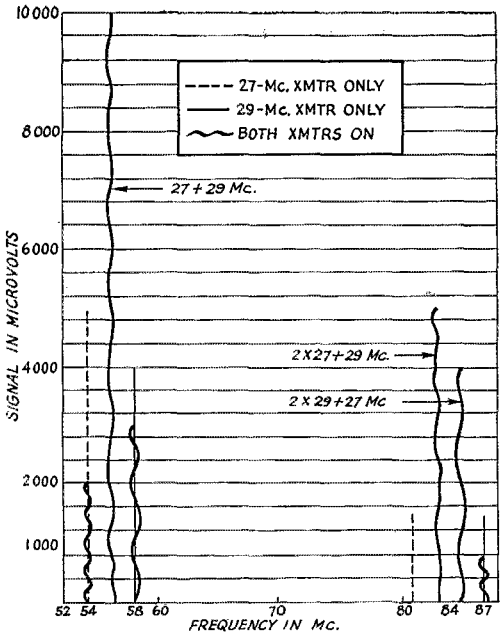


Fig. 7 — Harmonic and heterodyne signals from artificial joint on TV antenna. Two transmitters, each 50 watts input; transmitting antenna 50 feet from TV antenna.

antenna can produce TVI at 900 feet, less efficient joints common to the antenna should certainly be suspected when TVI at close range is developed.

Experiments with Joints as Mixers

Getting back to the TV antenna, the diode connected to the support arm was utilized in examining the behavior of joints as mixers. Natural joints had been investigated with two signals transmitted simultaneously at W2RYI on several occasions, but data from controlled tests were needed for a better understanding of the results.

At times, two separate transmitting antennas were used, but results were identical when the two signals were fed through a coax T-fitting to the discone transmission line, so the measurements made to produce the data for Figs. 7 and 8 were taken with a single source of radiation. One transmitter and a grid-dip oscillator had been used while tracking down the high-level sink joint. The signal from the grid-dip meter was fed into the BX, water, sewer, gas, and steam lines at various points along the lines while the regular transmitter was on 27 Mc. The water and sewer lines in the vicinity of the kitchen developed the strongest sum and difference signals, the grid-dip oscillator being run at 28.4 and 3.0 Mc. to develop signals at 1400 kc. for detection with the battery portable, and at 30 Mc. for checks in the communication receiver.

Stronger and steadier mixed signals, of course, are developed when a second transmitter is run instead of the dipper, and, if work such as searching the neighborhood areas for joints is found necessary, a husky signal is advantageous. In any detecting operation, whether at broadcast frequencies or in the amateur or television bands, the receiver must reject the amateur fundamental. Traps or high-pass or low-pass filters may be required to prevent the production of harmonics or mixed signals in the receiving device.

Two-signal transmissions produced some interesting data. Fig. 7 shows the major harmonic and sum-frequency signals between 50 and 100 Mc. that were developed in the TV antenna with the artificial joint. The power input to each transmitter was 50 watts; the transmitters were run individually at 27 and 29 Mc. and then simultaneously at the two frequencies. Readings taken for the individual transmitters showed that mixed signals developed between two and three times as much voltage as harmonics in the same frequency ranges. The harmonics had less amplitude when both transmitters were operating than when each transmitter was on by itself; the ratio of mixed-to-harmonic signal when both transmitters are operating runs between 5 and 30 to 1. No set pattern for the occurrence of various ratios is evident in the limited data represented by this graph, but the general observation holds that the mixed signals are stronger than the harmonics.

The two-signal method can be utilized to advantage if the existence of detrimental nonlinear systems is questioned in a given location. If mixed signals are produced, the evidence helps confirm the presence of rectifying joints, and the general ratio of harmonic-to-mixed signal can be employed to approximate how much of the harmonic radiation is due to the transmitting equipment and how much is caused by the external systems.

Another clue to the presence of rectifiers

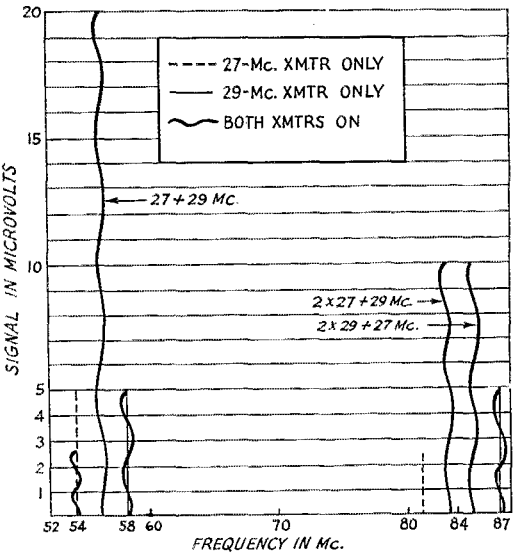


Fig. 8 — Harmonic and heterodyne signals from natural joints at W2RYI. Two transmitters, each 300 watts input; signals picked up by TV antenna.

is available in locations where there is a strong local broadcast station. Mixed signals from the amateur and broadcast transmitters are sometimes available. With the artificially corroded antenna, modulated signals in the 10-to 20-microvolt range can be found 930 and 770 kilocycles from the 2nd and 3rd harmonics of 27 Mc. These signals are W2RYI mixture products of WPAT and WJZ, which are located, respectively, 5 and 10 miles away.

On rare occasions, an audible arc may form at a corroded joint. Some of the "old timers," especially 'phone men, have had experience with talking bathtubs and hot-air ducts that called CQ. This type of modulated arc can produce r.f. harmonics as well as sound waves, but the sound may be easier to follow than the r.f. path when tracking down the source of the disturbance. There is one more example of sound indicating r.f. trouble: If the telephone picks up modulation from a transmitter, rectification is taking place, and r.f. harmonics are probably being produced.

A New Phenomenon

An unusual phenomenon was immediately apparent when the readings were being taken on the mixed signals. Fig. 7 shows the effect as a differential between the radiation levels of a given harmonic when first one and then two fundamental signals are introduced to the diode. The 3rd harmonic of 27 Mc. was recorded as 1500 microvolts when the 27-Mc. transmitter was on the air alone. As soon as a 29-Mc. signal was added, however, the 81-Mc. signal dropped from 1500 microvolts down to 50. This was not a case of poor regulation! The power output of the 27-Mc. transmitter remained constant. It was a weird experience to raise the 29-Mc. power slowly from zero to maximum and watch the 81-Mc. signal drop inversely from maximum to minimum. Other harmonics shown on the graph behaved similarly, but the 3rd of 27 happened to be the most striking.

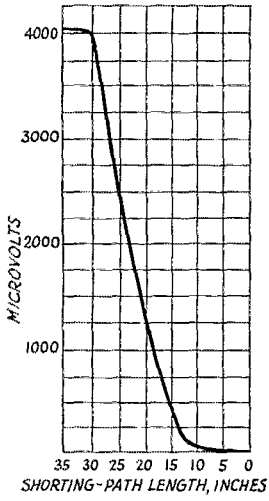


Fig. 9 — Effect of length of shunt across optimum second-harmonic nonlinear joint.

The mechanism of this phenomenon may be cancellation by phase displacement or shift in the operating range of the crystal, or some other derangement that obeys the law of energy conservation. Whatever the cause, some day some application will come along that can utilize this screw-ball effect. In the meantime, it can be used as part of the evidence to convict kitchen sinks.

Two Signals on Natural Joints

Fig. 8 shows the normal two-signal radiation field at W2RYI. When this graph was made, the artificial joints had been tucked away in boxes on the shelf, and specific "bad" natural joints had been eliminated. The general trends in the graph pattern are similar to those in the artificial joint pattern of Fig. 7, adding to the evidence that the residual harmonic level is predominantly from external nonlinear systems.

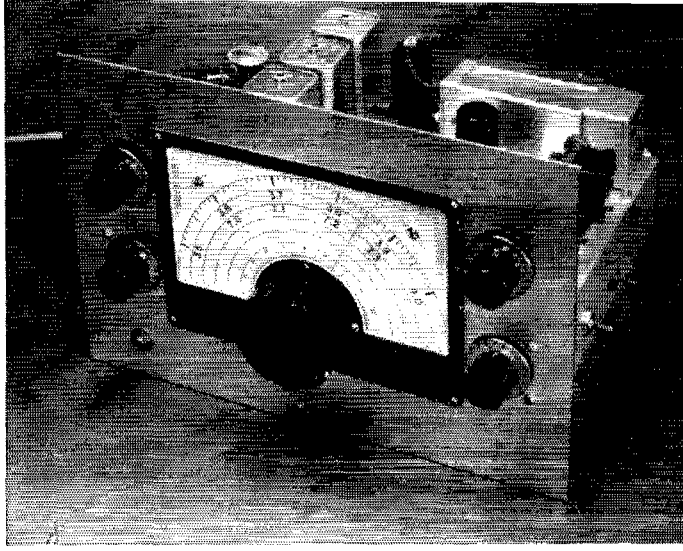
Occasionally, the natural joints at W2RYI produce signals at a lower level than that shown in Fig. 8, and at other times the intensity increases. Joints that produce heavy interference appear on an average of about once a year. As mentioned previously, some of the bad joints are difficult to eliminate, so shunting them with a conductor is an alternative. The accessibility of the junction determines the length of the shunt that can be employed, but shunts that are long have too much inductance.

Shunt lengths are evaluated in Fig. 9. The data plotted represent the radiation characteristics of the optimum 2nd-harmonic system with various lengths of No. 14 copper wire connected across the diode. The actual shunt path includes the distance along the conductors on both sides of the crystal. If attenuation of more than 10 to 1 is desired, it is apparent that a total shorting path of less than 15 inches is necessary. Readings were also taken with an optimum 3rd-harmonic system. The curves for the 2nd and 3rd harmonics were identical in shape, but were 6 db. apart.

No obvious resonances were found during the shorting tests. The shunt evidently does a straightforward job of reducing the fundamental r.f. voltage across the crystal. There may be some resonance tricks that can be performed on the lines common to an inaccessible joint, but the possibilities seem remote. There are, however, other tricks to try that are based on known procedures. For instance, a beam antenna could be so situated that the heading toward the house would be the one most seldom used. Improvement in the order of 10 to 20 db. could be derived. If the shack is on a farm, putting the antenna far away — and high — will reduce the fundamental field. Sometimes changing the polarization from horizontal to vertical, or vice versa, will reduce the strength of the signal reaching a specific, troublesome conductor.

Perhaps a ground-plane antenna placed on top of the house would reduce the r.f. field below sufficiently to eliminate TVI from inaccessible joints; this is an opportunity for the antenna boys

(*Continued on page 108*)



This four-tube double-conversion receiver is built for stable and selective operation in the 3.5- and 7-Mc. bands. The knobs to the left of the tuning dial control audio volume (*upper*) and b.f.o. on or off, and the right-hand knobs control input tuning (*upper*) and i.f. gain.

A Good Four-Tube Superhet

Stability and Selectivity in a Small Double-Conversion Receiver

BY BYRON GOODMAN,* W1DX

THERE are just three reasons that come to mind why any amateur would want to build a receiver these days. One is a matter of curiosity — he would like to find out for himself what makes them tick. The second is the matter of performance — he can still build a better receiver than the manufacturers make. (Notice that we didn't say "better than the manufacturers *can* make," because that probably isn't true, but it is true that commercial designs must be based on a series of compromises that will sell the most sets.) And the third reason is simply the matter of pride — he enjoys operating with something he built himself.

Hey! What about price? Can't you build a receiver cheaper than you can buy it? Sorry, but we doubt it. If you want an all-band receiver, it is rather unlikely that you can build a copy of any of the commercial receivers for what you pay for the factory product. And if you think you can redesign any particular job so that it can be built at lower cost and still look and perform the same, the manufacturer has a job waiting for you as his design engineer.

We aren't offering a design to compete with the manufactured product. But for $50 (plus $15 for a power supply) you get a 4-tube receiver (with 8-tube performance) that is not difficult to build and that has selectivity and stability not surpassed by factory-built receivers costing much more. On the debit side, it covers only the 3.5- and 7-Mc. bands — if you want 14- and 21-Mc. coverage we suggest crystal-controlled converters ahead of it. It will snake out 75-meter 'phone signals in a manner seemingly inconsistent with its small size, although it lacks a.v.c. and you have to handle the r.f. gain manually. There is no audio power tube for running a loudspeaker, but the audio volume is enough to rattle the diaphragms of the most rugged pair of headphones. Now that you have our biased appraisal of the set, and if you think you might be interested in a good two-band receiver, let's take a look at the circuit.

The Circuit

The receiver is a double-conversion affair, with intermediate frequencies of 1700 and 100 kc. The 1700-kc. first i.f. reduces the image problem considerably, and also permits using an oscillator that tunes only one range for the two bands. Tuning the oscillator from 5.2 to 5.7 Mc. gives an i.f. of 1700 kc. for the 3.5- to 4.0-Mc. range and the same i.f. for the 6.9- to 7.4-Mc. range. Thus the oscillator components can be soldered in place (no switching or plug-in coils) and the dial calibration made once and not worried about after that. To change bands, it is only necessary to swing the input condenser to the 80- or 40-meter band. The 1700-kc. i.f. eliminates any pulling on the oscillator, on either the 40- or 80-meter range.

The 6SB7-Y is a considerably better tube than the 6SA7, from the standpoint of gain, and was a "must" choice for the first converter, since no r.f. stage was to be used. To minimize spurious responses, two tuned circuits were used. In the original version the stray capacity coupling between stator plates of a dual condenser was used. From a signal standpoint the coupling was quite adequate, but on 40 meters the set was plagued with strong commercials around 9 Mc. riding through, since the strong second harmonic

*Assistant Technical Editor, *QST*.

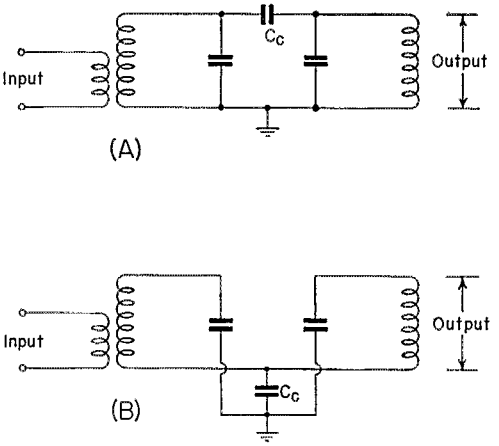


Fig. 1 — The two methods of capacity-coupling two tuned circuits. In the circuit at A, the coupling increases with frequency, since the reactance of C_c decreases with frequency. In the circuit at B, the coupling is greater as the reactance at C_c is *increased*, so the coupling will decrease as the frequency becomes higher. In either case it is assumed that the only coupling is that resulting from C_c, so the coils must be shielded from each other.

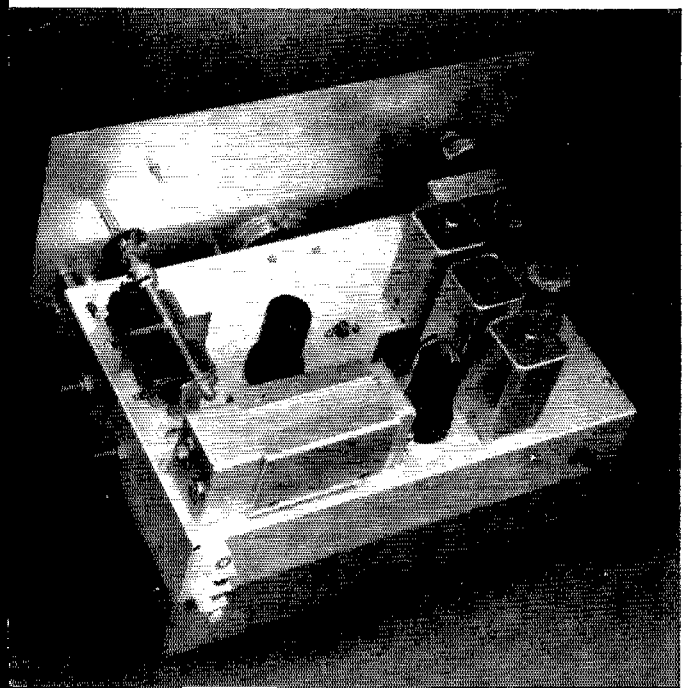
of the oscillator (around 10.7 Mc.) made this almost inevitable. Attempts at reducing the magnitude of the second harmonic were fruitless, so the two stator sections were shielded from each other, and a shield was added between the coils. Coupling was then controlled by a large capacitor common to both circuits, and this did the trick beautifully. The reasoning followed, of course, was that the original capacity-coupled circuit increased the coupling at the higher frequencies, while the common-capacity coupling now used decreases at the higher frequencies. Suffice to say it was well worth the effort, since it boosted the 9-Mc. rejection from 30 to around 50 db. Fig. 1 shows the principles involved in the two circuits.

Referring to the circuit diagram, Fig. 2, the 1700-kc. signal from the first converter is then converted in the 6K8 second converter to 100 kc. The use of a 1600-kc. crystal for the oscillator at this point may seem like an elaboration, but it permits using a gain control (R_{10}) that has no effect on the frequency. This is a desirable characteristic of any receiver (no frequency change with gain-control setting), and so the 1600-kc. crystal at $2.70 was not considered to be a luxury. While this oscillator could be made self-controlled, it would be almost certain to "pull" with gain-control changes.

The 1700-kc. transformer, T_1, between the first and second converters may also appear to be a luxury, since the one specified is a relatively expensive job. However, there can be no compromise at this point, because a poor transformer will not have enough rejection to avoid the secondary images (200-kc. away) that might otherwise ride through. This is no idle speculation on our part — we originally used cheaper components here and made the 6K8 regenerative, but it was too clumsy. The present arrangement is much more satisfactory.

The 100-kc. output from the 6K8 is filtered through several tuned circuits and feeds a triode plate detector (½ 6SN7). This detector is regenerative, but the regeneration is fixed and doesn't have to be bothered with by the operator unless he changes tubes and the replacement has considerably different characteristics. The regeneration in this 100-kc. detector is what gives the receiver its single-signal c.w. reception characteristic, since there aren't enough tuned circuits to give it otherwise. The b.f.o. uses the other triode in the 6SN7 envelope, and stray coupling is used for the b.f.o. injection. Using a 100-kc. coil similar to those used in the amplifier, the Clapp circuit is a logical one for the b.f.o., because of the high L-to-C ratio involved. No panel control of b.f.o. pitch was made available — it was deemed unnecessary because the selectivity is not adjustable.

Up to this point the gain of the receiver is



♦

This view of the four-tube receiver shows the horizontal mounting of the 1700-kc. i.f. transformer, the 1600-kc. crystal (in front of the 6K8 converter), and the audio transformer near the panel (between the volume control and the 6SN7 detector-b.f.o.). Note the shield between stator sections of the antenna-input condenser.

The aluminum chassis is supported by a steel chassis that adds weight and strength to the entire assembly.

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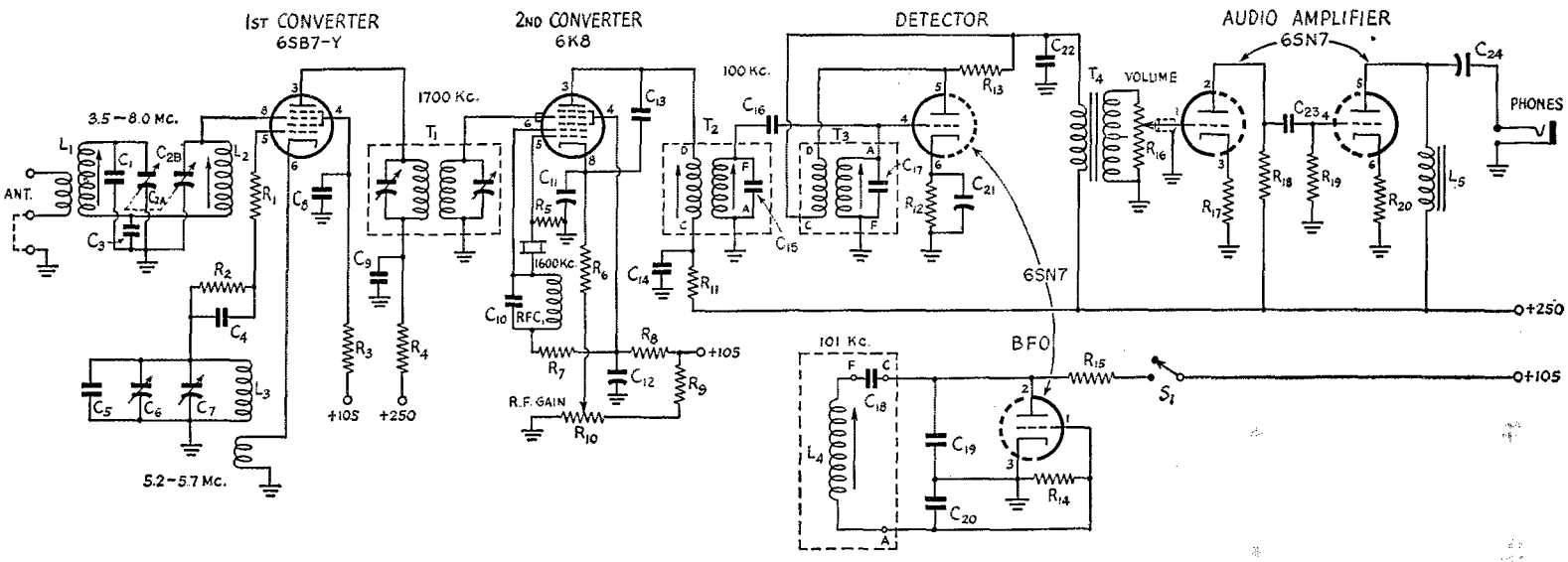


Fig. 2 — Wiring diagram of the four-tube receiver.

C_1 — 10-$\mu\mu$fd. ceramic or mica.
C_2 — 140-$\mu\mu$fd.-per-section dual variable (Hammarlund MCD-140-M).
C_3, C_{22} — 0.001-μfd. ceramic or mica.
C_4 — 220-$\mu\mu$fd. silver mica.
C_5, C_{10} — 47-$\mu\mu$fd. silver mica.
C_6 — 35-$\mu\mu$fd. midget variable (Bud LC-1643 or Hammarlund HF-35).
C_7 — 100-$\mu\mu$fd. midget variable (National PSR-100).
C_8, C_9, C_{23} — 0.01-μfd. ceramic.
C_{11}, C_{12}, C_{14}, C_{21}, C_{24} — 0.1-μfd. 400-volt plastic cased (Sangamo or Sprague).
C_{13} — 390-$\mu\mu$fd. mica.
C_{15}, C_{17}, C_{18} — 100-$\mu\mu$fd. mica.
C_{16} — 4.7-$\mu\mu$fd. mica.
C_{19}, C_{20} — 0.0015-μfd. mica.
R_1 — 47 ohms.
R_2 — 22,000 ohms.
R_3 — 4700 ohms.
R_4, R_8, R_{20} — 1000 ohms.
R_5 — 0.15 megohm.
R_6 — 220 ohms.
R_7 — 2000 ohms.
R_9 — 10,000 ohms, 2 watts (or two 22,000 ohms, 1 watt in parallel).
R_{10} — 1000-ohm wire-wound potentiometer (Mallory M1MP).
R_{11} — 1800 ohms.
R_{12} — 33,000 ohms.
R_{13} — 6800 ohms.
R_{14}, R_{18} — 0.1 megohm.
R_{15} — 10,000 ohms, 1 watt.
R_{16} — 0.25-megohm volume control.
R_{17} — 2200 ohms.
R_{19} — 0.22 megohm.
All resistors ½ watt unless specified otherwise.
L_1, L_2 — 35 turns No. 30 d.c.c. close-wound on National XR-50 slug-tuned form. Primary on L_1 is 8 turns No. 30 d.c.c. close-wound at ground end.
L_3 — 23 turns No. 24 bare space-wound 32 turns per inch, ⅝-inch diam. Tickler is 1¾ turns spaced 1 turn from L_3. See text. (Made from B&W 3008 Miniductor).
L_4 — 20-mh. (approx.) slug-tuned coil. See text. (RCA 205R1).
L_5 — 20-henry 15-ma. choke (Stancor C-1515).
RFC$_1$ — 750 μh. (National R-33).
S_1 — S.p.s.t. rotary or toggle.
T_1 — 1700-kc. i.f. transformer, modified. (Millen 62161) See text.
T_2, T_3 — 100-kc. transformers made from TV components (RCA 205R1). See text.
T_4 — Small 3:1 audio transformer (Stancor A-63C). The 1600-kc. crystal is a Peterson Radio type Z-2.

not too high, and two stages of audio amplification are used. Omitting the cathode by-pass condensers still leaves more than enough audio for any pair of high-impedance headphones.

There is good reason for keeping the gain low up to the audio amplifier. By keeping the level as low as possible up to and through the selective stages, there is a minimum opportunity for overloading and cross-modulation, and the gain must be kept only high enough to prevent degrading the signal-to-noise ratio. Further, it is well known that a regenerative stage has a tendency to "flatten out" with strong signals, so the regenerative detector is somewhat protected by keeping the gain down. But don't for one minute get the idea that this receiver doesn't have plenty of sensitivity, because it does. In any normal location, and with a halfway decent antenna, you will hear all the signals any large receiver can pull in, unless the large receiver has more selectivity than this one. This wouldn't be true on 20 and 10 meters, of course, because there it is hard or impossible to get away without using an r.f. stage for best signal-to-noise ratio, but on 40 and 80 the "outside" noise is almost always the limiting factor.

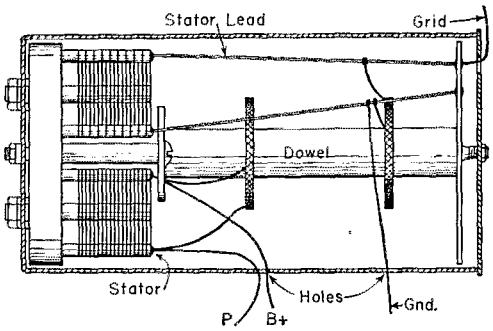


Fig. 3 — The 1700-kc. i.f. can is modified by drilling two holes in the side of the can.

On the transformer assembly proper, the old grid (green) and ground (black) wires are removed. On the tuning condenser connected to the coil nearest the tuning condensers, a new plate lead is connected to the stator and a new B+ lead to the rotor. The old plate lead (blue) becomes the new grid lead, and the old B+ lead (red) becomes the new ground lead by transferring it from the terminal to the rotor wire near the coil.

During reassembly, the new plate and B+ leads should be soldered to a length of wire that is passed through the shield-can hole before the entire assembly is completed. Otherwise it is difficult to snake out the new plate and B+ leads unless small flexible wire is used.

Construction

One's first reaction to a glance at the photographs is probably "Why build a receiver like that?" An aluminum chassis is stacked on top of a steel one — why? Well, we think we have some pretty good reasons, and the results have backed us up. One of the primary objectives in this little receiver was to build something that was stable, where a signal wouldn't disappear if you leaned on the dial or dropped a pin on the table. Our choice of dial was the National ACN, because it can be calibrated. To put the knob of the ACN dial where it would be comfortable meant raising it on the 8 × 12-inch panel, and with a chassis mounted at the bottom of the panel this would mean adding braces between panel and chassis for maximum rigidity. So we used the side of the 7 × 11 × 2-inch chassis to back up the part of the panel where the dial was mounted, fastening the two together with 6-32 screws, ½-inch long brass collars and a few necessary washers. The ACN drive mechanism is more than 2 inches in diameter, and it would have weakened the chassis to cut out a hole for this drive, as well as making a nasty workshop problem. So we have an aluminum chassis mounted above the bottom of the panel, and the whole thing sits on an inverted steel chassis that has rubber feet (grommets) in the corners. We could have used another aluminum chassis at the bottom, of course, but we wanted all the weight we could get. If you have ever operated with a small receiver that can easily be pushed around on the table top, you'll know why. In any event, the receiver is stable — pushing on the dial doesn't vary the beat note at all, and pounding the table alongside the receiver results in only the slightest of short warbles. (We've never met anyone who operates his receiver while pounding with his other hand on the table, but we know it is one of the universal tests for receiver stability.)

In the oscillator circuit, the 35-$\mu\mu$fd. tuning condenser is supported by a small aluminum bracket, and the 100-$\mu\mu$fd. trimmer is mounted on the chassis so that it is adjustable from the top. Neither condenser is grounded to the chassis through its mounting — leads from the rotors are grounded to the chassis at one point near the 6SB7-Y tube socket. The oscillator coil is mounted by its leads on a small multiple tie point. This may seem ridiculous in an oscillator that we want to be stable, but the B&W Miniductor is solid, and has so little mass that it is hard to make it vibrate on its short leads.

The shield between the input coils, L_1 and L_2, is made of thin aluminum. It has a notch in the edge that goes against the chassis side, to clear the antenna-coil leads, and it has a hole through it for the lead between the bottoms of L_1 and L_2. The dual condenser, C_2, is fastened to the chassis by a single 6-32 screw, and the head of this screw has a copper shield soldered to it for minimizing coupling between C_{2A} and C_{2B}. The shield is easily cut out from copper flashing and soldered to the screw head. The rotor assembly of C_2 must be removed to put the shield in place, but this is just a matter of loosening four screws. Don't touch the stator plates. The screw with the shield on it, which holds C_2 to the chassis, also holds the coil shield in place underneath the chassis.

The 1700-kc. i.f. transformer is mounted on its side because the chassis and panel sizes are such that the receiver can be mounted in a small cabinet, and mounting the transformer upright would prevent any such installation. To lay the

transformer on its side, two ⅜-inch diameter holes were drilled in the side of the i.f. can, opposite the coils. The leads from the i.f. transformer are brought out these holes and through corresponding holes in the chassis. An end plate on the transformer has a clearance hole for the grid lead. Fig. 3 shows these modifications and how the leads are connected and brought out. The 1700-kc. transformer was fastened to the chassis with two clamps using spade bolts, in much the manner that some filter condensers are clamped. Another method might be to make a bracket of the end plate and another bracket at the adjusting-screw end of the transformer.

The 100-kc. circuits use a TV component, the RCA 205R1 Horizontal Oscillator coil. As purchased, they have the soldering lugs and tuning screw out of the top of the can, but they are easily reversed by uncrimping the can and reversing the assembly. Before reassembly, however, there are a few things to be done. These coils are actually two coils, a large one connected to Pins A and F (with a center-tap at C) and a smaller coil connected between C and D. The large coil is used for the 100-kc. tuned circuit by connecting a 100-$\mu\mu$fd. mica condenser between A and F and lifting the center-tap from Pin C. Don't break the center-tap — the easiest way is to scrape the two wires first to remove the insulation, flow a drop of solder on the scraped portion, and then cut the two wires away at the pin. The other winding is used as the primary in T_2 and the tickler in T_3. The primary in T_2 can be tuned from the top, because there is also an iron slug in this smaller coil.

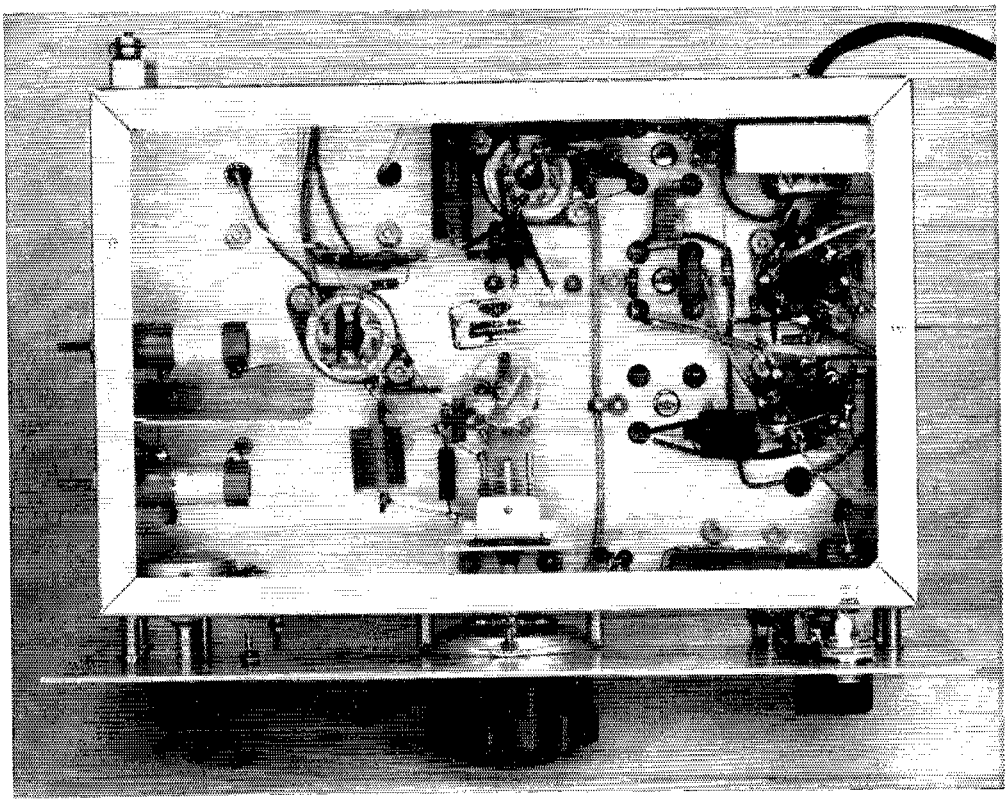
While all of these modifications may sound complicated, they are actually harder to describe than to do, and with the components in hand there should be no trouble in making the changes.

In wiring the set, tie points were used liberally so that no components would be floppy. The only shielded wires are the one running from the volume control R_{16} to Pin 1 of the audio amplifier and the leads from T_3 to Pins 4 and 5 of the detector. The shields are grounded to the chassis at the ends and any other convenient points.

The oscillator coil, L_3, is made from B&W Miniductor. To separate the two coils of L_3, push the 3rd or 4th turn from one end of the piece of Miniductor through toward the center of the coil. Snip this wire with a pair of cutters and push the two ends back out. Each end is then peeled around for ½ turn. The two coils are then adjusted to the right number of turns by working in from the outside ends.

The rotor of C_2 is grounded underneath the chassis by running a wire from the front support of the rotor through a hole in the top

This view underneath the chassis shows how the parts are arranged around the various tube sockets. Note the baffle shield between the two input coils (*left*). Not clearly visible in the photograph, but an important part of the construction, is the tie point that supports the oscillator coil (between tuning condenser and coil baffle shield).



of the chassis to the lug under L_1. Grounding the rotor to the top of the chassis is inadvisable because the r.f. must then flow over and under the chassis.

The aluminum chassis is bolted to the steel chassis by two 4¼-inch lengths of ⅛-inch diameter brass rod, threaded 6-32 at each end. These rods pass through holes in the top and lip of each chassis. The only holes that are required in the steel chassis are those for the two tie rods, the four holes for the rubber feet, and a 1¼-inch diameter hole to clear the headphone jack.

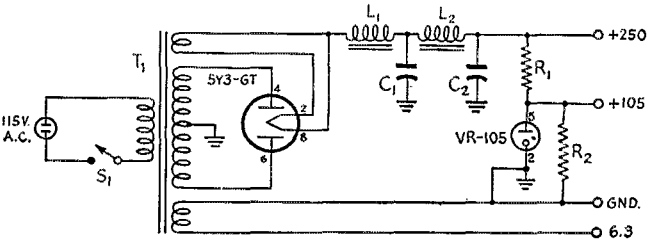


Fig. 4 — Suggested circuit diagram for the receiver power supply.

C_1, C_2 — 16-μfd. 450-volt electrolytic.
R_1 — 4000-ohm 10-watt wire-wound.
R_2 — 0.1-megohm 1-watt composition.
L_1 — 8-henry 75-ma. filter choke (Stancor C-1355).
L_2 — 15-henry 75-ma. filter choke (Stancor C-1002).
S_1 — S.p.s.t. toggle.
T_1 — 325-0-325 volts at 55 ma.; 6.3 v. at 2 amp.; 5 v. at 2 amp. (Stancor PC-8407).

Adjustment

There are two types of adjustment that must be made to get the receiver working: adjusting the circuits to the proper frequencies and adjusting the oscillators and the regenerative detector to the proper amplitudes. To this latter end, leave the grounded end of R_5 disconnected in your original wiring, and lightly solder (so that it can be changed later) the lead from Pin 5 of the detector to Terminal C of T_3. Resistors that may require changing are R_3, R_7 and R_{13}, so don't solder them too well the first time around.

Connect a power supply to the receiver and see that the tubes light and that the power-supply voltages are approximately correct. The 250 volts can be anything 25 volts either side of 250, and the 105 volts, coming from a VR tube preferably, will be nothing to worry about if the VR tube lights.

Having proved the wiring this far, connect a low range milliammeter between R_5 and ground (+ lead to ground) and apply power again. The grid current should read about 0.05 ma. (50 μa.). If it reads much more than this, try a slightly larger resistor at R_7, or a smaller one if the grid current is too low. Make these adjustments with the rotor arm of R_{10} at the grounded end (maximum gain).

Next check the oscillation of the oscillator portion of the 6SB7-Y. To do this, connect the + side of your 0–10 high-resistance voltmeter to the chassis and connect the — terminal to a 10-mh. r.f. choke. Touch the other side of the choke to the junction of R_1 and R_2. Lacking a high-resistance voltmeter (20,000 ohms per volt or a v.t.v.m.), lift the end of R_2 that connects to the tuning condenser and insert a 0–1 milliammeter between resistor and ground. With C_7 set at about ¾ maximum capacity, your voltmeter should read about 3½ volts (or the milliammeter about 0.2 ma.). If it reads much more, increase the value of R_3 — if much less, the value of R_3 should be decreased. If you get no reading, it means the oscillator isn't working, and you probably have a mistake in the wiring. With both coils of L_3 wound in the same direction (as with the Miniductor), the stator of the tuning condenser should be connected to the outer end of the larger coil, and Pin 6 of the 6SB7-Y should be connected to the inside turn of the smaller coil.

If you can borrow a serviceman's test oscillator that will give a modulated signal at 1700 kc., this signal can be introduced at the grid of the 6K8 and the 100-kc. i.f. circuits can be peaked (b.f.o. turned off), listening in the headphones for maximum response. The 1700-kc. signal can then be transferred to the grid of the 6SB7-Y and the trimmers peaked on T_1. Lacking the signal generator, the next best bet is to provide a modulated signal in the 80- or 40-meter band and couple it to the stator of C_{2B}. Let's assume the signal you have is from a crystal oscillator or VFO at 3750 kc., running from an unfiltered power supply to furnish the modulation. Set the tuning dial vertical. If the signal were at 3500 kc., you would set the tuning condenser C_6 at almost full capacity. Rock C_7 slowly until the signal is heard. Then peak the 100-kc. transformers T_2 and T_3, reducing the signal input as necessary to avoid overloading. Then turn on the b.f.o. and adjust the slug in L_4 until a beat note is heard. Then peak the trimmers in T_1.

With the initial tuning of the 100-kc. channel done, the slugs of L_1 and L_2 can be adjusted for maximum signal, with no antenna connected. Set C_2 at almost full capacity, your signal near 3.5 Mc., and adjust the iron slugs for maximum in the headphones. If you are using a VFO or crystal oscillator, there will probably be enough pick-up without any apparent coupling, but a short 6-inch wire connected to the antenna terminal may be required to pick up the output from a low-powered signal source.

Unless you are very lucky, indeed, the 100-kc. circuits will not be tuned to the exact frequency that makes the calibrations coincide on 80 and 40 meters. While it isn't necessary, of course, it does make the dial look cleaner. To bring the calibrations into line, beg or borrow a crystal frequency standard that will give signals at 100-kc. intervals. First locate the 4.0- and 7.0-Mc. points on the dial, by referring the harmonics from the 100-kc. standard to the original signal you used for alignment. If, for example, the 80-meter sig-

(Continued on page 108)

Voltage-Multiplying Circuits

A Brief Review of Transformerless Power Systems

BY GABRIEL P. RUMBLE,* EX-W5BBB

VOLTAGE-MULTIPLYING circuits, that is, power-supply circuits in which an a.c. voltage is changed to a higher d.c. voltage, have their widest application at the present time in television receiver circuits. However, frequent use is made of such circuits in ham gear where simplicity and light weight are prime considerations.

Voltage Doublers

In Fig. 1, a condenser and rectifier in series are connected across a source of alternating voltage.

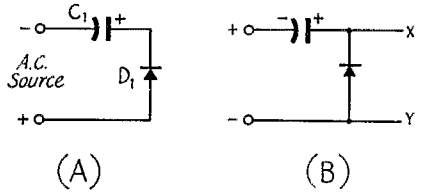


Fig. 1 — In A the condenser is being charged. In B the voltage between points X and Y is essentially twice the peak value of the applied a.c. voltage.

When the polarity of the source is as shown in Fig. 1A, the rectifier will conduct and the condenser will become charged to the peak value of the a.c. voltage. When the source voltage reverses polarity, the rectifier will not conduct, but the polarities of the condenser charge and the source voltage will be such as to be additive. Therefore, when the source voltage reaches its peak value on this second half of the cycle, the voltage between points X and Y will be twice the peak value of the source voltage. This doubled voltage can be conducted through an additional rectifier, as shown in Fig. 2, to charge a second condenser to

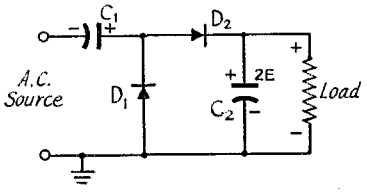


Fig. 2 — A practical half-wave voltage-doubling circuit.

deliver twice the peak value of the source voltage to the load. Thus we have a circuit by which a voltage higher than the source voltage can be obtained without the use of a transformer. The circuit of Fig. 2 is called a voltage-doubler circuit. It should be noted that no current flows from the input circuit to the load during that portion of the cycle when the first condenser, C_1, is being charged, because the polarity existing at that time is such as to make the rectifier, D_2, nonconducting. Therefore, the circuit is a half-wave rectifier. However, the discharging of the condensers has a filtering action that smooths out the pulsations before reaching the load. The ripple voltage appearing across the load will depend on the capacitance of the condensers and the value of the load resistance, becoming smaller with an increase in each. For many applications, no further filtering is necessary. Capacitances of 40 μfd. are commonly used throughout voltage-multiplying circuits. C_1 should have a voltage rating at least equal to the peak value of the source voltage; C_2 twice this value.

When more than a light load is placed across the output terminals of the circuit of Fig. 2, the output voltage sags sadly. Regulation is a function of condenser capacitance and rectifier resistance, improving with an increase in capacitance and a decrease in resistance. An advantage of this circuit is that one side of the load circuit may be grounded directly.

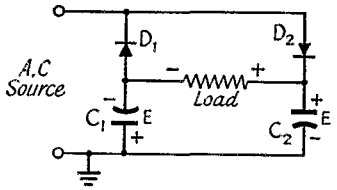


Fig. 3 — A full-wave voltage-doubling circuit.

Improvement in regulation and a reduction in the output ripple can be obtained by using a voltage-doubler circuit in which full-wave rectification takes place. Such a circuit is shown in Fig. 3. On one alternation (half cycle) one condenser is charged, while on the other alternation the other condenser is charged; hence full-wave rectification. The two charged condensers are in series across the load; hence voltage doubling. A disadvantage of this circuit in some applications is that neither side of the load circuit may be grounded. Both C_1 and C_2 should have a voltage rating at least equal to the peak value of the a.c. input voltage.

Voltage Multipliers

The principle of voltage multiplication, that is, the charging up of a condenser through a rectifier during one alternation and the addition of the condenser charge to the line voltage on the other alternation can be extended beyond doubling to tripling, quadrupling and, indeed, to any number of stages. Fig. 4 shows a multiplier cir-

*8309th AU, Post Signal, APO 958, % Postmaster, San Francisco, Calif.

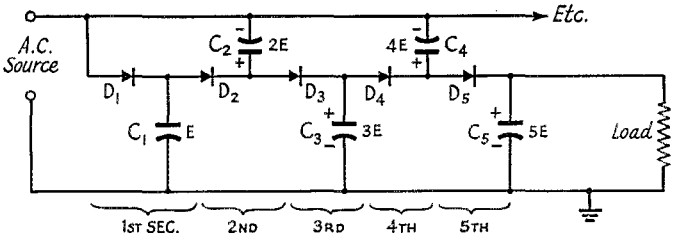


Fig. 4 — Sections may be added to the voltage-doubling circuit to obtain any desired multiplication. The circuit shown at right will deliver an output voltage approximately equal to five times the peak value of the applied a.c. voltage at the input.

cuit having five sections. You will notice that the first two sections of this circuit are similar to the doubling circuit of Fig. 2. The condenser, C_5, will be charged up to five times the peak voltage of the a.c. input voltage. To obtain the desired output voltage, it is necessary merely to employ the appropriate number of sections. E is the peak value of the applied input voltage. The condensers should have a voltage rating at least equal to this peak voltage times the number indicated in each section. The voltage regulation of such an arrangement gets worse as stages are added. For this reason, the condenser capacitances should be as large as practicable. At first glance, one might suspect that the inverse peak voltage across the rectifier increases with each stage, but such is not the case. Under no load, the peak inverse voltage across each rectifier is the same, i.e., twice the peak value of the a.c. input voltage. No matter how many stages, this type of circuit always gives half-wave rectification. As indicated, one side of the load circuit may be grounded.

When tripling or quadrupling, better voltage regulation will be obtained with the circuits of Fig. 5. As with the full-wave doubler circuit, however, neither side of the load circuit can be grounded directly. In the tripler circuit of A, C_1 and C_3 should have a voltoge rating at least equal to the peak value of the a.c. source voltage, while the minimum voltage rating for C_2 should be twice this value. In the quadrupler circuit of B, C_1 and C_4 should be rated for the peak of the source voltage and C_2 and C_3 for double this value.

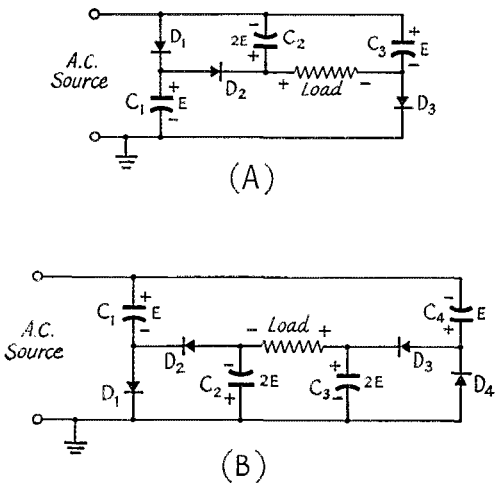


Fig. 5 — (A) Voltage tripler. (B) Voltage quadrupler.

From an examination of these circuits, it will become evident that they are most practical for use with selenium or other types of rectifiers requiring no heated filament. The number of filament transformers will usually prohibit the use of vacuum-tube rectifiers. Since the capacitances required are large, such circuits are normally considered economically attractive when the output voltage is limited within the voltage ratings of electrolytic condensers.

January 1928

. . . Results of the International Radiotelegraph Conference were not as unfavorable to amateurs as was anticipated, thanks to the staunch support of the United States and other friendly delegations.

. . . ARRL Secretary Warner tells a full story of the Conference, pointing out the fears and prejudices toward amateurs held by European governmental and commercial interests attending the meeting.

. . . The Conference designated these amateur band allocations, anticipated effective by 1929: 1715–2000, 3500–4000, 7000–7300, 14,000–14,400, 28,000–30,000 and 56,000–60,000 kilocycles.

. . . In "Municipal Ordinances on Radio Transmission Unlawful," ARRL Assistant Secretary A. L. Budlong tells of League Director Paul Segal's successful precedent-setting case for 9ALM against the town of Wilmore, Ky.

. . . "Rotten Bunk," by The Old Man, gives a hide-tanning to amateurs who hold the view that ham radio is now on the skids as a result of International Radiotelegraph Conference decisions.

. . . P. C. Lackey, 5AJ, and Dean Spencer, 5JU, stress some important factors to be considered before the average c.w. transmitter may be properly modulated for work in the 'phone bands.

. . . "The Grinding of Quartz Plates," by E. G. Watts, jr., 4FM, gives thorough attention to a subject of great interest to crystal-control enthusiasts faced with the prohibitive costs of commercially-ground plates.

. . . Glenn H. Browning discusses "Radio Frequency Chokes for Receivers" and Rudolph Sturm, 9BQY, furnishes many valuable pointers for emergency and portable operation in "A Portable Power Supply."

. . . "Matching the Transmission Line to the Antenna," by Walter Van B. Roberts, gives a somewhat mathematical slant on the problem of coupling transmitter output to antenna for maximum efficiency.

. . . There appears a complete description of nu3CAB, the de luxe Washington, D. C., installation of C. A. Briggs, which has probably handled more messages without schedules than any other ham station of the day.

Simple Remote Tuning for the VFO

An Easily-Made Unit with Minimum Drift

BY DONALD H. MIX,* W1TS

• **In the August issue of *QST*, W3ASW pointed out the possibilities that the Clapp VFO circuit offered in the way of remote tuning and the advantages to be gained by such a system. This article describes the practical construction of a unit incorporating the principles set forth in that article. It not only affords a simple means of feeding a VFO to an existing transmitter but also results in reduced frequency drift.**

As pointed out previously, the series-tuned Colpitts (Clapp) VFO circuit lends itself especially well to remote tuning control.[1] This refers to the currently popular scheme in which the VFO is placed on the operating table where it can be tuned conveniently, while the rest of the rig may be several feet away. Such an arrangement often involves complications, such as the need for an additional tuned circuit at the output end of the cable coupling the VFO to the transmitter. This is particularly inconvenient if the transmitter stage being fed is normally a crystal oscillator.

The Clapp circuit has the advantage that the tuned circuit can be separated from the VFO tube through a cable several feet long not only with negligible loss, but also without reaction on the frequency by movement of the cable. However, perhaps the greatest advantage in this arrangement is that separation of the tube and tuned circuit reduces temperature effects (drift) to a minimum. It also permits mounting the coil in its enclosure without regard to other components. The coil can be placed at the center of the box with maximum spacing from the sides and, as a consequence, minimum sacrifice in *Q*.

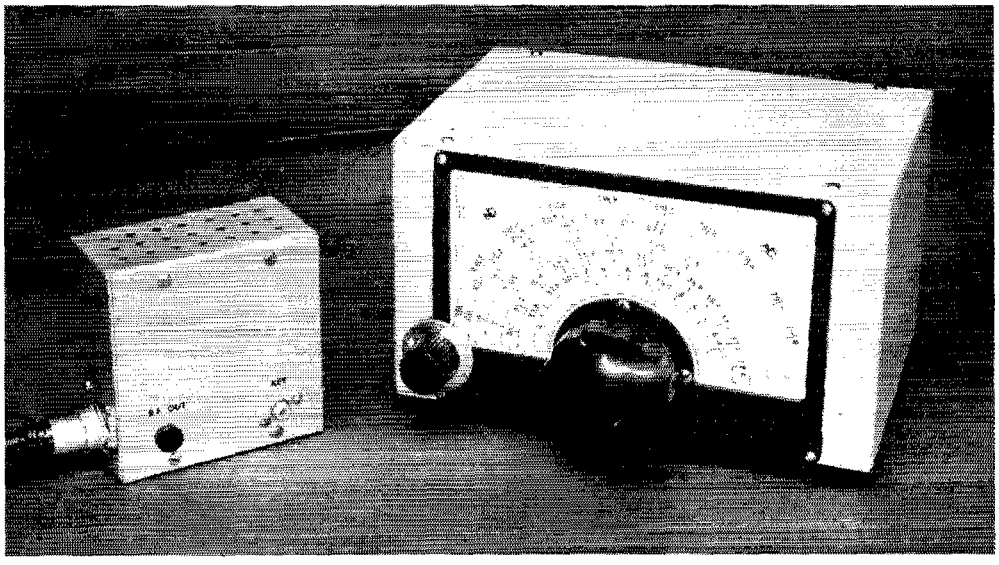
In this instance, the VFO consists of the two shielded units shown in the photographs, one containing the tuned circuit (Fig. 1B) and the other the 5763 oscillator tube and a pair of 0B2 voltage regulators (Fig. 1A), because the VFO was designed primarily as a driver for the "Band-Box" frequency multiplier described in the April, 1952, issue of *QST*.[2] However, in many cases, the crystal-oscillator tube of a rig can be substituted for the second unit mentioned, if the tube is a 6AG7 or 5763. If the popular grid-plate crystal-oscillator circuit is in use, it should be possible to feed the tuned circuit directly through the 2-conductor cable to the crystal terminals without modifying the crystal circuit in any way. The cable may be of any length up to 10 feet or so. RG-22/U is recommended.

The oscillator operates in the 3.5-Mc. region and the bandspread tuning system, consisting of

* Assistant Technical Editor, *QST*.

[1] Long, "Cutting Down VFO Drift," *QST*, August, 1952, p. 20.

[2] Mix, "The 'Bandbox' — a Single-Control Frequency-Multiplier Unit," *QST*, April, 1952, p. 11



The remotely-tuned VFO. The large box contains the tuned circuit, the smaller one the oscillator and voltage-regulator tubes. The two terminals on the smaller box are for output and key connections. The power connector is at the end opposite the cable connection.

C_1, C_2 and C_3, is designed to cover the desired frequency ranges in three steps, when C_1 and C_2 are altered as described under Fig. 1. With one setting of C_2, the tuning condenser, C_1, spreads the range of 3500 to 3750 kc. out over 95 per cent of the National ACN dial. Since this fundamental range covers the most-used 80-meter c.w. frequencies, and harmonics of this range cover all of the higher-frequency bands, excepting only the 11-meter band, this range will usually suffice for 90 per cent of all operating. By shifting C_2, the range of 3750 to 4000 kc. is spread out over about 75 per cent of the dial. The 27-Mc. band is provided for by a third setting of C_2.

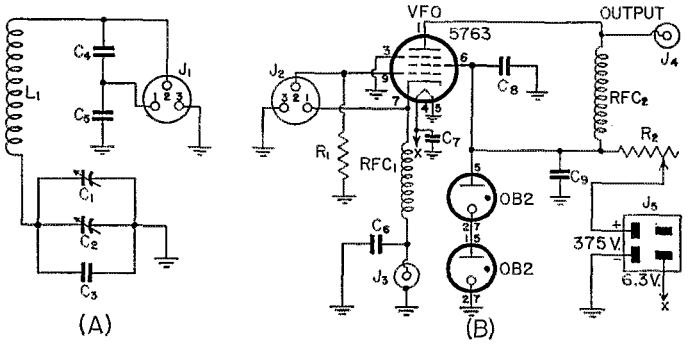


Fig. 1 — Circuit of the remotely-tuned VFO.

C_1 — Approx. 12-$\mu\mu$fd. variable (Hammarlund HF-15, rear stator plate removed, rear rotor plate bent; see text).
C_2 — Approx. 23-$\mu\mu$fd. variable (Hammarlund HF-35, last stator and last two rotor plates removed).
C_3 — 39-$\mu\mu$fd. silvered mica.
C_4, C_5 — 0.001-μfd. silvered mica.
C_6, C_7, C_8, C_9 — 0.001-μfd. disk ceramic.
R_1 — 47,000 ohms, ½ watt.
R_2 — 10,000 ohms, 10 watts, with slider.
L_1 — 35 μh. — 39 turns No. 18, 1⅞ inches long, 1½-inch diam. (B&W JEL-80, 1 turn and link removed).
J_1, J_2 — 3-contact female jack (78-PCG3F).
J_3 — Key jack — 'phono input jack.
J_4 — Insulated 'phone-tip jack.
J_5 — 4-contact male connector (C-J P-304-AB).
RFC_1, RFC_2 — 1-mh. r.f. choke (National R-50).
NOTE: RG-22/U remote cable is terminated at each end with Amphenol 91-MPM3L male connector to fit J_1 and J_2.

Construction

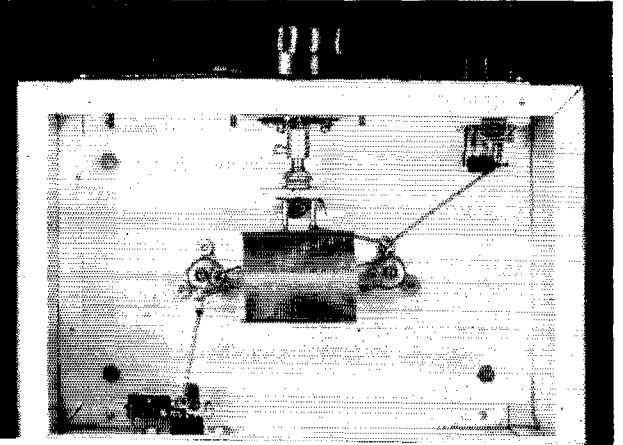
The tuned circuit is housed in a 5 × 6 × 9-inch aluminum box. An enclosure of this size is needed not only to provide mounting for an adequate dial, but also to permit spacing the coil well away from the sides of the box so that its Q will not be drastically reduced by the shielding in its field. Incidentally, tests showed that although larger coils had a higher Q before they were placed in a box of this size, the Q of the B&W "J" coil was only negligibly less when the coil was enclosed. Some increase in Q can be obtained by using a larger coil, such as the "T" series B&W unit, provided that a much larger enclosure is used.

The dial is first mounted centrally on one of the 5 × 9-inch sides of the box. The tuning condenser, C_1, is then coupled to the dial and the mounting step at the rear of the condenser is supported against the bottom of the box with a heavy metal spacer cut to fit. The bandset condenser, C_2, is shaft-hole mounted 1 inch in from the left side and bottom of the box. This necessitates drilling the shaft hole through the edge of the dial frame. C_3 is soldered directly across the terminals of C_2. The knob is a National HRS-5.

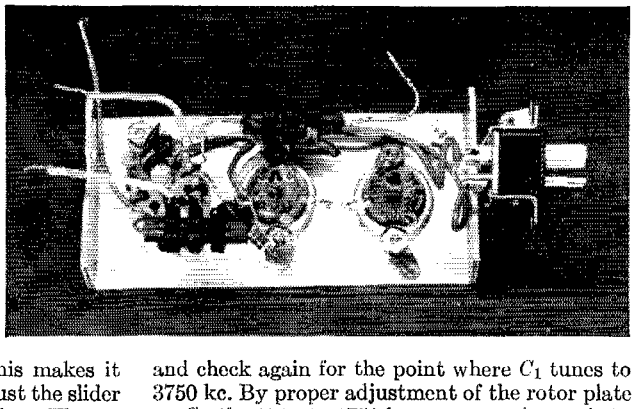
The B&W coil is removed from its mounting by first drilling out the rivets in the plug-in base, leaving the metal angle pieces at each end attached to the coil, and unsoldering the leads from the pins. The link winding is carefully removed by snipping the turns and prying the spacing blocks loose with a knife. One turn is removed from the coil itself. The coil is then mounted on National GS-1 pillar insulators so that it will be centrally located in the box in both directions.

The three-contact jack for the remote-tuning cable is set in the back of the box, and C_4 and C_5 are soldered to its terminals.

The photographs show the essential details of the assembly of the tube unit. The enclosure is a standard 2 × 2 × 4-inch aluminum box. The three tubes are mounted on a shelf spaced 1½ inches from the top of the box. This dimension is critical if the tubes are to be removed without difficulty. The keying and output jacks are mounted in one of the covers, below the shelf level, and the power connector is mounted at one end and the jack for the coax cable at the other. The resistor, R_2, is mounted on top of the shelf, alongside the tubes, on the same side of the box



Interior of the tuned-circuit box. C_4 and C_5 are to the rear. C_3 is soldered across C_2 to the left in front.



Bottom view of the tube-unit shelf. RFC_1 is above, RFC_2 below. C_6 is soldered to J_3 on the cover plate. The two leads going to the left solder to the cable connector. The one to the left above goes to J_4, the lead to the right to J_3.

as the keying and output jacks. This makes it possible to remove the tubes and adjust the slider by removing the blank cover of the box. The resistor is supported between two small angle pieces joined with a piece of threaded rod (or a long 6-32 screw) through the resistor form.

All wiring, with the exception of the connections to the keying and output jacks and the cable connector, can be done before the shelf is placed in the box. This includes connections to the power connector which mounts from the inside. Leads of proper length are made for the jacks and cable connector, and these connections can be made after the shelf has been put in place, and just before the cover is put on. Care should be used in placing the tubes in their sockets, since there is little height to spare. If necessary, the tips of the tubes can be run up through the ventilating holes in the top of the box to allow the pins to clear the sockets.

Adjustment

Any power supply delivering between 250 and 400 volts at 50 ma. or more may be used to operate this VFO. If a 120-ma. transformer, instead of the 70-ma. unit specified for the "Band-Box" in April *QST* is provided, the VFO and the multiplier unit may be operated from the single supply.

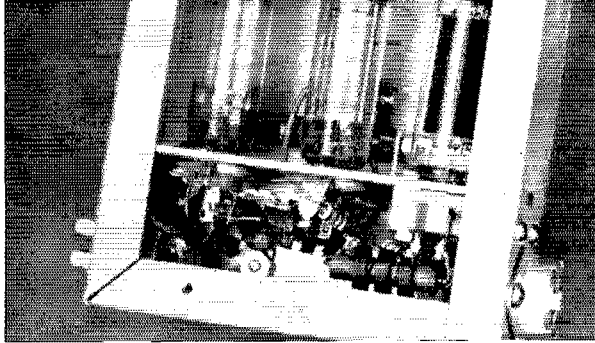
Adjustment of the frequency range for maximum bandspread is quite simple. Set C_1 to a dial reading of 5. Then adjust C_2 until the oscillator signal is heard on the receiver at 3500 kc. Set the receiver to 3750 kc. and adjust C_1 until the signal is heard. If this occurs with the dial set at less than 100, carefully bend the rearmost rotor plate of C_1 away from the adjacent stator plate, making sure that the plates do not touch and short the condenser in any position of the rotor. Turn C_1 again to a dial reading of 5, reset C_2 for 3500 kc., and check again for the point where C_1 tunes to 3750 kc. By proper adjustment of the rotor plate on C_1, the 3500-to-3750 kc. range can be made to cover the entire dial, or as much of it as desired.

After this initial range has been set, tune the receiver to 3875 kc. Set C_1 to midscale and adjust C_2 until the VFO signal is heard. Then the range of 3750 to 4000 kc. should be approximately centered on the dial with a coverage of about 75 divisions. The range can be shifted one way or the other by simply shifting C_2 slightly.

If it is desired to center the 11-meter band on the dial, set C_1 to midscale, set the receiver to 3387 kc. and adjust C_2 until the VFO is heard. All three settings of C_2 should be plainly marked so that they can be returned to when desired.

The cathode current (measured in series with the key) may vary over the tuning range from about 28 ma. with both C_1 and C_2 set at maximum capacitance to 37 ma. with both at minimum.

In using the VFO, the tube unit should be placed close to the stage to be driven and fastened securely to the chassis. A short lead should be used to connect the output terminal to the grid of the stage to be driven. If the driven stage has no grid condenser, a 100-$\mu\mu$fd. mica condenser should be connected between the output terminal and the grid of the driven stage. If more than adequate drive is obtained, the screen of the oscillator tube can be connected to the junction between the two VR tubes, rather than to the end of R_2 (Fig. 1). This unit is not a power device, and adequate gain in the way of a crystal-oscillator tube or other buffer amplifier should be provided.



The completed tube section with the tubes in place. Ventilation holes are drilled in the top of the box and in the plate covering the free side.

Happenings of the Month

ELECTION RESULTS

Autumn balloting in ARRL director elections has resulted in the selection of one new director and the re-election of three others, while in the vice-director field three new faces appear plus one returned to office.

Wesley E. Marriner, W9AND, has been re-elected for another two-year term as Director of the Central Division, in a close decision over his opponent, John G. Doyle, W9GPI, 1144 votes to 1110. **Harry M. Matthews, W9UQT,** becomes the new vice-director effective January 1st, winning handily over the incumbent, Charles F. Reberg, W9MVZ, 1431 votes to 802. OM Matthews, senior radio operator and technician for the Illinois State Police, has served as an assistant director the past two years, as officer of the Central Illinois Radio Club and Sangamon Valley Radio Club, was one of the organizers and is currently manager of the 75-meter Illinois Emergency Net, and is also Chairman of the Illinois Amateur Radio Club Council.

With incumbent Joseph M. Johnston, W2SOX, not a candidate, the Hudson Division has a new director in the person of **George V. Cooke, jr., W2OBU,** who received a thumping majority of 1405 votes to 352 for Stephen J. Neason, W2ILI, and 256 for William A. Tuthill, W2JFP. A test technician for the Sperry Gyroscope Co., OM Cooke has considerable background in League organizational matters — SCM of the N.Y.C.-L.I. section for two terms, former president of the Lake Success Radio Club, service on the committee for the 1949 Hudson Division convention, and the post of vice-director during the past term.

Thomas J. Ryan, W2NKD, received 1196 votes of Hudson Division members to become their new vice-director, while William H. Hannah, W2US, tallied 811. Tom is an enrollment representative of the Blue Cross in Elizabeth, N. J., and is also a former SCM, in this case of Northern New Jersey; he is a radio officer in the N. J. National Guard and is deputy chairman for the amateur division of N. J. civil defense.

Frank L. Baker, jr., W1ALP, has been re-elected as vice-director of the New England Division, with 915 votes to 585 for Clayton C. Gordon, W1HRC. In this column of our November issue we failed to report that **Percy C. Noble, W1BVR,** is again the director choice of New England members, being returned without opposition. "Perce," incidentally, has the longest service of any U. S. director, having represented the N. E. Division continuously since 1936.

Northwestern returned to the Board for a third term **R. Rex Roberts, W7CPY,** who won handily over Harold W. Johnston, W7DXF, 839 to 396.

A. David Middelton, W5CA, has been returned as West Gulf Division director by a healthy majority, 1023 votes to 374 for David H. Calk, W5BHO, and 189 for William M. Mead, W5APW. The division's new vice-director is **Carl C. Drumeller, W5EHC,** whose 830 votes put him well ahead of Bartow H. Huff, W5AHD, with 156, and John D. Martin, jr., W5PA, with 587. A radio engineer-instructor with CAA, OM Drumeller started in 1932 as W9EHC in Colorado, becoming active in the Pikes Peak Amateur Radio Assn., and later serving two terms as the state's SCM; more recently, he has been treasurer of the Oklahoma City Amateur Radio Club and currently holds that post in the Aeronautical Center Amateur Radio Club.

Although not the highest on record, the percentage of eligible voters actually using their ballots was substantial in each of the divisions, except one where only the vice-director post was at stake. The average figure for director balloting: 57.1%. By divisions:

Central	61.7%
Hudson	47.6%
New England	40.5%
Northwestern	60.1%
West Gulf	64.1%

BRAILLE TRANSCRIPTIONS

For some recent years now the Hq. has been engaged in a very considerable amount of correspondence with various agencies for the blind to get transcribed into Braille suitable material to enable sightless persons to follow up an interest in radio, via amateur channels. It is with considerable pleasure, therefore, that we report the American Printing House for the Blind, under contract with the Library of Congress, is in the process of producing ARRL's *How to Become a Radio Amateur* and *Radio Amateur's License Manual* in grade 2 Braille. A supply will be distributed, for free loan, to about 30 regional libraries around the country. Individual copies may be purchased at cost of production, plus postage and insurance. *How to Become* is in two Braille volumes, at a price of $4.20 plus 45¢; the *LM* is in three volumes, priced at $6.30 plus 75¢. Charge or C.O.D. orders are not accepted. All orders should be sent to:

American Printing House for the Blind
1839 Frankfort Avenue
Louisville 6, Kentucky

Libraries which will shortly have copies available for free loan are:

Library for the Blind, New York State Library, Albany.
Victor H. Kreigshaber Memorial Library for the Blind, Atlanta, Ga.
Service for the Blind, Texas State Library, Austin, Texas.
Books for the Blind, Chicago Public Library, Chicago, Ill.
Cincinnati Library Society for the Blind, Cincinnati, Ohio.

Cleveland Public Library, Cleveland, Ohio.
Florida Council for the Blind, Talking Book Library, Daytona Beach, Fla.
Books for the Blind, Denver Public Library, Denver 2, Colorado.
Wayne County Library, Dept. for the Blind, Detroit 8, Michigan.
Minnesota Braille & Sight Saving School, Faribault, Minnesota.
Library of Hawaii, Honolulu, Hawaii.
Service for the Blind, Indiana State Library, Indianapolis 4, Indiana.
Ill. School for the Blind, Free Circulating Library, Jacksonville, Ill.
Braille Institute of America, Los Angeles 29, Calif.
Librarian for the Blind, Nebraska Public Library Commission, Lincoln 9, Nebr.
New Orleans Public Library, New Orleans, La.
Library for the Blind, New York Public Library, New York 1, N. Y.
Oklahoma Library Commission, Oklahoma City 5, Okla.
Books for the Blind, Free Library of Philadelphia, Philadelphia 3, Pa.
Library for the Blind, Carnegie Library of Pittsburgh, Pa.
Work with the Blind, Library Assn. of Portland, Portland 5, Ore.
Books for the Blind Section, California State Library, Sacramento 9, Calif.
State Library for the Blind, Saginaw, Michigan.
Books for the Blind, Salt Lake City Public Library, Salt Lake City 1, Utah.
Library for the Blind, Seattle Public Library, Seattle 3, Washington.
Work with the Blind, Henry L. Wolfner Memorial Library, St. Louis 8, Missouri.
Division for the Blind, Library of Congress, Washington 25, D. C.
Perkins Institution for the Blind, Watertown 72, Mass.

EXAMINATION SCHEDULE

The Federal Communications Commission will give amateur examinations during the first half of 1953 on the following schedule. Remember this list when you need to know when and where examinations will occur. Where exact dates or places are not shown below, information may be obtained, as the date approaches, from the Engineer-in-Charge of the district. *Even stated dates are tentative and should be verified from the Engineer as the date approaches.* No examinations are given on legal holidays. All examinations begin promptly at 9 A.M. except as noted.

Albuquerque, N. M.: April 3.
Amarillo, Texas: March 31.
Anchorage, Alaska, 52 Federal Bldg.: By appointment.
Atlanta, Georgia, 411 Federal Annex: Tuesday and Friday at 8:30 A.M.
Bakersfield, Calif.: Sometime in May.
Baltimore 2, Md., 508 Old Town Bank Bldg.: Monday through Friday. When code test required, between 8:30 A.M. and 9:30 A.M.
Bangor, Maine: April 16.
Beaumont, Texas, 329 P.O. Bldg.: Monday through Friday except Thursday only when code test required.
Billings, Montana: May 9.
Birmingham, Alabama: March 5 and June 4.
Boise, Idaho: Sometime in April.
Boston, Mass., 1600 Customhouse: Monday through Friday 8:30 A.M. to 2 P.M.
Buffalo, N. Y., 328 P. O. Bldg.: Thursday.
Butte, Montana: May 7.
Charleston, W. Va.: Sometime in March and June.
Chicago, Ill., 1300 U. S. Courthouse: Friday.
Cincinnati, Ohio: Sometime in February and May.
Cleveland, Ohio: Sometime in March and June.
Columbus, Ohio: Sometime in January and April.
Corpus Christi, Tex.: March 11 and June 10.
Cumberland, Md.: Sometime in April.
Dallas, Texas, 500 U. S. Terminal Annex Bldg.: Monday through Friday. Tuesday only when code test required.
Davenport, Iowa: Sometime in January and April.
Denver, Colorado, 521 New Customhouse: 1st and 2nd Thursdays, 8 A.M.
Des Moines, Iowa: Sometime in January and April.
Detroit, Michigan, 1029 Federal Bldg.: Wed. and Fri.
El Paso, Texas: April 7.
Ft. Wayne, Ind.: Sometime in February and May.
Fresno, Calif.: March 20 and June 19.
Grand Rapids, Mich.: Sometime in January and April.
Hartford, Conn.: March 10–11.
Hilo, T. H.: April 7.
Honolulu, T. H.: Monday through Friday, 8:15 A.M.
Houston, Texas, 324 U. S. Appraisers Stores Bldg.: Tuesday and Friday.
Indianapolis, Ind.: Sometime in February and May.
Jackson, Miss.: March 11 and June 10.
Jacksonville, Fla.: April 11.
Jamestown, N. D.: April 29, 10 A.M.
Juneau, Alaska, 6 Shattuck Bldg.: By appointment.
Kansas City, Mo., 3200 Federal Office Bldg.: Friday, 8:30 A.M.; also by appointment.
Klamath Falls, Ore.: Sometime in May.
Knoxville, Tenn.: March 19 and June 18.
Lihue, Kauai, T. H.: April 21.
Little Rock, Ark.: January 14 and April 15.
Los Angeles, 539 Federal Bldg.: Wed., 9 A.M. and 1 P.M.
Louisville, Ky.: Sometime in May.
Manchester, N. H.: May 13.
Marquette, Mich.: May 6, 10 A.M.
Memphis, Tenn.: January 16 and April 17.
Miami, Fla., 312 Federal Bldg.: Thursday.
Milwaukee, Wisc.: Sometime in January and April.
Mobile, Ala., 419 U. S. Courthouse and Customhouse: Wednesday and by appointment.
Nashville, Tenn.: February 5 and May 7.
New Orleans, La., 400 Audubon Bldg.: Monday through Friday except Monday through Wednesday only at 8:30 A.M. when code test required.
New York, N. Y., 748 Federal Bldg., 641 Washington St., Monday through Friday.
Norfolk, Va., 402 Federal Bldg.: Monday through Friday except Friday only when code test required.
Oklahoma City, Okla.: January 15–16 and April 16–17.
Omaha, Nebr.: Sometime in January and April.
Philadelphia, 1005 U. S. Customhouse: Monday through Friday, 8:30 A.M. to 2 P.M.
Phoenix, Ariz.: Sometime in January and April.
Pittsburgh, Penna.: Sometime in February and May.
Portland, Maine: April 14.
Portland, Ore., 307 Fitzpatrick Bldg.: Friday, 8:30 A.M. for 20 and 13 w.p.m. tests; 9 A.M. for 5 w.p.m. test.
Rapid City, S. D.: May 29.
Roanoke, Va.: April 4.
St. Louis, Mo.: Sometime in February and May.
St. Paul, Minn., 208 Federal Courts Bldg.: Friday.
Salt Lake City, Utah: March 14 and June 13.
San Antonio, Tex.: February 12 and May 14.
San Diego, 15-C U. S. Customhouse: By appointment.
San Francisco, 323-A Customhouse: Mon., Novice and Technician, 8:45 A.M.; Fri., General and Extra, 8:45 A.M.
San Juan, P. R., 323 Federal Bldg.: Thursday, and Monday through Friday at 8 A.M. if no code test required.
Savannah, Ga., 214 P. O. Bldg.: By appointment.
Schenectady, N. Y.: March 18–19 and June 17–18, 9 A.M. and 1 P.M.
Seattle, Wash., 808 Federal Office Bldg.: Friday.
Sioux Falls, S. D.: March 11 and sometime in June. Novice and Technician at 10 A.M.; others at 1 P.M.
Spokane, Wash.: May 5.
Springfield, Mo.: Sometime in June.
Syracuse, N. Y.: Sometime in January and April.
Tallahassee, Fla.: January 10.
Tampa, Fla., 410 P. O. Bldg.: By appointment.
Tucson, Ariz.: Sometime in April.
Tulsa, Okla.: January 19–20 and April 20–21.
Wailuku, T. H.: April 9.
Washington, D. C., 415 22nd St., N.W.: Monday through Friday, 8:30 A.M. to 5 P.M.
Wichita, Kans.: Sometime in March.
Williamsport, Penna.: Sometime in March and June.
Wilmington, N. C.: June 6.
Winston-Salem, N. C.: February 7 and May 2.

A Novice 35-Watter

Simple Construction with TVI Precautions

BY LEWIS G. McCOY,* W1ICP

• While the threat of TVI isn't anything to be taken lightly, there is no need to approach the prospect of your first 80-meter transmitter with fear and trepidation. And you don't have to worry that it will involve a lot of complicated shielding and other metal work. To the contrary, W1ICP shows how attention to the important details will result in a TVI-suppressed transmitter that is just as easy to build as any high-harmonic-output rig ever was.

IN conversations with many Novices it was found that one of the big problems confronting them was TVI. After considerable study and work it can be very disheartening to receive that coveted ticket, get on the air, and find that one has suddenly become very unpopular with the neighbors. But TVI is not a *necessary* part of being a ham. Here is a transmitter that is easy to build, has a minimum of shielding, and yet gets a clean bill of health on all TV channels. The TVI-proofing consists of using an aluminum chassis, bottom plate, metal tubes, a shield can on the amplifier coil, and by-passing of the 115-volt line and the key leads where they leave the chassis. If the transmitter had been designed to work on higher frequencies than 3.5 or 7 Mc., there might have been a need for shielded wiring, but it was found that ordinary hook-up wire was adequate for the job on the low frequencies.

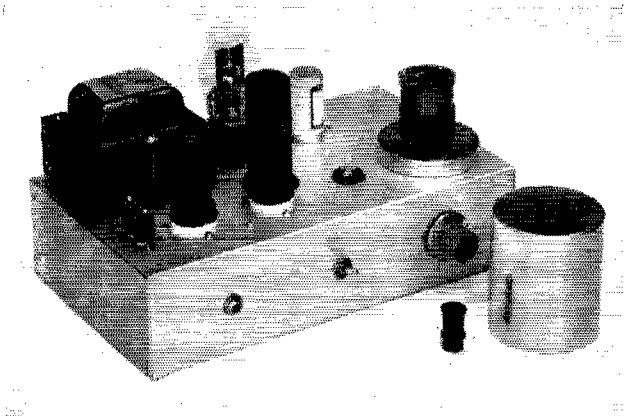
The transmitter consists of a 6AG7 crystal oscillator stage driving a 6L6 amplifier. The oscillator uses 80-meter crystals and has no tuning controls, and 80- or 40-meter output is selected by tuning the plate circuit of the 6L6. The wiring diagram is shown in Fig. 1. A small flashlight bulb in the B+ lead to the 6L6 is used instead of a milliammeter for indicating plate current, thereby reducing the cost of the transmitter by several dollars. If the builder has a 100- or 150-ma. milliammeter, it can be used in the plate circuit in place of the flashlight bulb, but additional shielding may be necessary.

The power transformer is a receiver-replacement type, and any transformer that delivers between 300 and 400 volts at 100 to 150 ma. can be used. The 10-μfd. electrolytic condensers are the chassis-mounting metal-enclosed type. Paper-covered electrolytics can be used, but they must be mounted below the chassis to maintain good shielding.

* Technical Assistant, *QST*.

Construction

A 12 × 7 × 3-inch aluminum chassis with bottom plate is used. As can be seen from the photograph, the r.f. components are mounted in a line across the chassis. Although the placement of the parts is not critical, wiring is easier when the components are arranged in line. A line 2 inches in from the front is drawn across the top of the chassis and placement is as follows: crystal socket, 1 inch from left-hand side of chassis; oscillator socket, 2½ inches; amplifier socket, 5 inches; flashlight lamp, 7½ inches; and amplifier coil, 10¼ inches from the left side. It should be added that experienced builders cover the chassis with paper and mark the centers and parts placement on and through the paper to keep the chassis clean. The power transformer is mounted in the rear left-hand corner, and the rectifier socket is placed 1½ inches from the transformer edge. The dual 10-μfd. electrolytic condenser is



Top view of the transmitter also showing the 1CA shield can and the flashlight-bulb shield. The shield is not for TVI precautions but to give a better view of the bulb for tuning purposes.

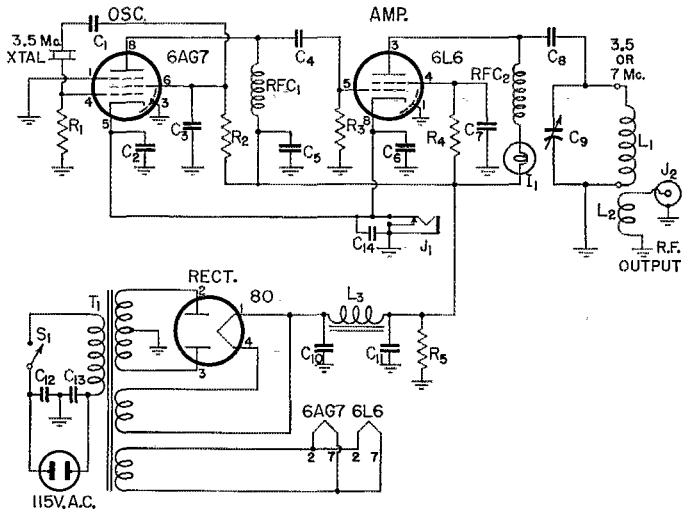


Fig. 1 — Circuit diagram of the Novice 35-watt transmitter.

C_1, C_2, C_5, C_6, C_7, C_8 — 0.005-μfd. 500-volt disk-type ceramic (Sprague).
C_3, C_4 — 100-$\mu\mu$fd. mica.
C_9 — 235-$\mu\mu$fd. variable (Bud Mc-1859).
C_{10}, C_{11} — 10-μfd. 450-volt electrolytic (see text).
C_{12}, C_{13}, C_{14} — 0.001-μfd. 500-volt disk-type ceramic (Sprague) (see text).
R_1 — 56,000 ohms, ½ watt.
R_2 — 22,000 ohms, 1 watt.
R_3 — 18,000 ohms, 1 watt.
R_4 — 18,000 ohms, 1 watt.
R_5 — 50,000 ohms, 10 watts.
L_1 — 3.5–7.0 Mc. — 15 turns No. 18 enamel, 1½-inch diam., close-wound (National XR-4 coil form).
L_2 — 5-turn link No. 18 enamel, close-wound below tank coil L_1.
L_3 — Filter choke, 10.5 henrys, 110 ma., 220 ohms (Merit C-2993).
I_1 — No. 46 pilot-lamp bulb, 6–8 volts, 250 ma., blue bead.
J_1 — Closed-circuit jack.
J_2 — Coax connector, chassis-mounting type.
RFC_1 — 100-μh. r.f. choke (Millen 34300).
RFC_2 — 2.5-mh. r.f. choke (National R100-S).
S_1 — S.p.s.t. toggle switch.
T_1 — Power transformer, 350 volts r.m.s. each side of center, 120 ma.; 6.3 volts, 4.7 amp.; 5 volts, 3 amp. (Merit P-2953).

placed 4 inches from the transformer.

On a center line drawn across the front of the chassis, the key jack is mounted 2½ inches from the left-hand edge, the switch 6 inches, and the amplifier condenser knob 9½ inches. The 115-volt plug and the coaxial output connector are mounted on the back of the chassis.

Underneath the chassis, the power-supply choke, L_3, is mounted between the rectifier socket and the electrolytic condenser. Three tie points were used in the construction: one between the oscillator and the amplifier, one at the electrolytic condenser, and one between the transformer and oscillator tube. Millen ceramic sockets are used for the tubes and the coil, and the screws that hold the sockets to the chassis also hold soldering lugs, for convenience in making chassis ground connections. There are various types of dial-lamp mountings that can be used for the tuning indicator but, whatever type is used, care should be taken to see that it is insulated from the chassis, to avoid short-circuiting the plate supply to the chassis.

Wiring

Push-back hook-up wire was used in construction, and a neat wiring job can be obtained if the wires are laid out parallel to the sides and ends of the chassis. If this is the builder's first construction job, it will be time well spent to read the information on soldering given in *The Radio Amateur's Handbook* and also an article on construction practices in a recent issue of *QST*.[1]

The power supply is wired first. The connections to the electrolytic condensers are hidden by the filter choke in the photograph, but the bleeder resistor, R_5, is visible just at the edge of the choke. The output of the power supply is brought to the tie point visible alongside the resistor. The heaters of the 6AG7 and the 6L6 are wired next.

Pin 8 of the 6L6 and Pin 5 of the 6AG7 are wired together and C_2 and C_6 are installed. A lead is then run from Pin 5 of the 6AG7 to the key jack and C_{14} is installed across the key jack, keeping the leads of C_{14} as short as possible. This completes the cathode keying circuit.

The square condenser appearing over the 6AG7 socket is C_3 and is connected between Pin 6 and ground. In the photograph it hides R_2, the screen dropping resistor that is connected from Pin 6 to the tie point between the tubes. The B+ lead is run to this tie point, and both R_2 and R_4 are tied to it. RFC_1 is also obscured in the photograph, but it goes from Pin 8 of the 6AG7 to the tie point of the B+ lead. The condenser below RFC_2 is C_8 — it is connected from Pin 3 of the 6L6 to a tie point and then to the stator of C_9.

[1] Goodman, "How To Wire a Transmitter," *QST*, Feb., 1952.

The heavy black lead coming from the base of the coil socket is a piece of coax cable that shields the output of the amplifier from stray harmonics that might be present below the chassis. The inner conductor of the coax goes to the output coax connector, and the shield of the coax is grounded as close as possible at the connector. To prevent harmonics from flowing out of the chassis on the 115-volt line, C_{12} and C_{13} are installed at the outlet plug from each side of the line to ground. Keep the condenser leads as short as possible.

Operation

The first step in testing the transmitter is to fix up a dummy antenna for test purposes. A 25-watt electric light bulb will serve. Solder a wire lead to the screw part base of the lamp and another lead to the point on the base. One lead is grounded to the chassis of the transmitter and the other lead is inserted in the coax output connector. A telegraph key is fixed up with leads and a plug, and the plug is inserted in the key jack. Make sure the key is open, and then plug in the 115-volt line. Give the rig a minute to warm up before closing the key.

When the key is closed, the flashlight lamp will light up. When the amplifier condenser, C_9, is turned, the flashlight bulb should dim at certain points and the dummy antenna should light up. The flashlight bulb dims when the amplifier is tuned to the crystal frequency or twice the frequency, indicating minimum plate current and the fact that the amplifier circuit is tuned to the crystal frequency or a harmonic. There should be two points where the flashlight bulb dims — one when the condenser, C_9, is nearly engaged or near maximum capacity, and one point near minimum capacity. The dimming of the bulb near maximum capacity indicates resonance in the 80-meter band and the minimum tuning point indicates resonance in the 40-meter band. It is very important that the condenser setting for each band be carefully marked on the tuning knob to insure correct setting of the condenser.

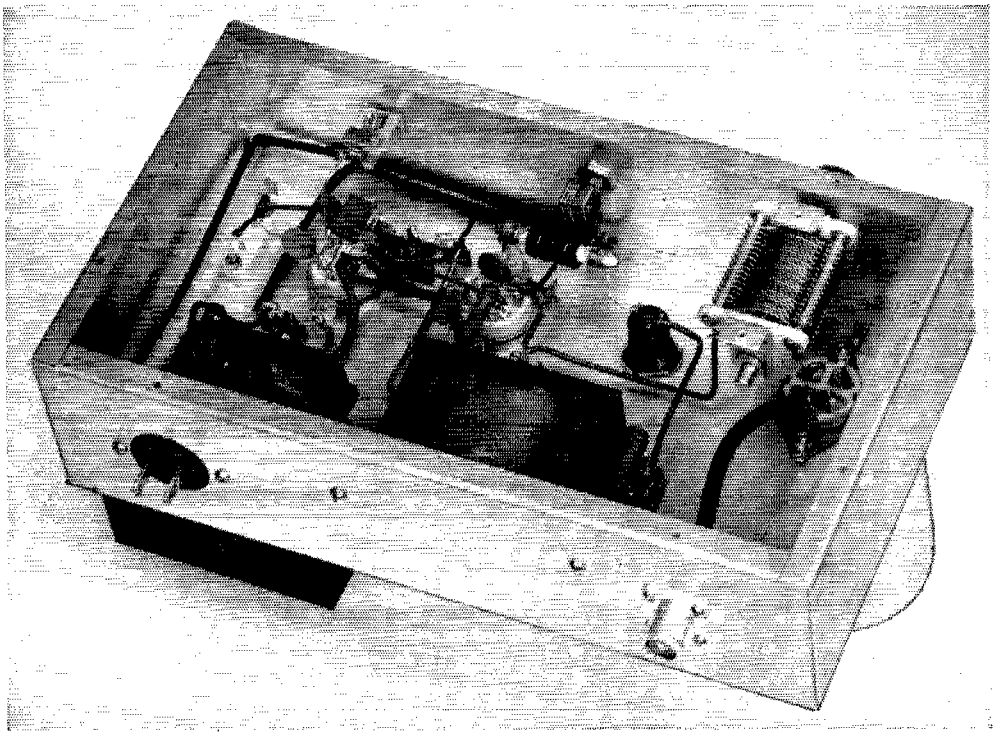
In some localities metal 6L6s are not available and if such is the case, a shield will be needed for a glass tube to prevent radiation of harmonics that could cause TVI. An ordinary tin can will suffice but several ¼-inch holes should be drilled in the top of the can for ventilation, since a 6L6 runs quite warm.

Needless to say, 35 watts of power will produce plenty of contacts. *The Radio Amateur's Handbook* lists several methods of antenna coupling, and there is an article in August, 1952, *QST* [2] on antenna coupling for Novices that describes simple methods of getting the most power into the antenna.

The 35-watter was put on the air at the Headquarters lab and a few CQs produced satisfying results. The transmitter was operated alongside a TV receiver without a trace of interference on all of the 12 TV channels.

[2] Smith, "Antenna Couplers for the Novice."

Bottom view showing the completely wired transmitter. The black lead on the right-hand side of the chassis is a piece of RG-59/U coax cable used to shield the output from any stray harmonics.



19th ARRL International DX Competition

'Phone: Feb. 6th–8th and Feb. 20th–22nd; C.W.: March 6th–8th and March 20th–22nd

It's time again to ready your station for the ARRL International DX Competition, to be held in February and March of this year. This contest, the nineteenth of its kind, gives an opportunity for all Canadian and continental U. S. operators to add new countries to their DX totals, other stations to fill in for their WAS and WAVE awards, and everyone to match DX operating skill with other operators in his country or ARRL section. But, whether you have 9 or 9 hundred watts, whether you work 2 or 2 thousand stations, whether you have a wire out the window or a 7-element antenna, you can have a whale of a lot of fun in this annual event.

Explanation of DX Contest Exchanges

Exchanges	*RST Report of Station Worked*	*Three-Digit Number, Representing Power Input*
Sample (c.w.)	579	150
Sample ('phone)	57	500

As in the past, two week ends are devoted to c.w. operation and two to 'phone operation, giving everyone an opportunity to participate in four week ends of hot activity. In order to take advantage of any 28-Mc. openings, both 'phone periods are scheduled for February. The c.w. periods are in March. In each case periods are separated by "rest up" week ends. To enable stations whose 'phone operations are limited to 10 and 11 meters to compare their scores with similar stations, a special listing is available.

As usual, special certificate awards are offered to the top single-operator 'phone and c.w. scorer in each country and ARRL section. A special category recognizes multiple-operator stations in those sections or countries from which three or more valid multiple-operator entries are received. Multiple-operator scores are grouped with single-operator scores in club competition, and a handsome gavel is offered to the club with the highest aggregate score. Within a club, single-operator entries can compete for the "club-certificate" awards given to the highest c.w. and 'phone scorers.

If you're new to the DX Contest, it won't take you long to catch on. During the contest period, stations outside of the U. S. and Canada will call "CQ W/VE" or "CQ TEST" and will exchange numbers as shown in the sample elsewhere on these pages. If the input is 250 watts, your number is 250. If you run only 75 watts, use the number 075. Full kilowatts have a choice — they can use either 000 or 999. If your input is different on different bands, change the number to approximate the input figure, but don't bother about 0.1 per cent accuracy on any band — the usual approximation is adequate.

You can try a "CQ DX" or "CQ TEST" if you're a W or VE, but past experience shows that this pays off *very seldom*. On c.w., Ws and VEs have quotas but this doesn't apply to 'phone. Keep your log carefully, and send a copy of it, in the form shown, to ARRL. Free contest forms are available from ARRL Headquarters, West Hartford, Conn., upon request. Get your station working at top efficiency, make no social commitments for the important week ends, read the rules to acquaint yourself with the pattern, and then get set for DX galore in February and March.

Rules

1) *Eligibility:* Amateurs operating fixed amateur stations in any and all parts of the world are invited to participate.

2) *Object:* Amateurs in the continental U. S. and Canada will try to work as many amateur stations in other parts of the world as possible under the rules and during the contest periods.

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

4) *Entry Classifications:* Entry may be made in either or both the 'phone or c.w. sections: c.w. scores are independent of 'phone scores. Entries will be further classified as single- or multiple-operator stations. Single-operator stations are those at which one person performs all the operating func-

CONTEST TIMETABLE

'Phone Section:

Time	*Starts*		*Ends*	
GCT	Feb. 6th	2400	Feb. 8th	2400
AST	Feb. 6th	8:00 P.M.	Feb. 8th	8:00 P.M.
EST	Feb. 6th	7:00 P.M.	Feb. 8th	7:00 P.M.
CST	Feb. 6th	6:00 P.M.	Feb. 8th	6:00 P.M.
MST	Feb. 6th	5:00 P.M.	Feb. 8th	5:00 P.M.
PST	Feb. 6th	4:00 P.M.	Feb. 8th	4:00 P.M.
The second period of this contest starts at these same hours Feb. 20th.			The second period of the contest ends at these same hours Feb. 22nd.	

C.W. Section:

GCT	Mar. 6th	2400	Mar. 8th	2400
AST	Mar. 6th	8:00 P.M.	Mar. 8th	8:00 P.M.
EST	Mar. 6th	7:00 P.M.	Mar. 8th	7:00 P.M.
CST	Mar. 6th	6:00 P.M.	Mar. 8th	6:00 P.M.
MST	Mar. 6th	5:00 P.M.	Mar. 8th	5:00 P.M.
PST	Mar. 6th	4:00 P.M.	Mar. 8th	4:00 P.M.
The second period of this contest starts at these same hours Mar. 20th.			The second period of this contest ends at these same hours Mar. 22nd.	

LOG, 19th A.R.R.L. INTERNATIONAL DX COMPETITION

Sheet 1 of 1 Call..... ARRL Section.....or Country.....

Date & Time	Station Worked	Country	Record of New Countries for Each Band						Serial Numbers		Points
			3.5	7	14	21	27	28	Sent	Received	
Feb. 7											
0005 GCT	VP9E	Bermuda			1				56375	57080	3
Feb. 8											
1300	PAØGN	Netherlands						1	58375	47075	3
1306	G6CL	England						2	58375	46150	3
1345	PAØRA	Netherlands						2	56375	59080	3
2030	LU7AZ	Argentina						3	58375	57750	3
2310	VP9X	Bermuda			1				57500	56050	3
Feb. 21											
1020	ZL1MR	New Zealand			2				58500	58075	3
1035	VK2TI	Australia	1						47500	46100	3
1105	VK2RA	Australia	1						46500	45100	3
1421	PAØLQ	Netherlands						3	45375	57100	3
Feb. 22											
0925	TF3EA	Iceland			3				57500	57050	3
1245	G2MI	England						3		46125	2
1255	G3KP	England						3	56375	57100	3
1350	G2MI	England						3	57375		1
1430	G5BA	England						3	46375	55100	3
2320	KZ5AW	Canal Zone			4				58500	58500	3

Sample of report form that must be used by foreign c.w. and all 'phone participants.

tions. Multiple-operator stations are those obtaining assistance, such as from "spotting" or relief operators, or in keeping the station log and records. A special 'phone listing is available for those entrants whose work is exclusively in the 10- and/or 11-meter bands.

5) *Contest Periods:* There are four week ends, each 48 hours long: two for 'phone work and two for c.w. The 'phone section starts at 2400 GCT, Friday, February 6th and Friday, February 20th, ends 2400 GCT, Sunday, February 8th and Sunday, February 22nd. C.W. section starts at 2400 GCT, Friday, March 6th and Friday, March 20th, ends 2400 GCT, Sunday, March 8th and Sunday, March 22nd.

6) *Valid Contacts:* In the 'phone section, all claimed credits must be made voice-to-voice. In the telegraph section, only c.w-c.w. contacts count. Crossband contacts may not be counted.

7) *Exchanges:* Each participating operator will use three figures to represent the approximate transmitter power input. C.w. contestants will exchange six-figure numbers, each consisting of an RST report plus the three "power" numbers. (Examples are given in the sample log.) 'Phone contestants will exchange five-figure numbers, each consisting of a Readability-Strength report plus the three "power" numbers. If the input power varies considerably on different bands, the "power" number should be changed accordingly.

♦

Sample of report form that must be used by W/VE c.w. participants. When a station is worked for less than the maximum number of points allowed (as for example the contact with G2MI shown at right), the additional contact to make up the points not earned in the first contact should be entered at the bottom of the sheet. Canadian entrants should allow two blocks for each country, but may record no more than six contacts therein. A separate set of sheets should be used for each band.

♦

8) *Scoring:*

a) *Points:* 1 point is earned by a W (K) or VE/VO station upon receiving acknowledgment of a number sent, and 2 points upon acknowledging a number received. Two points are earned by any other station upon receiving acknowledgment of a number sent, and 1 point upon acknowledging a number received.

b) *Final Score:* W (K) and VE/VO stations multiply

LOG, 19th INTERNATIONAL DX COMPETITION

Call..... ARRL SECTION.....

Band 28 Mc. Sheet 1 of 3

	Station Worked	Date	Time (GCT)	Numbe Sent	Number Received
Netherlands	PAØGN	3/6	1300	589450	479075
	PAØRA	3/6	1345	569450	579080
	PAØLQ	3/21	1421	459450	578100
England	G6CL	3/6	1306	589450	469150
	G2MI	3/21	1245		469125
	G3KP	3 21	1255	569450	579100
	G5BA	3 21	1430	469450	559100
Argentina	LU7AZ	3 6	2030	589450	579750
	G2MI	3/21	1350	579450	

total points earned under Rule 8(a) by the number of countries worked on one band plus the number of countries worked on each other band. All other stations multiply total points earned under Rule 8(a) by the sum of the number of W (K) and VE/VO licensing areas worked on one band plus the number of W (K) and VE/VO licensing areas worked on each other band.

Countries will be those on the ARRL Countries List. There are 19 licensing areas: 10 in the United States, 9 in Canada (VO, VE1–VE8).

9) *Repeat Contacts:* The same station may be worked again for additional points if the contact is made on a different frequency band. The same station may be worked again on the same band if the complete exchange for a total of three points was not made during the original contact on that band.

10) *Quotas:* The maximum number of points per country per band which may be earned by W (K) stations *in the c.w. section* is 12, and contacts made on the same band with the same country after the quota is filled will not count. Thus complete exchanges with 4 stations in one country on one band fill the band quota for that country. The maximum number of points per country per band which may be earned by VE/VO stations *in the c.w. section* is 18, and contacts made on the same band with the same country after the quota is filled will not count. Exchanges with 6 stations in one country on one band are thus permitted Canadian participants. There is *no quota* for stations in the c.w. section *outside* of the U. S. and Canada. There is *no quota* for *any* station in the 'phone section.

11) *Reporting:* Contest work must be reported as shown in the sample form. Each entry must include the signed statement as shown in that example. Contest reports must be mailed no later than April 24, 1953, to be eligible for *QST* listing and awards. All DX Contest reports become the property of the American Radio Relay League. No contest reports can be returned.

12) *Awards:* To document the performance of participants in the Nineteenth ARRL International DX Competition, a full report will be carried in *QST*. In addition, special recognition will be made as follows:

a) A certificate will be awarded to the high scoring single-operator 'phone and to the high-scoring single-operator c.w. entrant in each country (as shown in the ARRL Countries List) and in each of the 73 U. S. and Canadian ARRL sections (see page 6 of this issue) from which valid entries are received. In addition, a certificate will be awarded to the high scoring multiple-operator station in each section or country from which three or more valid multiple-operator entries are received.

b) A suitable certificate will be awarded to the operator making the highest single-operator 'phone score in each ARRL-affiliated club, provided the club secretary submits a listing of a minimum of three 'phone entries by bona fide resident members of such club, and provided further that these scores are confirmed by receipt at ARRL headquarters of the individual contest logs from such members. The highest single-operator c.w. scorer in each club will be awarded a certificate under the same conditions.

c) ARRL will award a gavel to the affiliated club submitting the greatest aggregate 'phone and c.w. score by bona fide resident club members, whether single- or multiple-operator entries, provided such scores are confirmed by receipt at ARRL headquarters of the individual contest logs from such members.

13) *Judges:* All entries will be passed upon by the ARRL Award Committee, whose decisions will be final. The Committee will void or adjust entries as its interpretation of these rules may require.

14) *Disqualifications:* Off-frequency operation (as confirmed by a single FCC citation or advisory notice or two ARRL accredited official observer measurements) will disqualify. Low tone reports in logs will also be considered by the ARRL Award Committee as grounds for disqualification.

SUMMARY, 19th A.R.R.L. INTERNATIONAL DX COMPETITION

Entry Call..... *ARRL Section*.....*or Country*.....
(*C.W. or 'Phone*)

Name.....*Address*.....

Transmitter Tubes.....

Receiver.....*Antenna(s)*.....

(Logs from W, VE or VO show number of foreign countries worked. Logs from other countries show number of U.S.A. and Canadian call areas worked.)

Bands	*3.5 Mc.*	*7 Mc.*	*14 Mc.*	*27 Mc.*	*28 Mc.*	*Total*
No. Countries QSOed	1		4		3	*8
Number of Contacts						15

Number of Different Countries Worked..... *Number of Hours of Station Operation*.....

.....
Assisting Person(s): Name(s) or Call(s)

45		*8*		*360*
(*Points*)	×	(*Multiplier*)	=	FINAL SCORE

Participation for Club Award in the.....
(*Name of Club*)

I certify, on my honor, that I have observed all competition rules as well as all regulations established for amateur radio in my country, and that my report is correct and true to the best of my belief. I agree to be bound by the decisions of the ARRL Award Committee.

.....
Operator's Signature

* Figure in this box is multiplier.

Sample of summary sheet that must accompany all reports.

All photos courtesy Briggs Mfg. Co., Detroit

"Here's How!"—Detroit

Some De Luxe Teamwork for Civil Defense

AMATEURS throughout the country are rallying to implement the machinery of Civil Defense through the Radio Amateur Civil Emergency Service (RACES). The teamwork and enthusiastic participation necessary in this, one of amateur radio's most ambitious undertakings, is perhaps demonstrated no more clearly than in this pictorial account of a well-coördinated project in Detroit.

For the past two years members and associates of the Inter-County Amateur Radio Club in the Detroit area have been working closely with the Office of Civil Defense and the American Red Cross in maintaining a six-county network of emergency communications.[1] It became apparent as a result of a series of recent drills that an important asset to existing facilities would be the availability of numerous hand-carried portable transmitter-receivers.

The conclusion was reached that ordinary mobile installations might well become inoperable during certain types of disaster, are frequently limited in their approach to scenes of centralized trouble and are rarely adaptable to such uses as transmitting from boats during floods, etc. Thus, despite obvious range limitations, it was decided that compact stations carried by hand have a definite rôle to play in a well-rounded emergency communications program.

Approximately one hundred such small units were desired but the commercial market cost was found to be prohibitive. So Inter-County's amateurs approached representatives of Detroit industry and radio dealers to organize the venture pictured here, an activity quite unique in the history of amateur radio.

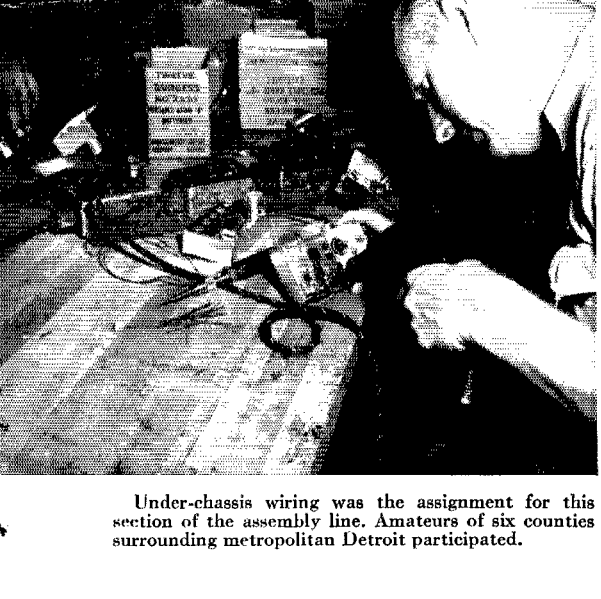
With an assist from radio suppliers M. N. Duffy & Co., hams financed the purchase, at cost, of the various materials needed to build their own transmitter-receivers. Using evening workshop space and equipment loaned by the Briggs Manufacturing Co., some forty amateurs took advantage of the arrangements.

Other AREC/RACES groups may well benefit from the successful enterprise recounted and pictured here.

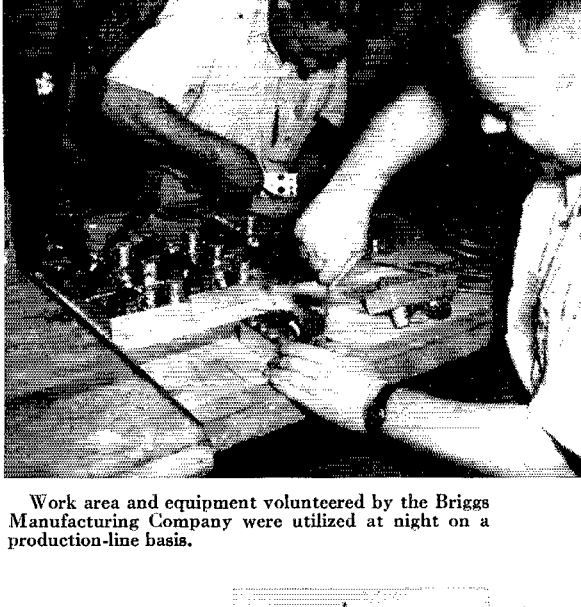
[1] Gary, "Amateur Radio in Detroit Civil Defense," *QST*, September, 1951, p. 52.

Novices and Old-timers alike pooled their efforts to turn out the work. A total of approximately 20 man-hours per unit was required to complete the job.

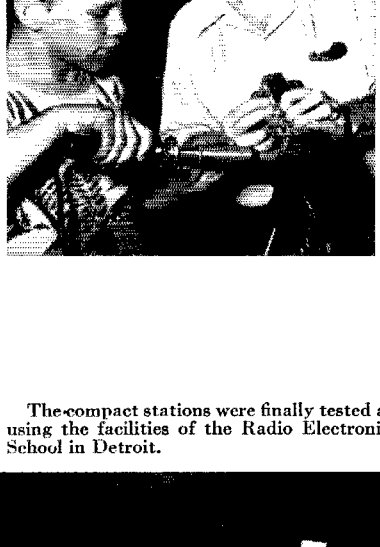
The club's technical committee, assisted by W8HFU, furnished the design and schematics of the transmitter-receivers. This group prepared transformers.



Under-chassis wiring was the assignment for this section of the assembly line. Amateurs of six counties surrounding metropolitan Detroit participated.

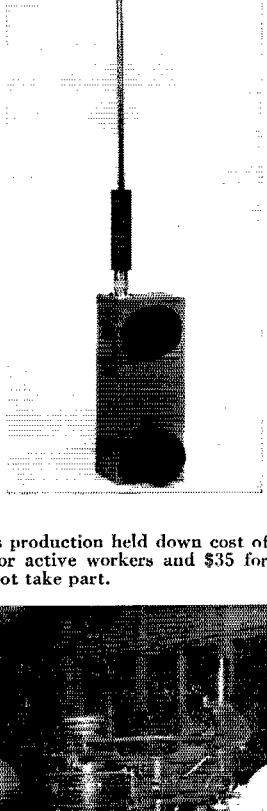


Work area and equipment volunteered by the Briggs Manufacturing Company were utilized at night on a production-line basis.



Left: A father (W8CLH) and son combination collaborated to expedite one of the numerous soldering operations required.

Right: One of the super-portable units as constructed. They are normally crystal-controlled on 29,610 kc., the Detroit area's general emergency frequency. An early *QST* will contain detailed circuit and constructional data.



The compact stations were finally tested and adjusted using the facilities of the Radio Electronic Television School in Detroit.

The efficiency of mass production held down cost of the units to $25 each for active workers and $35 for club members who did not take part.

Some ABCs of V.H.F. Receiver Design

Hints for Improving Weak-Signal Performance at 50 Mc. and Higher

BY EDWARD P. TILTON,* W1HDQ

THE receiver engineers can pass this one up. It is written for the fellow who, knowing little of the factors that make for good reception, tends to judge a receiver by its price tag or its appearance. He is more likely to choose a receiver that harmonizes with his wife's interior decorating scheme, or one that sounds best in the broadcast band, rather than the receiver that will deliver optimum performance in the ham bands. And as for building something in the receiving line for himself — well, he shudders at the thought — if, in fact, he has ever gotten around to thinking about it.

Now there are many good reasons why we tend, more and more, to let the receiver manufacturers do the dirty work in designing and construction for us. Unless we have extensive shop facilities, good test equipment, and considerable experience in receiver work it is difficult to build a complete receiver for 3.5, 7 or 14 Mc. that will equal one made by an outfit having these assets. But even if we intend to work only on the lower bands, we should not fall into the habit of letting the engineers do all our *thinking* for us, too! And if we are going to concentrate on the frequencies from 28 Mc. up, we have little choice but to build our own gear, if we expect to do a first-class receiving job.

What Makes a "Sensitive" Receiver?

We all want to be able to pull in the weak ones. To be able to hear signals that other fellows miss is a universal amateur aim, regardless of the frequency we work on. Before we invest a month's pay in a new communications receiver, or start in building a v.h.f. converter, therefore, we should know something of the factors that make for superior weak-signal reception.

Up to around 20 Mc. or so there is no very marked difference in the weak-signal capabilities of the better receivers. Below this region nearly all tubes work well, and the limiting factor in receiving weak signals is noise generated *outside* the receiver. Additional r.f. amplifier stages, no matter how well designed, will serve mainly to increase such noise in direct proportion to the signals we want to hear. Thus, adding r.f. gain is similar to tacking on another stage of audio — it will make the signals louder, but no more readable. In some of the simpler receivers having no r.f. amplifier stage, or an ineffective one, an external r.f. preamplifier may be needed to bring up the level of the weakest signals, but in a majority of cases the only way to hear more DX on 3.5, 7 or 14 Mc. will be to put up a better antenna, or move to a quieter location.

As we approach the v.h.f. region the picture changes, and our noise level comes from a different source. Tube performance falls off as we go higher in frequency, and amplifier stages have to be run "wide open" to produce enough gain to make weak signals audible. There is still some external noise, to be sure, but much of the "shush" that is characteristic of a hot v.h.f. receiver is tube noise, generated within the receiver. At 3.5 Mc., a good receiver with its a.v.c. off and its gain controls set for optimum weak-signal reception makes little or no noise when its antenna is disconnected, or the terminals shorted. A good v.h.f. receiver makes plenty! What, then, are these "low-noise front ends" we talk about in *QST* and the *Handbook?*

The point to remember here is that the noise generated within the receiver, not that coming in on the antenna, is the limiting factor in v.h.f. receiver sensitivity. This condition begins to show at 28 Mc. It is much more marked at 50 Mc., and it is all-important at 144 Mc. and higher. Thus, the more gain an r.f. amplifier stage provides for a given amount of noise generated, the better will be its weak-signal performance.

To make the best use of this information, we have to know what makes "tube noise" and what tubes develop the least for a given amount of gain. Most of this noise results from electronic action within the tubes, so other things being equal, the more elements within the tube, the more noise it will make as a v.h.f. amplifier. Thus, a pentode (with a plate, screen, suppressor and control grid, all contributing to the total cathode current) will make more noise than a triode, when the upper limit of its useful frequency range is approached. And these elements add to the input and output capacitance of the tube, resulting in more capacitive loading of the tuned circuits to which it is connected.

The principal advantage of the pentode is that, by isolating the grid and plate circuits it makes possible high gain (over its normal frequency range) without external neutralizing circuits. When the limit of its operating range is approached it gives way to the triode, with some circuit tricks added to achieve stability. Well designed pentode stages work just about as well as triodes at 21 and 8 Mc., but at 50 Mc. and higher the triodes take over almost exclusively. And even at 21 and 28 Mc., the pentodes don't do so well unless the circuits are designed specifically for these frequencies.

Here, then, is the main reason why the best "all-band" receivers fall down on 28 and 50 Mc., compared to even the simplest converters of the home-built variety. The first stages of any re-

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

ceiver that covers the broadcast band and the lower ham bands are designed to give optimum performance there — in the range where they will be used most. Stability over a wide tuning range, good response to automatic volume control action (needed to work that popular accessory, the S-meter), and freedom from cross-modulation troubles dictate the use of tubes that do not perform well at 28 Mc. and higher. It's a hard fact of receiver design, and no reflection on the ability of the engineers who develop our commercial receivers, that you can spend close to a thousand dollars for a receiver and still not get as good performance on 28 or 50 Mc. as is available with a converter you can build yourself for twenty dollars or less.

Maybe there will be a really good commercial receiver for the v.h.f. bands someday, but it has not appeared on the horizon thus far, except in limited-production converter form.

The Role of Selectivity

Too many v.h.f. men think of selectivity only as an aid to separating stations on crowded lower frequencies, not realizing that it is also directly related to the effective signal-to-noise ratio that can be achieved when the receiver is used with a converter for the v.h.f. bands. All other things being equal, the greater a receiver's bandwidth the more noise it will make for a given amount of over-all gain.

Let's look at Fig. 1 for a moment. Here are

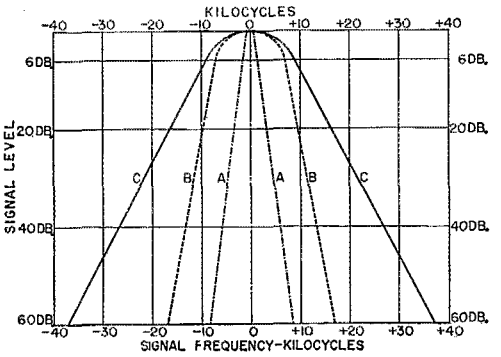


Fig. 1 — Some typical receiver selectivity curves. The narrow curve, *A*, is about the best that can be obtained with a 455-kc. i.f. without crystal filter. It will be superior to the high-fidelity curve, *B*, in weak-signal v.h.f. reception. Curve *C* is representative of the response of receivers having higher intermediate frequencies.

"selectivity curves" showing relative receiver response as we tune through a signal. When we understand that the signal-to-noise ratio of a v.h.f. receiver is inversely proportional to the area of its selectivity curve, we see at once why we want to use no more bandwidth than is necessary to pass an intelligible signal.

Curves *A* and *B* were taken from the instruction manual of the new Hallicrafters SX-73. They show the passband of this superb receiver in two of its six selectivity positions. Curve *A* is for the sharp i.f. position, without crystal filter. Curve *B* shows the broadest response, used mainly for high-fidelity broadcast reception. From *B* we see that to drop the signal level 6 db., we have to tune out 7 kc. either side of the center frequency. To drop it 60 db. we must detune 17 kc. On curve *A*, we see that the 6-db. points are only about 3 kc. removed from the center frequency, and the 60-db. points are only about 8 kc. from the center.

Now we know that to receive voice modulation with good readability, we need only about 5 or 6 kilocycles bandwidth, and we can get along with even less, if we have to. Thus, there will be little, if any, difference in the sound of a 2-meter signal with the selectivity control in either of these two positions, but the receiver noise that will be present on a weak signal will be vastly greater with the wide bandwidth.

Consider curve *C*. This was not taken from any particular receiver, but it is about the best that could be expected with a receiver having a high intermediate frequency and no crystal filter. It might be one of those Command sets, with the 2830-kc. i.f. systems, for example. One look at its selectivity curve shows that this is not going to make a hot v.h.f. receiver, no matter how good a converter we put ahead of it. The bandwidth would be fine for 2-meter mobile work, but don't rely on it for home-station use if you want to hear the weak ones.

The bandwidth of the SCR-522 is even broader. That was a fine receiver for non-critical fixed-frequency work, the purpose for which it was intended. It is *not* a top-flight weak-signal receiver, and no amount of work on the front end will make it so. The way to hop up reception with a 522 or any other broad-tuning receiver, assuming that you've already done a job on the front end, is to take the output of the high-frequency i.f. and feed it into a communications receiver, where the passband can be reduced to the minimum needed for voice intelligibility.

This noise-bandwidth relationship also shows why it is a waste of time to convert radar-type receivers to amateur use. Progress in our 420-Mc. band has been delayed several years because of the availability of the APS-13, the BC-645, the BC-788, the ASB-series receivers and other broadband devices on the surplus market. They're fine for local work, receiving the broad emissions of modulated oscillators, but useless for weak-signal DX reception. Just imagine their bandwidth of *four megacycles* or more presented in the manner of Fig. 1, and you see why one of these receivers is a millstone around the neck of the ham who has just jumped into the u.h.f. pool!

One last thought on this selectivity business. So far, we've been talking about the minimum bandwidth needed for voice. We can't clip much sharper than 3 kc. and still copy voice modulation. But we can go down to a bandwidth of a few hundred cycles and get along nicely on c.w. There is an obvious point here for the fellow who wants to work real v.h.f. DX — there's no way to do it like using high selectivity and c.w.

(Continued on page 112)

The three-band 45-watt coffee-can rig is housed in a standard 7 × 14 × 8-inch cabinet.

Another Coffee-Can Rig

Adding a Doubler Stage

BY EDWARD HAYWARD,* W1PH

A YEAR or so ago, the author described an inexpensive VFO rig using a one-pound coffee can as the shielding enclosure for the oscillator.[1] This was designed primarily for the 3.5- and 7-Mc. bands, but 14-Mc. operation was possible by changing the oscillator coil. Aside from the inconvenience of opening up the can to change VFO coils, there is always the danger that inconsistencies in plug-in-coil contacts may result in intermittent instability in the VFO. For these reasons, I decided to revamp the original circuit to provide a doubler stage so that the VFO could always be operated at 3.5 Mc.

The revised circuit is shown in Fig. 1. A 6V6 series-tuned Colpitts (Clapp) VFO drives an untuned buffer stage using another 6V6. The following stage, using a third 6V6, may be used either as a doubler to 7 Mc. or as a second buffer on 80. In the latter case, a 2.5-mh. r.f. choke, mounted in a plug-in coil form, is substituted at L_2. The 6L6 is operated as a straight amplifier at 7 Mc. No trouble has been experienced operating in this manner without neutralization.[2]

Two keying jacks are provided. With the key plugged in at J_1, and S_1 closed, all stages are keyed simultaneously for break-in. With the key at J_2 and S_1 open, only the final is keyed. The latter may be found preferable at 14 Mc. Inexpensive meters are provided for measuring doubler and final-amplifier plate currents. Fig. 2 shows the diagram of a suitable power supply. An input of 45 watts can be run to the final stage on all bands.

The cost of parts for this little rig should not exceed $35.00 if all new parts are purchased. However, a good share of the components will be found in the usual junk box. Although metal construction may be used, I made the chassis or base from Presdwood. It is much easier to work and I have had no trouble with TVI either on my own receiver or those of my neighbors.[3] The parts are mounted on a piece 12⅞ inches long and 6¼ inches wide. The Presdwood is fastened to a ¾-inch piece of wood of the same dimensions, using ½-inch spacers between to provide clearance for the wiring underneath. I gave the baseboard and coffee can two coats of Steelcoat rubberized enamel in deep maroon and it really dolls it up.

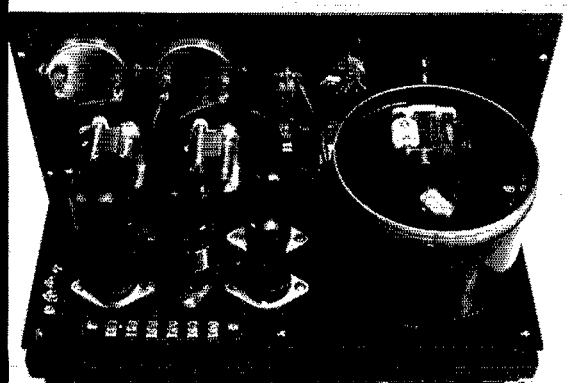
The oscillator components are mounted in the coffee can. The tuning condenser, C_2, is shaft-hole mounted on one side of the can, placing it far enough down in the can so that it does not interfere with the cover. The band-set trimmer, C_3, and the padder, C_1, are soldered

* 15 Woodbine Terrace, Auburndale, Mass.

[1] Hayward, "The Coffee-Can VFO Sr.," *QST*, Sept., 1951, p. 26.

[2] It is possible that stray coupling between the two coils is appropriate for neutralizing. If trouble with self-oscillation is experienced, link neutralizing may be used, or the 6L6 may be operated as a doubler with an r.f. choke at L_2. — ED.

[3] In Boston, only Channels 4 and 7 are in use. In localities where other channels, especially Channels 2 and 6, are in use, it may be necessary to follow some of the precautions of power-lead filtering and shielding outlined in the TVI chapter of *The Radio Amateur's Handbook*, at least for 14-Mc. work. — ED.



Interior view of the coffee-can VFO transmitter.

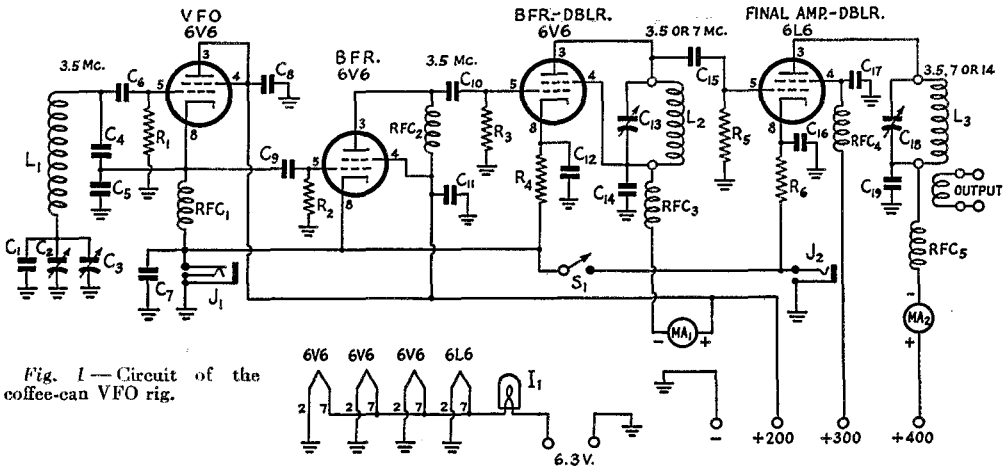


Fig. 1 — Circuit of the coffee-can VFO rig.

C_1 — 200-$\mu\mu$fd. silvered mica.
C_2 — 100-$\mu\mu$fd. variable (Bud MC-1875).
C_3 — 45-$\mu\mu$fd. neg.-temp. trimmer (Erie N-500).
C_4, C_5 — 0.001-μfd. silvered mica.
C_6 — 100-$\mu\mu$fd. silvered mica.
C_7 — 0.0039-μfd. mica.
C_8, C_{11}, C_{12}, C_{14}, C_{16}, C_{17}, C_{19} — 0.01-μfd. mica or ceramic.
C_9, C_{10}, C_{15} — 100-$\mu\mu$fd. mica.
C_{13}, C_{18} — 140-$\mu\mu$fd. variable (Bud MC-1876).
R_1 — 0.1 megohm, ½ watt.
R_2, R_3 — 47,000 ohms, ½ watt.
R_4 — 150 ohms, ½ watt.
R_5 — 24,000 ohms, ½ watt.
R_6 — 150 ohms, 1 watt.
L_1 — 19 turns No. 16 enam., 1½ inches diam., close-wound.
L_2 — 7- and 14-Mc. output — 16 turns No. 18 enam., 1⅛-inch diam., close-wound.
L_3 — 3.5 Mc. — 30 turns No. 18 enam., 1½-inch diam., close-wound; 5-turn link.
— 7 Mc. — Same as L_2; 3-turn link.
— 14 Mc. — 9 turns No. 18 enam., 1⅛-inch diam., ⅛ inch between turns; 2-turn link.
NOTE: Links are of hook-up wire wound over bottom turns of plate coils.
I_1 — 6.3-volt dial lamp.
J_1 — Closed-circuit jack. (see text).
J_2 — Open-circuit jack.
MA_1 — D.c. milliammeter, 50-ma. scale (Shurite 950).
MA_2 — D.c. milliammeter, 200-ma. scale (Shurite 950).
RFC_1, RFC_2, RFC_3, RFC_4, RFC_5 — 2.5-mh. r.f. choke (National R-50).
S_1 — S.p.s.t. toggle.

across the terminals of C_2. The tube socket is mounted opposite the condenser on 9/16-inch spacers. The socket should be wired up before mounting in the can. The coil, L_1, is wound at one end of a coil form 2 inches long and the opposite end of the form is cemented to the bottom of the can, midway between the condenser and tube. The small components — r.f. choke, by-pass condensers and resistors — are distributed about in the remaining space, using insulated tie points where necessary. Connecting leads are brought out through holes drilled in the bottom of the can and through the baseboard. The dial is a National type AM.

In the rear-view photograph, the two 6V6s

(Continued on page 114)

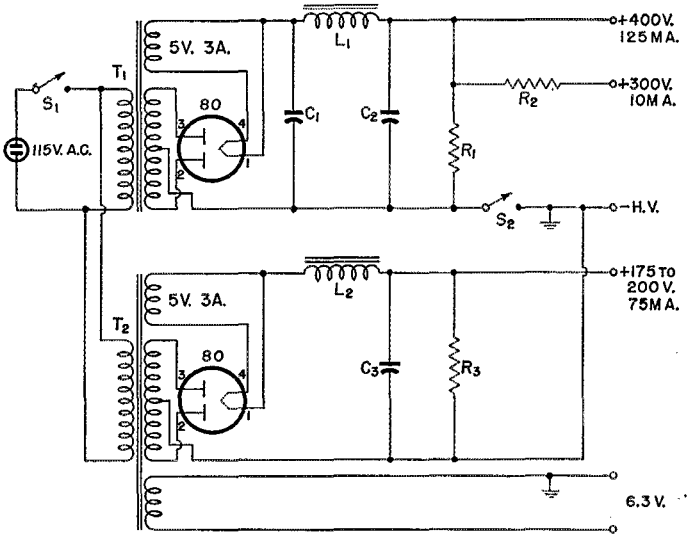


Fig. 2 — Circuit of a power supply for the coffee-can VFO rig.

C_1 — 8-μfd. 600-volt electrolytic.
C_2 — 8-μfd. 450-volt electrolytic.
C_3 — 16-μfd. 450-volt electrolytic.
R_1 — 50,000 ohms, 25 watts.
R_2 — 12,000 ohms, 10 watts.
R_3 — 50,000 ohms, 10 watts.
L_1 — 10-hy. 125-ma. filter choke.
L_2 — 10-hy. 75-ma. filter choke.
S_1, S_2 — S.p.s.t. toggle.
T_1 — Power transformer: 375–0–375 volts, 125 ma.; 5 volts, 3 amp.
T_2 — Power transformer: 250–0–250 volts, 75 ma.; 5 volts, 3 amp.; 6.3 volts, 3 amp.

An Inexpensive Radioteletype Converter

Simple Unit for Transmitting and Receiving

BY MARVIN BERNSTEIN,* W2PAT

THE teletypewriter is a machine that can convert an appropriate series of pulses of direct current into a typed message at various speeds, usually up to a maximum of 60 w.p.m. This is accomplished by making use of a five-unit-code pulse system in which various combinations of marking and spacing impulses operate electromagnets which set up code bars in the printer and mechanically convert the pulses into the correct information or functions. In addition to the five code pulses, a starting pulse and a stopping pulse are required. The time interval between the beginning of the starting pulse and ending of the stopping pulse is approximately 163 milliseconds.

The operation of these teleprinters on short telegraph lines using direct-current impulses requires the use of little external equipment other than a source of electrical power to operate the selector magnets and motors. In order to operate the printer with signals derived from a radio receiver tuned to a radio station sending printer signals, however, a separate piece of equipment is required. This unit is called a converter and is used to change or convert the radio signals into the proper sequences of impulses of marking and spacing currents required by the printer. In one system commonly used, the radio signals are received and changed to marking or

• As those who operate radioteletype know, a device is required to change the audio tones at the output of the receiver to d.c. pulses that operate the printer and, conversely, to convert the d.c. pulses from the transmitting keyboard to audio tones for modulating the transmitting carrier. This article describes a simplified unit for this purpose.

* % Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

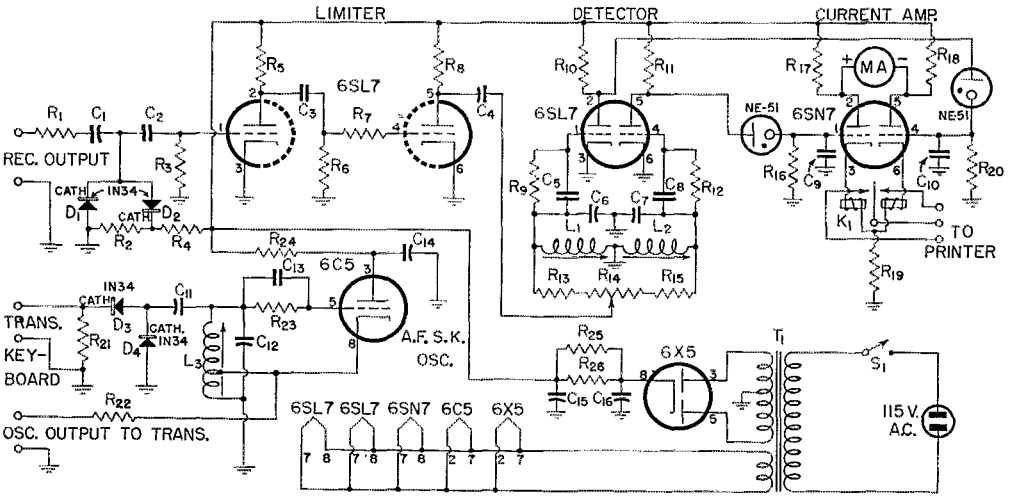


Fig. 1 — Circuit of the radioteletype converter.

C_1 — 0.01-μfd. paper.
C_2, C_3 — 0.003-μfd. mica.
C_4 — 0.05-μfd. paper.
C_5, C_8, C_{13} — 0.0047-μfd. mica.
C_6 — 0.15-μfd. paper.
C_7, C_{14} — 0.1-μfd. paper.
C_9, C_{10} — 0.001-μfd. mica.
C_{11} — 0.029-μfd. (approx.).
C_{12} — 0.03-μfd. paper.
C_{15}, C_{16} — 10-μfd. 450-volt electrolytic.
R_1, R_{21} — 33,000 ohms, ½ watt.
R_2 — 150 ohms, ½ watt.
R_3, R_7 — 0.47 megohm, ½ watt.
R_4 — 0.1 megohm, 1 watt.
R_5 — 0.22 megohm, ½ watt.
R_6, R_9, R_{12}, R_{13}, R_{15}, R_{22}, R_{23} — 47,000 ohms, ½ watt.
R_8 — 0.1 megohm, ½ watt.
R_{10}, R_{11} — 2.2 megohms, ½ watt.
R_{14} — 50,000-ohm potentiometer.
R_{16}, R_{20} — 1 megohm, ½ watt.
R_{17}, R_{18} — 270 ohms, ½ watt.
R_{19} — 1000 ohms, 1 watt.
R_{24} — 51,000 ohms, 1 watt.
R_{25}, R_{26} — 6800 ohms, 2 watts.
L_1 — 36 mh. (GE RLD-019 TV width control).
L_2 — 29 mh. (GE RLD-014 TV width control).
L_3 — 95 mh. (GE RLC-091 TV hor. osc. coil).
S_1 — S.p.s.t. toggle.
T_1 — Power transformer: 250-0-250 volts r.m.s., 30 ma.; 6.3 volts, 3 amp.

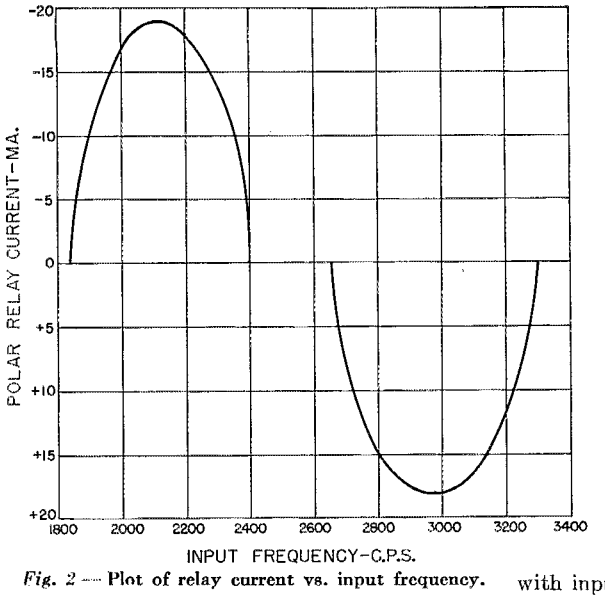


Fig. 2 — **Plot of relay current vs. input frequency.**

spacing audio frequencies of 2125 and 2975 c.p.s., respectively. In the case of v.h.f. operation, these frequencies are the result of amplitude modulation of the transmitter carrier by means of an audio-frequency-shift keyed oscillator. The lower frequencies in the range below 30 Mc. permit the use of carrier-frequency-shift circuits in the transmitter; in this case the receiver output is obtained by making use of the b.f.o. and beating against the carrier so that alternate audio outputs of 2125 and 2975 cycles are obtained.

The converter must have certain characteristics in addition to its function of changing the audio tones into marking and spacing current impulses. It must function properly even though the signals vary in amplitude or have poor signal-to-noise ratio. It must also produce direct-current signals which are free from bias or other forms of distortion. For optimum operation the d.c. impulses should exactly duplicate the original impulses generated at the transmitter end of the RTTY circuit.

The Circuit

The circuit shown in Fig. 1 is a form of converter in which a few refinements have been eliminated to demonstrate the simplicity of equipment needed for radio use. This unit is, however, adequate for printing information transmitted by commercial frequency-shift stations operating in the h.f. bands at speeds of 60 w.p.m. The converter will operate with signals which are only 6 db. above the noise level. The equipment is specifically designed for use with a transmitter in the v.h.f. bands where amplitude modulation of the transmitter carrier is ordinarily employed; a circuit of a simple audio frequency-shift oscillator is included for use with the transmitter.

A simple functional description of the operation of the various circuit elements follows: In receiving, the audio output from the receiver is fed to two germanium diodes, D_1 and D_2, that are biased with approximately 0.3 volts. The result is to limit the maximum peak voltage applied to the grid of the 6SL7 limiter tube to values of 0.14 to 0.6 volts with input-signal levels varying from 1 volt to more than 30 volts. The diodes are even more effective in clipping the peak amplitude of narrow noise pulses. The 6SL7 cascaded limiter-amplifier is used primarily to increase the level of the signal voltage, but a secondary function is to obtain additional output-level stabilization. The output signal amplitude is approximately 15 volts and varies ± 1.0 db. with input-voltage changes from 0.45 volts to more than 30 volts.

The output signals from the 6SL7 limiting amplifier are fed into the two parallel-tuned LC circuits, L_1C_6 and L_2C_7, which are resonant to 2125 and 2975 cycles, respectively. The potentiometer is used to adjust the ratio of the currents in the two windings of the polar relay, K_1, when noise voltage only is applied to the converter input. The second 6SL7 tube is used as a grid-rectifying dual detector, and the plate currents of this tube will depend on the amount of signal applied to each grid. A marking signal

(*Continued on page 114*)

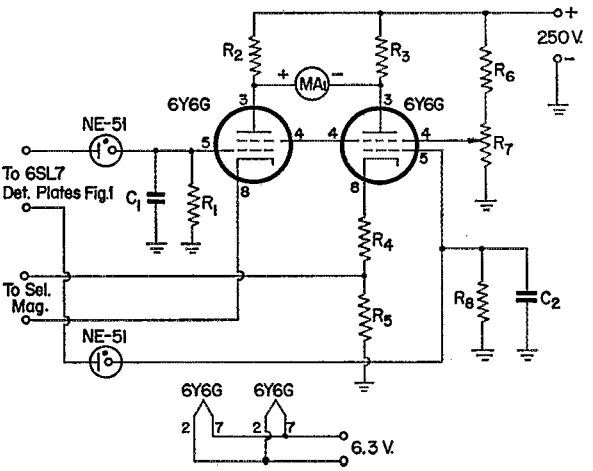


Fig. 3 — **Converter-circuit modifications for use with single-selector magnets.**
C_1, C_2 — 0.002-μfd. mica.
R_1, R_3 — 0.47 megohm, ½ watt.
R_2, R_3 — 220 ohms, ½ watt.
R_4 — 220 ohms, 1 watt.
R_5 — 470 ohms, 2 watts.
R_6 — 47,000 ohms, 2 watts.
R_7 — 50,000-ohm potentiometer.

THE latest (September) roster of active 75-meter s.s.b. stations, compiled by **W3KPP, W2SHN, W3ASW** and **W9DYV,** shows some interesting trends and statistics. In the U. S., 237 stations in 37 states and Hawaii are listed, and 17 VEs in all call areas but 4, 6 and 8. In the U. S., the W2 area leads with the most stations (55), followed by W9 (34) and W4 (30). The cellar spot is held by W5 (5), followed by W6 (10). No guarantee is made that these figures are completely accurate, of course, but they are certainly indicative of the spread and activity.

You can't talk crystal-lattice filters to the s.s.b. gang without mentioning the famous "Weaver-Brown" combination that wrote the two classical articles on the subject for *QST* a year and a half ago. Here is half of that team: Earl Weaver, W2AZW, and his well-organized station. The crystal-lattice exciter can be seen at the left-hand edge of the operating table, and the big rack houses the push-pull 813 final. A BC-348 is used with a "Signal Slicer" for listening.

One of the latest arrivals on the s.s.b. scene is Dick Purinton, **W9SZ,** of Lemont, Ill. The generator is an Edmunds crystal-filter unit, with its output heterodyned to 9 Mc. by an 8.6-Mc. crystal oscillator. The 9-Mc. s.s.b. signal can then be used on either 4 or 14 Mc. by beating it against a 5-Mc. VFO. The output end is part of a converted GO-9 transmitter, using a Class A 837 buffer to drive an AB_1 803. The linears converted without a squeal, and Dick is quite pleased with the way the tubes behave with the reduced bias and higher sensitivity. On the receiving side, an HRO is supplemented by a YRS-1. During Dick's first QSO, the other s.s.b. station kept asking for repeats, and W9SZ was apprehensive about the working of the rig, until W9DYV chimed in on the frequency that the signal was "loud and clear." Turned out that the contact was with another s.s.b. beginner, and he was having trouble with his receiver adjustment. The moral must be: Don't blame the s.s.b. rig until you've talked to an expert!

Harry McCormick, **W9HB,** at Pekin, Ill., is on 20 in a big way, with an Electronic Engineering Co. exciter and a kilowatt final. . . . Ed Brown, **W9ROQ,** at Chillicothe, is giving it a whirl with 10 watts and a crystal-filter exciter. . . . Art Collins, **WØCXX,** at Cedar Rapids, Iowa, is making a lot of the a.m. die-hards think "maybe there's something to this single-sideband stuff after all."

The 20-meter s.s.b. gang should be on the lookout for **VR2CG,** Wyn McGee in the Fiji Islands. His phasing exciter uses 6AG7s in the balanced modulators, screen-modulated by push-pull 6SN7s, and the final is a pair of 811As driven to about 150 watts peak. "Carrier insertion is used quite a bit with chaps who are not conversant with s.s.b. signals, but it is dropped after the tuning procedure is 'Okayed.'" Wyn has worked two-way s.s.b. with Japan, Canada, KH6 and the U. S. A., and is looking forward to a s.s.b. WAC during the remaining two years of his stay in Fiji. He works the high end around 14,305 and is very interested in making skeds with any of the s.s.b. gang. He reports that VR2CJ should be on 75 s.s.b. within a few months, with 807s and a long wire.

Yoe, of **W2EB,** worked CN8FR through the Sunday afternoon QRM on 20 and took 14 messages. The CN said he had been trying for two days to establish a decent readable W contact for the QSP, and that the band was such a mess that s.s.b. was the only thing that saved the day. Yoe finds a rapidly-increasing interest in s.s.b. among the foreign 'phone stations, but they are handicapped in getting on by lack of information and gear.

On the other side of the Atlantic, Jean Lattard, **F9LE,** in Paris, is on 20 with a Rust phasing exciter using 6AQ5s as balanced modulators, an

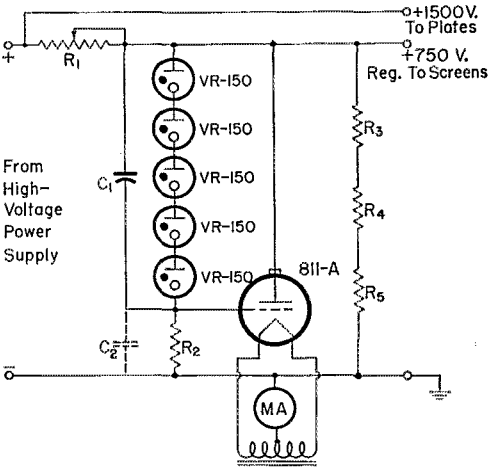


Fig. 1 — The regulated screen supply used with a pair of 813s at W2AZW.
C_1 — 0.01 μfd., 2000 volts.
C_2 — 0.01 μfd., 400 v., if needed to prevent oscillation.
R_1 — Adjustable wire-wound, resistance and wattage as required.
R_2 — 22,000 ohms, 2 watts.
R_3, R_4, R_5 — 0.1 megohm, 2 watts.
MA — Milliammeter required for original adjustment.

807 driver and an 813 final running about 200 watts peak. He is crystal-controlled on 14,250, 14,280 and 14,300 kc., and active around 2100–2300 GCT.

A Regulated Screen Supply

As everyone knows, or soon finds out, tetrode linear amplifiers require "stiff" screen-voltage supplies for lowest distortion. Earl Weaver, **W2AZW,** uses a pair of 813s in his output amplifier, and devised the circuit in Fig. 1 to stabilize the screen voltage. It is a shunt-type regulator that derives a regulated voltage from the high-voltage supply. Since the high-voltage supply will usually need a bleeder resistance for regulation purposes, the shunt regulator also takes care of that requirement.

A zero-bias tube is used, and the grid is always conducting, unless the source voltage drops so low that the VR tubes extinguish. The output voltage is equal to the sum of the VR drops plus the grid-to-ground voltage of the 811-A. This grid-to-ground voltage is the regulating potential, of course, and varies from 5 to 20 volts between full load and no load.

The initial adjustment is made by placing a milliammeter in the circuit as shown and adjusting R_1 for 15 to 20 ma. higher than the normal peak screen current. This adjustment should be made with the amplifier connected but with no excitation, so that the idling plate current will be drawn. After the adjustment is completed, the meter can be removed from the circuit and the filament center-tap wired directly to ground. Since R_1 is in a high-voltage circuit, it must be treated with full safety precautions, and all adjustments should be made only after the power is turned off and the high-voltage terminal has been grounded.

Any number of VR tubes may be used to provide a regulated voltage near the desired value. VR tubes with various operating voltages can be connected in series, if the current ratings are the same. Two 811-As can be connected in parallel if higher current capacity is required. The maximum current through the 811-A should be such that the manufacturer's plate-dissipation rating is not exceeded. It may be necessary to adjust R_1 for a slightly higher current under minimum load than is first expected, to compensate for full-load voltage drops in the high-voltage supply.

At W2AZW, the 813 screen current varies from about 5 to 60 ma., and the shunt regulator holds the screen voltage constant to within 10 or 15 volts.

Measuring Sideband Suppression

Howard Wright, **W1PNB,** suggests the simple stunt shown in Fig. 2 for measuring sideband suppression of your own or the other fellow's signal. It requires that you have a selectable-sideband receiver of some kind (filter, YRS-1, etc.) and an oscilloscope, and the only other requirement is a calibrated volume control.

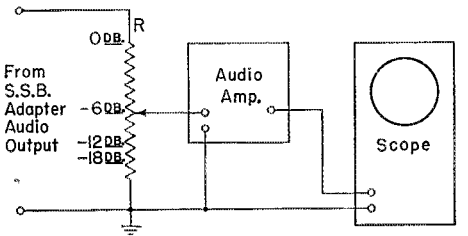


Fig. 2 — **By calibrating the volume control (*R*) of his selectable-sideband adapter, W1PNB gets direct readings of sideband attenuation.**

The volume control is calibrated with an ohmmeter. Assuming a 1-megohm volume control, the -6 db. point will be at half resistance or 0.5 megohm. The -12 db. point will be at half of this, or 0.25 megohm. The -18 db. point is half of this (0.125 megohm), and so on down the line in 6-db. steps.

The 'scope can be connected at any point in the audio amplifier following the calibrated volume control, and the sweep speed should be set low enough to make noise peaks appear as individual "spikes."

To measure sideband suppression, set the control at 0 db. and advance the r.f. gain control of the receiver to a point where the unwanted sideband gives a definite amount of 'scope deflection on peaks. Reduce the calibrated volume control setting (to save the loudspeaker) and switch to the desired sideband. Adjust the calibrated control until exactly the same amplitude peaks appear, and read the suppression ratio directly from the control.

The accuracy of the system is limited, of course, by the care taken in calibrating the control, errors in reading the 'scope, and by the maximum possible amount of sideband suppression the selectable-sideband receiver is capable of. However, the limit of the receiver rejection can readily be found by occasionally tuning across an unmodulated carrier and measuring the point of receiver failure. Any reports given below this ratio will be accurate.

807 Grounded-Grid Class B Stage

A note from **G3FHL** mentions that he and **G3BQQ** have used a triode-connected 807 as a linear amplifier in the circuit shown in Fig. 3. The grounded-grid stage has a very low input impedance (around 200 ohms), which accounts for the tapping down on the grid coil. Connected this way, the 807 becomes a zero-bias tube, at some plate voltage that wasn't mentioned. Since the subject of grounded-grid amplifiers gets kicked around a lot by the s.s.b. gang, the circuit is passed along for anyone who would like to try it.

— *B. G*

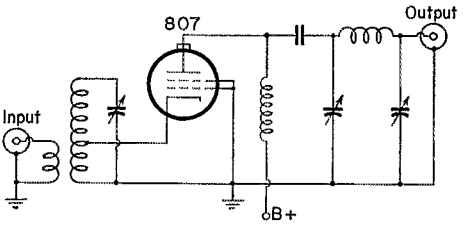


Fig. 3 — **Some of the s.s.b. Gs are using triode-connected 807s as zero-bias grounded-grid Class B amplifiers. The low input impedance of the stage requires that the input coil be tapped down, as shown here.**

CALLING ALL NOVICE HAMS!

The Novice Round-up makes its second annual appearance this year January 10th through 25th. Old-timers are invited to join in the fun and give the newcomers contacts.

Full details appeared in December *QST*, but as a reminder, don't forget that the Round-up starts on Saturday, January 10th, at 6:00 P.M., local time and ends on Sunday, January 25th, 9:00 P.M. local time. A time limit of forty hours is available. This can be used any way you prefer in operation on 80, 11 and 2 meters.

You've still time to get extra scoring credits by qualifying in the Code Proficiency Run from W1AW on January 19th, or from W6OWP on January 3rd, if you've time. But, in the meantime, send in to ARRL Headquarters for your free map of the United States, a contest log and reporting forms for the Novice Round-up. The fine outline map can be posted in your shack to keep a visual check on your worked-all-states progress.

Remember to check December *QST* again for full details on rules.

Inexpensive L and C Standards

One of the well-known uses of the grid-dip meter is as a calibrated source of r.f. in the resonant-circuit method of measuring inductance and capacitance. If the capacitance of a condenser is known accurately, the inductance of a coil connected to it can be determined from the frequency at which the combination resonates. Similarly, if a coil of known inductance is available the capacitance of a condenser connected to it can be measured. The accuracy of the method depends, among other things, on the accuracy with which the standard L and C values are known.

It is possible to get entirely adequate L and C standards for a matter of pennies, and the ingredients usually can be found in any radio parts store. Silver mica condensers are highly stable and their standard tolerance is plus or minus 5 per cent of the marked value. It is possible to get them with a tolerance of 2 per cent, but this usually will require a special order — which is slow going these days. Furthermore, it is not really necessary, since an inductance standard of the same order of accuracy is readily available in the B & W Miniductors. Being machine wound, these can be held to quite close tolerances in diameter and winding pitch, especially in sizes with the turns fairly well spaced. The 3015 type meets these requirements quite nicely.

By proper choice of values for the standards a range of L and C measurements that will take care of all the usual amateur requirements can be covered, without exceeding the frequency range commonly incorporated in a grid-dip meter. A good selection is 5 microhenrys for the coil and 100 $\mu\mu$fd. for the condenser. These will permit measurements of inductance from 0.1 to 100 μh. and capacitances from 5 $\mu\mu$fd. to 0.002 μfd., with a grid-dip range of 1500 kc. to 50 Mc.

Seventeen turns of 3015 Miniductor (1-inch diameter, 16 turns per inch) has an inductance of almost exactly 5 microhenrys. To be usable, it has to be mounted in some way that will permit ready connection, and it is convenient to use a binding-post plate as shown in the photograph [p. 120]. The 100-$\mu\mu$fd. silver mica can be similarly mounted, one plate of a pair being used for each unit. Ceramic plates are best from the standpoint of good electrical characteristics and mechanical stability, but the material is probably not too important. In cutting the coil to size, be careful not to distort the turns or disturb the spacing, and leave just enough lead length to solder into the lugs under the binding posts.

Fig. 1 can be used with a coil of this size and a run-of-mill 100-$\mu\mu$fd. silver mica. Using this chart and the calibration of a commercial grid-dip meter, it was found that over most of the range the maximum discrepancy between values of L and C so measured and the values given by measurement on a Boonton Q-meter was under 6 per cent, and the average deviation was considerably less. The actual capacitance of the condenser assembly was 106 $\mu\mu$fd.

(*Continued on page 120*)

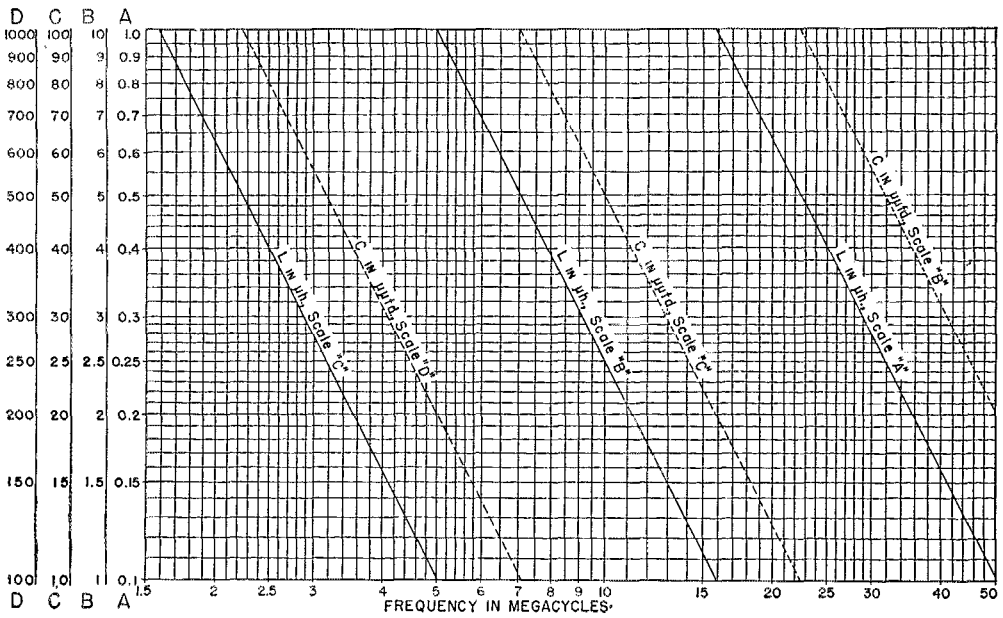


Fig. 1 — Inductance and capacitance as a function of the resonant frequency of an LC circuit, based on an inductance of 5μh. for capacitance measurements and a capacitance of 100 $\mu\mu$fd. for inductance measurements.

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

Good publicity is something amateurs can always use. In these days of TVI, the more favorable publicity, the better. We YLs have an excellent opportunity to sell our hobby from the human interest standpoint. Newspapers and broadcast stations are continually searching for people with interesting stories to tell. As feminine radio operators, we certainly can fill the bill!

In the Boston area alone, at least three radio programs, one TV program, and innumerable newspaper articles have featured "lady" hams during the past year or two. Similar broadcasts and articles occur throughout the country. Perhaps we should resolve this new year to personally do all we can to help build and maintain a store of good will for amateur radio.

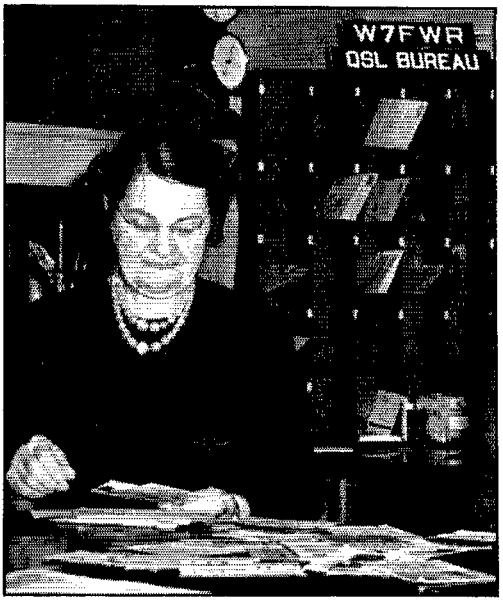
It's surprisingly easy to do once you get started — TV and radio broadcasts and newspaper articles can be a lot of fun. Then, too, ARRL has available for the asking sample scripts for radio interviews and speeches and various other material suitable for presentation to the general public. We can write magazine articles (or more ambitiously, books). We can talk to clubs, school and church groups. Bring the mobile rig along and watch eyes pop when you demonstrate two-way amateur radio in your car!

Keeping Up with the Girls

We are sorry to report the passing on November 2nd of May Smith, W1BDN, of Manchester, N. H. May was a real old-timer, having been licensed in 1920 with the call W1BAE. In 1928 she became W1BDN and held this call for twenty-four years. May was well known on the prewar five-meter band. . . . Now Advanced Class, W1UBM has held three licenses — Novice, General, and Advanced Classes — within fourteen months (see Sept. '52 column). Norma is undoubtedly one of few who have accomplished this feat in such a short time. . . . Fifteen members were present at this season's first meeting of the Los Angeles YLRC. FCC Docket 10237 and call-sign license plates were discussed. At a later date W6UHA, Maxine, entertained 25 club members and guests with a lovely luncheon, highlight of which was a large cake decorated with an antenna. The girls' greetings to W6VWR, Lou, who is at the Good Samaritan Hospital in L. A., were recorded by W6NAZ, Lenore. . . . WN1WNE, Sylvia, a new R. I. YL, is running 8 watts on two. . . . YLRL Publicity Chairman W1QON reports that a new club photograph album has been purchased, and the book is awaiting photographs to adorn its bare pages — one large hint! . . . W8ATB and OM W8QBO mobiled their way (75 meters) over 8000 miles during their recent trip West. Esther was particularly happy to meet W7s HHH JWC MUT NH, W9AYX, W0s EVT and KOY. . . . Unfortunately, VE3BTE is seriously ill and will be unable to continue as YLRL District Chairman for Canada. VE3AJR, Dell, will relieve Rose of her duties. . . . W4RIG, Bobbe, is doing well with her new 32V-3. . . . Two more new young YLs are 14-year-old WN9VJK, Louise Drolet, Kankakee, Illinois, and 16-year-old WN6OBZ, Joan Dobson, No. Hollywood. And 15-year-old WN3UPT, Sylvia Gramba, writes that she became interested in getting her own license because of "dear old Dad, W3CRK, and the way Mom would patiently look on as he got intrigued with

(*Continued on page 126*)

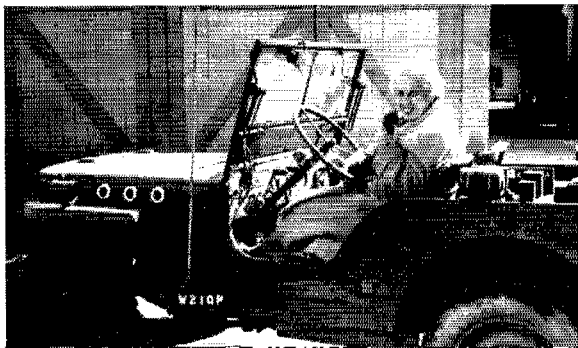
* YL Editor, *QST*. Please send all contributions to W1QON's home QTH: 318 Fisher St., Walpole, Mass.



The first YL QSL Bureau Manager — Mary Ann Tatro, W7FWR, of Olympia, Washington. Mary admits handling the bureau is a lot of work, but she claims a feeling of satisfaction in dispersing eagerly-awaited QSLs. Starting her fourth year in the job, she reports that in previous years about 45,000 cards were received annually, but "only" some 25,000 came in during 1952, due in part to poor DX band conditions and TV. When Mary has spare moments between mail deliveries, she operates ten 'phone with an HT-9 transmitter and HQ-129 receiver. Once each day she skeds her son W7EKW, using her OM's station, W7FWD.

♦

A Jeep, plus a mobile rig, plus a YL operator tend to create a bit of excitement as Lillian Klarfeld, W2IQP, has discovered. Lil draws lots of stares as she QSOs while driving about her home town, Newark, N. J., in her own jeep, which is outfitted with a 15-watt rig on ten. Lil's OM, W2EAO, and two sons, W2YCU and W2YGM, also have individual cars and each is equipped with a mobile rig on ten. There's a fifth rig fixed at home. All the Klarfelds hold Advanced Class licenses, too. We guess it's safe to assume that the family enjoys its hobby!



Unpainted But Adequate

An Idea for the Compact Ham Station

BY J. W. PADDON,* VE1OU/W3

In a better world every amateur would live in his own house set in the middle of ten acres judiciously dotted with tall pine trees and 80-foot towers. As it is, many of us live in cities, in apartments surrounded by TV sets, with no place to work and with neighbors whose reaction to sawing and hammering noises is only equaled by their appreciation of a Harris-tweed pattern appearing on a 20-inch screen.

To any amateur, a communications receiver is a thing of beauty and a joy forever. Oddly, this view is shared by few XYLs and no interior decorators. A good receiver is sure to be heavy and not suited to the creations of Sheraton or Hepplewhite. We got a receiver, and the problem of what to set it on automatically arose. The problem was further complicated by apartment living without access to tools or a working place.

People who own oil wells or have a seat on the stock exchange would probably have gone out and bought a bit of modern furniture or a genuine Grand Rapids antique. As for us, we immediately set forth to the well-known emporium of Mr. Sears and Mr. Roebuck. With a leer at the cost-of-living index, a course was set toward the unpainted furniture department where, after burrowing around among the displays, we came across an unpainted bookcase. This one was unusual because it was a double bookcase,[1] with shelves on both sides. *This* was it.

In Fig. 1 [p. 122] we see the cross-sectional view. The piece is 27 inches high, 30 inches long, and 16 inches deep. There is a vertical dividing panel halfway between the two open faces, separating the thing into two identical halves. Thus on each side of the partition there is a shelf about 7¾ inches deep. The vertical partition is made of 3/16-inch plywood and not removable, and the rest is of ponderosa pine, finished and ready to paint.

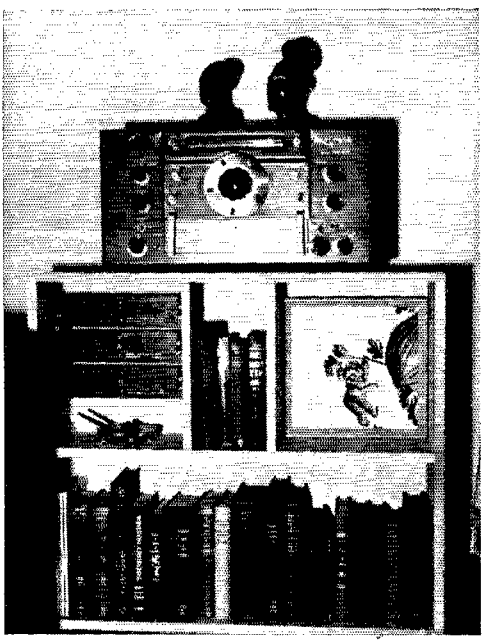
We didn't get a matching loudspeaker and case for the receiver. They cost money and space, and anyhow, we had a 7-inch 'speaker already. The next purchase was one of those little hacksaws that look like junior keyhole saws (35¢). Once the bookcase was delivered, it was laid flat on the floor and a 7-inch circle drawn on the vertical partition with a compass. The location shown in the photograph is not important; the 'speaker can be located to fit the OM's taste. A screwdriver was used to chew a starting hole through the plywood partition at a point on the circumference of the circle. The baby hacksaw made light work of the circle and that was it.

The bookcase is just wide enough to accommodate the receiver with a bit to spare. Four wood screws were used to secure the 'speaker to the back of the plywood partition. Connections were

(*Continued on page 122*)

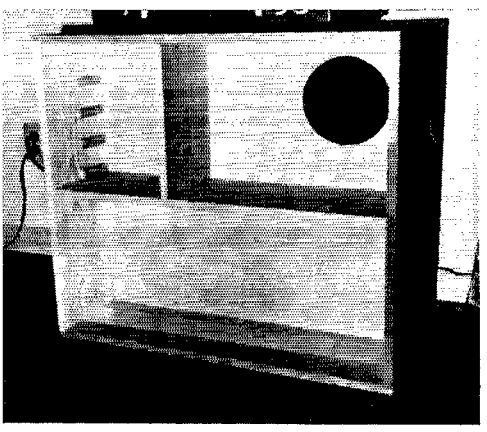
* P.O. Box 4897, Cleveland Park Stn., Washington 8, D. C.

[1] Sears & Roebuck No. 302 divided bookcase.



♦

Left: Although this bookcase looks like only enough support for the receiver, 'speaker, and a few books, it is a double affair in which the other half can be used for storing anything from the rig to the family jewels. *Below:* One of the two additional vertical partitions is in place, and the runners for supporting the receiver coils have been installed. (*Photos courtesy VE3KR*)



6th V.H.F. Sweepstakes, Jan. 10th-11th

ARRL Certificates to Leaders — Gavel for Winning Club

BY F. E. HANDY,* W1BDI

THE Sixth Annual V.H.F. Sweepstakes will start at 2:00 P.M. your local time, Saturday, January 10th, ending at midnight Sunday. 'Phone, m.c.w. or c.w. may be used, with results all contributing to one score. The aim of this contest is to work as many v.h.f. stations as possible in one week end. All points from such work will be multiplied by the number of *different* ARRL sections worked. "CQ Sweepstakes, this is W....., over" (on c.w. just "CQ SS de ..... K") will identify stations desiring to make contest exchanges.

If an exchange of SS data is completed in both directions, *two* points may be claimed. To make it easy to record exchanges they should be sent in the order of information shown. Exchanged information is in the form of a message preamble, with the ARRL section[1] substituted for the city and state, and the RST report for "check." Any station you work is good for *one* point in the score if you get the other operator's acknowledgment of "message," whether he is in the contest for score or not.

Contest reporting forms for your convenience will be sent free on request. Neither advance entry nor form is *required*. Follow the log arrangement shown. All lists, small or otherwise, are welcomed by ARRL to help support claims and make complete results in *QST* possible. Report as soon as the test is over.

Certificate awards will go to V.H.F. Sweepstakes winners in *each* ARRL section and to leading operators of clubs where three or more submissions are received. A *club gavel* goes to the club with top aggregate score. Get set for a v.h.f. operating week end!

Rules

1) *Eligibility:* Amateur operators in any field-organization section[1] operating fixed, mobile or portable *under one call* on or above 50 Mc. are invited to take part.

2) *Object:* Amateurs in U. S. and Canadian sections of the ARRL field organization will attempt to contact as many other stations in as many sections as possible.

3) *Contest Periods:* The contest starts at 2:00 P.M. your local time Saturday, Jan. 10, 1953, and ends at midnight Sunday, Jan. 11, 1953.

4) *Exchanges:* Contest exchanges, including all data shown in the sample, must be transmitted and receipted for as a basis for each scored point.

5) *Scoring:* (a) Contacts count *one point* when the required exchange information has been received and acknowledged, a *second point* when exchange has been completed in both directions.

(b) Final score is obtained by multiplying totaled points by the number of *different* ARRL sections[1] worked (the number in which at least one SS point has been credited).

6) *Conditions for Valid Contact Credit:* (a) Repeat contacts in other bands confirmed by completed exchanges of *up to two points per band* may be counted for *each different station* worked. (Example: W1XXX works W3MQU on 50 and 144 Mc. for complete exchanges, 2 points each on each band. 2 × 2 gives 4 points but only *one* section multiplier.)

(b) Crossband work shall not count for any points or sections.

(c) Fixed-, portable-, or mobile-station opera-

* Communications Manager, ARRL.

[1] See list of sections in the ARRL field organization, page 6. Awards include Puerto Rico, Hawaii, Alaska. In operating use section name abbreviations such as E. Mass., R. I., W. N. Y., Neb., N.Y.C.-L.I.

[2] In 'phone RST exchanges only two numerals need be used. Say *Readability . . . Strength. . . .* On c.w. full 3-number RST reports should be logged.

[3] Where only one point is made on a contact you can add a point by working this station again for exchange in the opposite direction later. Leave right or left report column blank so that other pairs of exchanges completed in one contact are side by side in your report.

EXPLANATION OF V.H.F. SS CONTEST EXCHANGES

Send Like Standard Msg. Preamble	*NR*	*Call*	*CK*	*Place*	*Time*	*Date*
Exchanges	Contest numbers 1, 2, 3, etc., a new NR for each station worked	Send your own call	CK (Readability . . . Strength . . . or RST[2] of station worked)	Your ARRL *section*[1]	Send time of transmitting this NR	Send date of QSO
Purpose (example)	QSO NR tells how you are doing. (NR 1)	Identification (W1AW)	All exchange reports (589)	Section[1] vital contest data. (Conn.)	Time and date must fall in contest period. (6R55 P.M. Jan. 10)	

STATION W. . . . — SUMMARY OF V.H.F. SWEEPSTAKES EXCHANGES

Freq. Band (Mc.)	SENT (1 point)				Time . . . . ST	Date (Jan.)	RECEIVED (1 point)				Time	Date (Jan.)	Number of Each Different New Section as Worked	Points
	NR	Stn.	CK-RST	Section			NR	Stn.	CK-RST	Section				
50	1	W1AW	57	Conn.	4:15 P.M.	10	3	W1QIX	47	Conn.	4:18 P.M.	10	1	
50	2		43		4:35 P.M.	10	7	W1HDQ	59	Conn.	4:40 P.M.	10	..	2
50	3		58		9:09 P.M.	10	6	W1EIO	359	Maine	9:11 P.M.	10	2	2
144	4		49		9:30 P.M.	10	32	W1CLS	58	E. Mass.	9:36 P.M.	10	3	2
144	5		57		9:50 P.M.	10	15	W1SF	58	Conn.	9:46 P.M.	10	..	2
50	6		54		11:30 P.M.	10	11	W2OHE	48	N. Y. C.-L. I.	11:32 P.M.	10	4	2
144	7		58		11:35 P.M.	10	30	W1QLX	57	Conn.	11:35 P.M.	10	..	2
144	8		57		11:45 P.M.	10	21	W3MKL	59	Md.-Del.-D.C.	11:56 P.M.	10	5	2
144	..	....	...	...	.....	..	18	W4FNR[2]	59	E. Fla.	12:34 A.M.	11	6	1
144	9	W1AW	34		8:50 A.M.	11	27	W1NY	59	W. Mass.	8:47 A.M.	11	7	2
50	10		479		9:18 P.M.	11	12	W5AJG	379x	N. Tex.	8:20 P.M.	11	8	2
50	11		589		10:40 P.M.	11	20	VE1QY	569	Maritime	11:35 P.M.	11	9	2

No. Bands Used: 2 9 Sec., 23 Pts.

Number and names of operators having a share in above work.....

Claimed score: 23 points × 9 sections = 207.

I hereby state that score and points set forth in the above summary are correct and true.

Equipment:

Signature.....

Address.....

Tube line-up.....

Number different stations worked.....

tion under one call, from one location only, is permitted.

7) *Awards:* Entries will be classified as single- or multioperator, a single-operator station being defined as one manned by an individual amateur who neither receives assistance nor gives assistance to any person in the contest period. Certificates will be granted based on the leading work in the single-operator classification in each ARRL section. Multioperator work will be grouped separately in the *QST* official report of results.

When three or more individual club members compete and submit logs naming the club with which they are identified, an ARRL certificate will be issued through such club to the leading individual in the local competition. When less than three individual logs are received there will be no club award or club mention.

A gavel with engraved sterling-silver band is offered the club whose secretary submits the greatest aggregate score, such claim successfully confirmed by *individual member reports* (resident club members *only*). Claims from federations, radio club councils, or other combinations of radio clubs, will not be accepted. Special memberships granted for contest purposes will not be recognized.

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

9) Reports from all entrants must be postmarked no later than January 26, 1953, to be considered for awards.

Strays

WØRA finds it's tough to coax the r.f. through his coax.

—....—

Our Navy's Jim Creek Valley, Wash., megawatt-output long-wave station, begun in 1946 and now nearing completion, will probably be lighting homes in near-by towns whether light switches are on or off. Not only that, wire fences for some 25 miles around will have to be properly grounded to prevent injury to livestock and farm personnel.

— *Seattle Times via WN7SCU*

Silent Keys

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

W1BDN, May L. Smith, Manchester, N. H.
W1RD, Walter S. Hamilton, Saugus, Mass.
W2BKQ, Charles G. Ligh, New Dorp, S. I., N. Y.
W2IFW, Ronald Keeton, Niagara Falls, N. Y.
ex-3BID, Ashby L. Groves, Brooke, Va.
W3GF, Arthur Hebb, jr., Glen Arm, Md.
ex-W3HNK, Dr. Wm. R. Wilson, Baltimore, Md.
W4DRZ, Robert M. Haskins, Ft. Lauderdale, Fla.
W4FVY, William E. DeWitt, Gainesville, Ga.
W4PJF, Morris Speisman, Santee, S. C.
ex-W6BOZ, Andrew F. Latham, Boulder City, Nev.
W6BVA, Olen W. Lewis, Garden Grove, Calif.
WN6HFR, Frank R. Nevarez, Los Angeles, Calif.
W7ARZ, Wallace J. Guthrie, Salem, Ore.
W8TZI, Gary E. Dodds, Caledonia, Ohio

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

FOR some time now most of us have been aware that a device called a transistor has been undergoing laboratory development. We knew that it was destined to have far-reaching effects on the science of electronics, but so far it had created no great stir in amateur circles. For one thing, the first transistors to be made available were suitable for use only at very low radio frequencies. Thus it may seem strange that what may be the first amateur use of transistors is reported in this section of *QST*, but the fact is that it happened on 144 Mc.

One evening not long ago K2AH, Mountain Lakes, N. J., worked W2KNI, Mountainside, W2DPB, East Orange, and W2UK, New Brunswick, with what was unquestionably the first amateur transistor transmitter, and probably the world's record for low transmitter power. Not even W2UK, more than 25 miles away, was at first aware that he had taken part in a history-making event. He knew that the signal was well down from what he had come to expect from K2AH, but it was readable enough.

Now don't rush off to the nearest radio store for a 2-meter transistor and a flashlight cell, to beat K2AH's low-power record; there are a few obstacles in the way. What happened was that George Rose, who is manager of the RCA Tube Department Advanced Development Group, had taken an experimental transistor now being developed for v.h.f. applications and made a 146-Mc. crystal oscillator out of it. The transmitter, complete with power supply, could have been built into cigarette-package size — probably the nearest thing yet to the wrist radio made famous by Dick Tracy.

As may be seen, there are features about this approach that may keep it from becoming routine ham practice for some time, but it does give some inkling of the manifold ends these amazing gadgets may eventually serve. More details of the K2AH rig in February *QST*.

Here and There on 6 and 2

In the big rush of events in early September there was bound to be some confusion as to who worked whom. Two errors in our reporting of the 2-meter openings have been brought to our attention, both of them in the "firsts" listed. Minnesota and Missouri were linked on 144 Mc. prior to the September sessions. Unless someone can establish prior claim, we install the July 6th contact between WØTJF and WØDDX as the first 2-meter work between these two states, with thanks to WØTJF for bringing it to our attention.

W5AJG says that the September openings created no excitement in Texas, so he was surprised to find a Wisconsin–Texas contact listed among the "firsts." He checked up on the Texas end and found that W5JHX has never been on 144 Mc., so it appears that we must scratch that one unless WN9SDH can give us the straight dope. The original report came by way of a third party, so there was plenty of opportunity for error in the calls involved.

With the sunspot cycle scraping bottom, there is not much DX news in regard to 50 Mc. these days, particularly in the fall months when sporadic-*E* skip is infrequent at best. Use of the 50-Mc. band for civil defense work has boosted occupancy markedly in some areas, however. Notable in this respect is Massachusetts, where state-wide operation on 6 is being planned. Already several regional nets are in business in the eastern and central parts of the state, and this influx of new stations has resulted in an increase in the routine use of the band as well. This comes at a time when other areas where no c.d. use of 6 is contemplated report activity on the band at a low ebb. At least 5 nights a week see 50-Mc. net operations taking place in Massachusetts, the most recent addition being one in the Worcester area. This group uses 50.56 Mc. each Thursday at 1930 EST, the function of net control rotating among the members.

November's news is not devoid of 6-meter DX reports, either. W6BWG, San Gabriel, Calif., heard W7s HEA and JPA working each other at 2010 PST on the 16th. At the first opportunity Wes gave them a call and maintained contact intermittently for the next hour and a half. The W7s also worked W6EPE at San Bernardino. Their signals were louder on 6, W6BWG reports, than any W7s heard on 10 during this period. W6TA, Inyokern, Calif., caught an opening to the east on the 25th, working W5MYJ at 1947, and hearing W5s MJD, HHU and MJE. The band remained open for about an hour. W6BWG caught this one, too, working W5s KWP, MYJ, MYI and MJD between 1907 and 2055. Again on the 26th, W6BWG worked the same stations and heard W5s AJG, ONS and SIN. WØINI, Pleasant Hill, Mo., worked W6ANN, W6IUC and W5MYI on the 26th. On the 25th he caught W4LAW, W7QAP, W5MYJ and W7LVR. Not bad for November!

The WAR certificate award offered some months ago by the Rochester (N. Y.) V.H.F. Group has helped to maintain activity on 144 Mc. in the area around that city. Stations within a 25-mile radius of Rochester must work 25 Rochester stations to qualify for the award, while those more than 25 miles away need work only 15. Special WAR Nights are scheduled from time to time, when operators wishing to work for the award can be assured of a large turnout of Rochester stations. The WAR Night schedule for the next few months is as follows: Dec. 16th, Jan. 22nd, Feb. 16th, March 17th, April 22nd, May 21st, June 15th. Another opportunity for Rochester area activity is the weekly operation of the Finger Lakes Net, working out on 145.35 Mc. each Friday night at 2000.

Two more 2-meter nets are reported by K6AM, Chula Vista, Calif. The gang in the San Diego area gather on the air each Tuesday at 1900. Present net membership numbers about 34, and the function of net control rotates among the group. In addition, there is a net coördinator elected for a 6-month period by the membership. W6BWI serves in this position until the end of 1952, when K6AM takes over. On June 30th, he will turn his duties over to W6IBS. Independently-powered gear is under construction, and will soon be available for simulated or actual emergencies.

Chula Vista also has its own 2-meter net. This group, presently numbering 6 stations, holds forth each Thursday at 1930, with W6MUJ as Net Control.

Mobile Antenna for 2 and 10

With both 28 and 144 Mc. being widely used in c.d. planning, a mobile antenna that will work well on both bands should be a useful item. A suggestion to this end is offered by W2FBR, East Orange, N. J. Ralph tried a regular 10-meter whip, which took power on both bands well enough, but the radiation angle on 144 Mc.

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

was high and the antenna did not compare in effectiveness with a 2-meter whip or coaxial dipole.

The addition of two coaxial skirts in the manner shown in Fig. 1 corrected this to a large extent. The skirts have no effect on the operation of the antenna on 28 Mc., yet its performance on 144 is greatly improved. Carrying the utility of the antenna still further, it is close enough to a 50-Mc. half-wave so that it has been used effectively on that band as well.

New Interest in 220 Mc. and Higher

For a reason that may not have occurred to many of us there is more interest in the frequencies above 220 Mc. today than ever before. And what's more important, it's growing every day. The reason for this is the temporary nature of the Novice Class license. Not a few holders of that ticket are fellows who were well enough grounded technically to pass the General Class exam, but who couldn't make the grade on the 13-w.p.m. code speed. Having passed the technical portion of the exam, they took Technician tickets along with their Novice ones, and were thus assured of permanent licenses.

There has been increasing interest in the higher frequencies for some years, and the advent of the Technician license, restricting the holder to use of 220 Mc. and up, helped this along. For the first year, however, almost every Technician also had a Novice ticket, so most of them concentrated their activity on 3.7 or 145 Mc. Now the Novice tickets are running out in considerable numbers, so the Technician license is getting an ever bigger play.

And why not? In the years since the early '30s literally thousands of beginners have made their start in amateur radio on the v.h.f. bands. Today's Technician has open to him bands that offer at least as much of interest as the 5-meter band offered to the beginner in the period of great v.h.f. expansion that began 20 years ago. It was several years before W1HDQ, for instance, worked anyone more than 50 miles away without climbing a mountain to do it, and almost nobody even dreamed of working over distances that stand as records for 220 and 420 today.

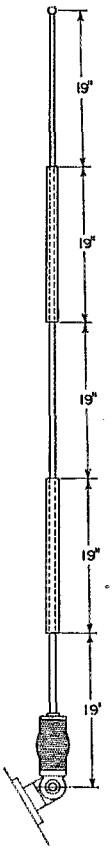


Fig. 1 — Modification of the 10-meter whip to permit low-angle radiation on 144 Mc., used by W2FBR.

The fellows who are busy on 220 and 420 would be the last to say that they have done all there is to be done on these bands. On the contrary, they are almost unanimous in their feeling that we have done little more than scratch the surface of the possibilities of these and higher bands. If these frequencies are to be developed, the Technicians most certainly will make important contributions to amateur v.h.f. and u.h.f. expansion. There are more of them every day, and it is probable that considerable activity could be developed on 220 and 420 Mc., at least, in almost any well-populated area. Such activity is already underway in Boston, New York, Cleveland, Detroit, San Francisco, Los Angeles and other cities. If you have a group of v.h.f.–u.h.f. experimenters not already mentioned in these pages, send us along the details for publicity in *QST*.

As an example of interest building up in 420-Mc. circles, W4HHK, Collierville, Tenn., sends in a list of 420-Mc. stations and equipment he's gathered recently. W5AJG, Dallas, Texas, has a 4X150 job in the works for 432.4 Mc. He has 16 elements with screen reflector, and a crystal converter ahead of an SX-43. W5AYU, Houston, also has a 4X150 rig, on 432.15. His array is five 5-element jobs stacked, and his converter uses a 6AN4 r.f. amplifier ahead of a crystal mixer. W5ONS, Victoria, has 10 watts on 432.2, feeding a 5-over-5 and a 16-element-with-screen array. W5AXY runs 40 watts input to a 9903 amplifier on 432.0 Mc., feeding a 5-over-5 array. His receiver is an NC-183D with a crystal converter. W4BYN, Memphis, Tenn., runs an 832A amplifier on 434.1 Mc. His array is a 16-element job, and his receiver a 6J6 mixer-oscillator converter. W4HHK-UDQ will soon have a 9903 tripler on 434.1 Mc. to go with their 32-element array and converters that work into an HRO-50T. Paul is getting fine results with a 6AJ4 r.f. amplifier built similar to the 6J4 job described in January, 1952, *QST*, and in recent editions of the *Handbook*. This is followed by either a crystal mixer, or a 6AM4 grounded-grid mixer, the latter being as yet inferior to the crystal job. Mixer output is 27 to 30 Mc. for tuning 432 to 435 Mc. Other stations in various stages of getting started on 420 are W5RCI, Marks, Miss., W5TOE and W5EMZ, Little Rock, Ark., and W9UED, Belleville, Ill.

Plate Lines for the 9903

One of the most widely-used tubes for 420-Mc. work is the Amperex AX-9903. This dual tetrode is capable of 10 watts output as a tripler from 144 Mc., or up to 30 watts as a 432-Mc. amplifier. It has only one disadvantage: the glass support for the plate pins is fragile, as a number of 420-Mc. experimenters have found to their sorrow. This condition has been corrected by the introduction of an improved version of the tube, but meanwhile, many of us have 9903s we'd like to use without fear of breakage around the plate pins.

In applications where a flexible lead between the plate

50 WAS Mc.

WØZJB	48	W4BEN	35	W8BFQ	41
WØBJV	48			W8LBH	39
WØCJS	48	W5VY	48	W8LPD	37
W5AJG	48	W5GNQ	46		
W9ZHL	48	W5MJD	46	W9ZHB	48
W9OCA	48	W5ONS	45	W9QUV	48
W6OB	48	W5JTI	44	W9HGE	47
WØINI	48	W5ML	44	W9PK	47
W1HDQ	48	W5JLY	43	W9VZP	47
		W5JME	43	W9RQM	47
W1CLS	46	W5SFW	43	W9ALU	47
W1CGY	46	W5VV	42	W9UIA	45
W1LLL	45	W5FAL	41	W9UNS	45
W1HMS	43	W5FSC	41		
W1LSN	42	W5HLD	40	W9QIN	47
W1DJ	40	W5HEZ	38	WØDZM	47
		W5LIU	37	WØNFM	47
W2AMJ	46			WØTKX	47
W2RLV	45	W6WNN	48	WØKYF	47
W2MEU	45	W6UXN	47	WØHVW	45
W2IDZ	45	W6ANN	45	WØMVG	44
W2FHJ	44	W6TMI	45	WØJOL	44
W2GYV	40	W6IWS	41	WØTJF	44
W2QVH	38	W6QVK	40	WØJHS	43
W2ZUW	35	W6GCG	35	WØPKD	43
				WØIPI	41
W3OJU	45	W7HEA	47		
W3NKM	41	W7ERA	47	VE3ANY	42
W3MQU	39	W7BQX	47	VE3AET	38
W3RUE	37	W7FDJ	46	VE1QZ	34
W3OTC	35	W7DYD	45	VE1QY	31
W3FPH	35	W7JRG	44	CO6WW	21
		W7BOC	42	XE1GE	19
W4FBH	46	W7JPA	42		
W4EQM	44	W7FIV	41		
W4QN	44	W7CAM	40		
W4FWH	42	W7ACD	40		
W4CPZ	42				
W4FLW	42	W8NSS	46		
W4MS	40	W8NQD	45		
W4OXC	40	W8UZ	45		
W4FNR	39	W8YLS	41		
W4IUJ	38	W8CMS	41		
		W8RFW	41		

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

connection and the tank circuit can be used, this presents no problem, as flexible ribbon or braid can handle the job. But on 420 you don't use "leads" in the conventional sense, and very flexible materials don't make good tank circuits as a rule. A neat solution offered by W5AYU is shown in Fig. 2. Lee makes the major portion of his half-wave line of stiff brass stock, and provides a short flexible section cut from beryllium copper spring stock only 0.005 inch thick.

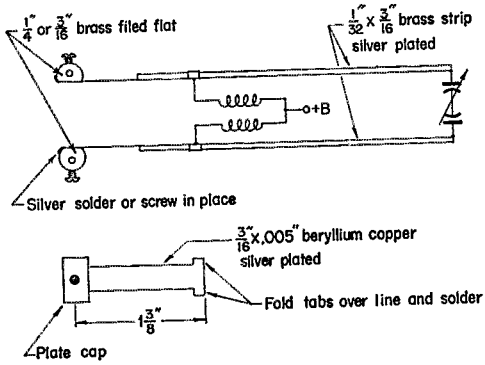


Fig. 2 — 420-Mc. tank circuit design for the AX-9903 suggested by W5AYU.

Tabs on the flexible portion fold over the brass strips, and are soldered in place. The plate connection is taken care of by small pieces of brass rod drilled to pass the 9903 plate pins. The flexible portion of the line may be silver soldered to these connectors, if facilities of this type of soldering are available, or the brass may be drilled and tapped for small screws to hold the flexible strips in place. The complete assembly is silver plated.

OES Notes

The new 6AJ4 tube is attracting attention among the fellows who are looking for ways to improve their receiver performance. This is a new triode especially designed for grounded-grid r.f. service at u.h.f. TV frequencies. From results reported by several workers it appears to be capable of anything that the much higher-priced 6J4 would do. A companion tube, for u.h.f. TV mixer use, is the 6AM4, also being tried out on 420 by several reporters.

W8FKC, Hudson, Ohio, is rebuilding his crystal-controlled 432-Mc. converter for these tubes. Ralph has already made use of the 6AJ4 in an r.f. preamplifier with excellent results, as has W4HHK. Both say that the tube operates very stably, and makes a worthwhile improvement in the signal-to-noise ratio, as well as gain, of their converters for 432 Mc. Mixed reports have come through so far on the 6AM4 as a grounded-grid mixer, and if anyone has achieved really good results with this tube the rest of the gang would be glad to have the details.

W9KQX uses the 6AJ4 as the second tube in his cascode converter, in place of the 6J6 commonly used with a triode-connected 6AK5 in this circuit. This is for 144 Mc.

W9MBI has been trying the 5842, another high-g_m triode, as an r.f. amplifier on 432, 220 and 144 Mc. Excellent results have been achieved on all bands, and on 432 Mc. the noise figure of Clare's crystal-mixer crystal-controlled converter was improved by about 8 db. by the addition of the 5842 preamplifier.

This is in line with results your conductor got with r.f. amplifiers described in January, 1952, *QST*, and in the 1952 and 1953 editions of the *Handbook*. From our results, we concluded that use of a crystal mixer without an r.f. amplifier is not so hot; that if no r.f. stage is used, it is better to use a vacuum-tube mixer.

W9LEE reports that the Northern Wisconsin Radio Club is sponsoring informal operation on 144 Mc. nightly at 2000 to extend what is developing into appreciable v.h.f. interest in that area.

A new OES from that region, W9DSP, Chippewa Falls, reports work on 438 Mc. with W9REQ. These two are using converted BC-645s at present, to exchange excellent signals over the 6-mile path. They'd be glad to hear from others within range who are interested in 420-Mc. work.

2-METER STANDINGS

	Call	States	Areas	Miles		Call	States	Areas	Miles
W1HDQ		18	6	850	W5ONS		7	2	950
W1IZY		16	6	750	W5SWV		7	2	—
W1RFU		15	7	1150	W5FBT		6	2	500
W1MNF		14	5	600	W5IRP		6	2	410
W1BCN		14	5	580	W5FSC		5	2	500
W1DJK		13	5	520	W5DFU		5	2	275
W1CTW		12	4	500					
W1KLC		12	4	500	W6PJA		3	3	1390
					W6ZL		2	2	1400
W2NLY		22	7	1050	W6WSQ		2	2	1390
W2UK		21	7	1075	W6NLZ		2	2	237
W2QED		18	7	1020	W6GCG		2	2	210
W2AZL		18	7	1050	W6EXH		2	2	193
W2ORI		16	7	830	W6ZEM/6		1	1	415
W2PAU		16	6	740	W6GGM		1	1	300
W2QNZ		14	5	400	W6YYG		1	1	300
W2SFK		13	6	—					
W2DFV		13	5	350	W8WJC		21	7	775
W2CET		13	5	405	W8BFQ		21	7	775
W2UTH		12	7	880	W8WRN		19	7	670
W2DPB		12	5	500	W8WXV		18	8	1200
W2FHJ		12	5	—	W8UKS		18	7	720
W2BVU		12	4	260	W8DX		17	7	675
					W8EP		17	7	—
W3RUE		19	7	760	W8WSE		16	7	830
W3NKM		19	7	660	W8RWW		16	7	500
W3QKI		17	7	820	W8BAX		15	6	655
W3KWL		16	7	720					
W3LNA		16	7	720	W9FVJ		22	7	850
W3FPH		16	7	—	W9EQC		21	8	820
W3GKP		15	6	650	W9BPV		20	7	1000
W3OWW		13	6	600	W9UCH		20	7	750
W3KUX		12	5	575	W9LF		19	—	—
W3PGV		12	5	—	W9WOK		17	6	600
W3LMC		11	4	400	W9MBI		16	7	660
					W9BOV		15	6	—
W4AO		20	7	950	W9LEE		14	5	780
W4HHK		19	6	710	W9AFT		14	—	—
W4JFV		18	7	830	W9UIA		12	7	540
W4MKJ		16	7	665	W9GTA		11	5	540
W4OXC		13	7	500	W9JBF		10	5	760
W4JDN		13	6	—	W9DSP		10	3	700
W4IKZ		13	5	650					
W4JFU		13	5	720	WØEMS		21	8	1175
W4CLY		12	5	720	WNØGUD		20	7	1065
W4JHC		12	5	720	WØIHD		16	6	725
W4OLK		12	5	720	WØNFM		14	7	660
W4FJ		12	5	700	WØZJB		12	7	1097
W4UMF		12	5	600	WØINI		12	5	830
W4LRR		5	2	900	WØWGZ		11	5	760
					WØOAC		11	5	725
W5JTI		14	5	670	WØJHS		9	3	—
W5RCI		14	4	790	WØHXY		9	3	—
W5QNL		10	5	1400					
W5CVW		10	2	1180	VE3AIB		17	7	850
W5MWW		9	4	570	VE3DIR		14	7	790
W5AJG		9	3	1260	VE3BPB		12	6	715
W5ML		9	3	700	VE3AQG		11	6	800
W5ERD		8	3	570	VE1QY		11	4	900
W5ABN		8	2	780	VE3DER		10	6	800
W5VX		7	4	—	VE3BOW		8	5	520
W5VY		7	3	1200	VE3QN		7	3	540
W5FEK		7	2	580	VE3TN		7	4	480

Other OES are using the winter lull to accomplish such varied ends as shack rebuilding and 420-Mc. TV experimenting. W8WRN and W7JRG are the carpenters. W2UTH is drawing pictures at present, in the hope of transmitting pictures later.

Any mention of amateur TV in these pages is sure to bring widespread response. W4MS, Pensacola, Fla., says that four lines in October *QST* about the camera information he has prepared brought 18 requests from 6 different call areas. The TV enthusiasts have launched the American Amateur Television Society, operated on a nonprofit basis for exchanging ideas. W4MS and W1BHD are prime movers in this project.

Hints and Kinks For the Experimenter

TETRODE CIRCUIT FOR CLAMPER TUBES

A SPACE-SAVING and very practical idea was recently suggested by W2SGJ, using a miniature tube (6AK6, 6AQ5, etc.), connected as a tetrode, in the protective circuit for a screen-grid amplifier. After trial, we can safely say that for a given tube the arrangement provides more effective clamper action than does the more commonly used low-μ triode circuit. Referring to the characteristics of a pentode or a tetrode tube, it will be seen that the plate current is more dependent on screen voltage than it is on plate voltage. Therefore, if the screen voltage of a multigrid tube is maintained as some suitable value, the normal plate current of the tube will not be too greatly affected by reduced plate voltage. Naturally, this feature is ideal for clamper-circuit operation because it means that the protective circuit will continue to draw heavily through the screen-dropping resistor even after the plate voltage (screen voltage for the r.f. amplifier) has been reduced to a very low value.

Fig. 1 is the schematic diagram of a clamper circuit which uses a Type 6AQ5 tube. The circuit

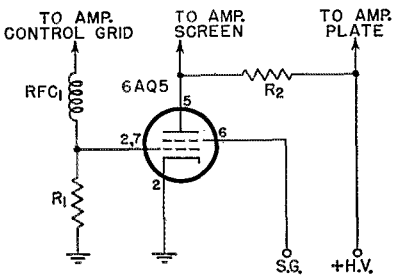


Fig. 1 — **Circuit diagram of the tetrode clamper using a miniature tube.**

differs from the standard low-μ triode layout in that the screen of the tube is fed from a fixed voltage source. R_1, R_2 and RFC_1 are all normal r.f. amplifier components. The voltage applied to the screen grid of the 6AQ5 may be obtained from the screen circuit of one of the exciter stages or it may be taken from the low-voltage supply through a dropping resistor. In any event, the applied voltage must be less than the value which will cause the screen-grid dissipation rating to be exceeded. A potential of approximately 130 volts appears to be maximum for the 6AQ5.

It is logical to assume that the screen-grid voltage for the tetrode clamper could be obtained from the amplifier high-voltage supply if the latter is one of the low-power jobs. If this system is employed, it may be necessary to tap the screen onto a voltage divider connected between the h.v. supply and ground. A simple series-dropping resistor may be used between the supply and the screen if the voltage does not rise too high when the clamper tube is cut off.

The above circuit will be of special interest to anyone who wants to clamp a 6146 — a tough tube to hold down. The writer has used both the 6AK6 and the 6AQ5 to clamp a 6146 to 15 ma. when the amplifier was operating with 360 volts on the plate. Under the same conditions, a conventional triode clamper held the current to no less than 100 ma. — *R. B. Haner, W2FBA*

[NOTE: *QST* wishes to thank Joe E. Stuckey, W4HCV, for forwarding data on his independent development of this screen-grid clamper circuit.]

[EDITOR'S NOTE: Here in the ARRL lab we found that the 6AQ5, operated as a tetrode clamper, will draw approximately 30 ma. plate current under the following conditions: E_p — 500 volts; plate-dropping resistor — 15,000 ohms; E_{sg} — 130 volts; I_{sg} — 13 ma.; E_{cg} — 0 volts.]

REVAMPING AUTO RADIOS FOR 160-METER MOBILE

MANY amateurs who wish to revamp a car radio for 160-meter mobile work are under the impression that an extensive modification is in order. Actually, the task is not nearly so difficult as would be expected and there are several types of receivers that can be done over in less than an hour. The following explains how easily and quickly the job can be done.

After the radio has been removed from the car, it should be opened and inspected. If the front end employs variable-inductance tuning, proceed as follows: First, locate the oscillator trimmer. This capacitor is usually mounted close to a converter tube (a 6SA7, 6A8, 6BA7, etc.) and is connected in parallel with a padder capacitance of approximately 300 $\mu\mu$fd. Remove the padder and replace it with one having a capacitance of approximately 250 $\mu\mu$fd.

The modified set should now be adjusted to the high-frequency end of the tuning range. Next, feed the output of a modulated signal generator to the antenna jack of the receiver and adjust the r.f. amplifier and the converter circuits for maximum response at 1900 kc. The set may now be reinstalled in the car and connected to the antenna. The antenna trimmer should now be peaked while listening to a weak signal located somewhere around 1800 kc.

Receivers employing variable-inductance tuning that we have converted have ended up with a frequency range of 600 to 1925 kc. Of course, the original calibration is off after the change but this is not objectionable after the push buttons have been set to their respective b.c. stations.

(Continued on page 124)

The operating position of ZD7A, picture taken by the proprietor of the Consulate Hotel, Jamestown, St. Helena. Authorities granted permission for the equipment to be installed atop Ladder Hill, a prominence over 800 feet above sea level (see below).

ZD7A

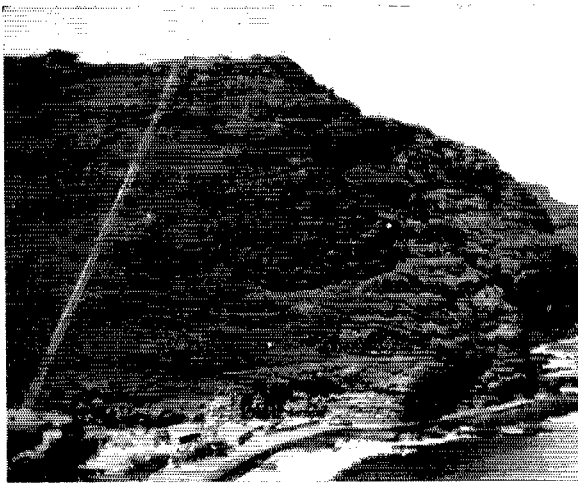
(Napoleon Was Born 137 Years Too Soon)

PICTURESQUE, volcanic St. Helena, famed as the island exile home of the Emperor Napoleon, is located some 1200 miles off Africa's west coast, has 47 square miles of area and supports an estimated population of 4800 souls. Until Arthur J. S. Hemsley (ZS6GV-ZS7B) came along, it was just another blank space on everybody's DXCC Countries List.

Thanks to OM ZS6GV and his keen perseverence in the face of obstacles so numerous in such an ambitious DXpedition, hundreds of amateurs throughout the world had an opportunity to contact ZD7-land. This very rare catch was available during most of the month of October, 1952.

ZD7A commenced eagerly-awaited operations October 10th and performed on the 20-, 15- and 10-meter bands steadily for over two weeks. The rig — a 6K6-6AG7-807 layout — was powered by an Onan generator and ran 20 watts input. This was all the soup needed to throw amateur frequencies into a howling uproar! The r.f. section and modulator were constructed as compactly as possible on a 12 × 7-inch chassis which can be seen atop the HRO receiver in the photo above.

Arthur's ambition now is to accomplish his own DXCC at his ZS6GV home station in Germiston, Union of South Africa. Grateful DXers everywhere will wish him the best of luck on it!

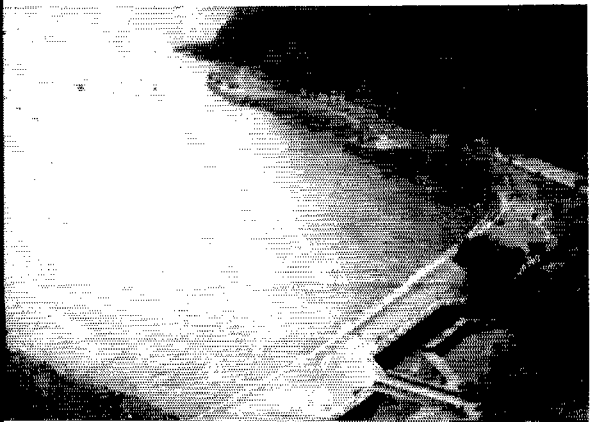


Right: Ladder Hill as seen from the floor of the valley in which all of Jamestown is situated. The valley is only 200 yards wide and a half mile in length. At the left is Jacobs Ladder with its precipitous angle. Arthur used this route to reach the gear of ZD7A from his quarters in the hotel below.

Right, below: Looking down the giddy angle of Jacobs Ladder from the small platform at the top. "Upon becoming used to the exhausting task and firmly grasping the rails, I skipped down two at a time and reached the bottom step in five minutes." No soft touch for a 42-year-old!

Below: A view of the bay from the rampart at the summit of Ladder Hill. Ships calling at the island must be anchored in the roadstead and all passengers and cargo conveyed to shore in rowboats. This system was disconcerting to ZS6GV but the islanders are adept small-boat sailors.

—All photos via W1FH



A.R.R.L. COUNTRIES LIST • *Official List for ARRL DX Contest and the Postwar DXCC*

AC3 ..... Sikkim
AC4 ..... Tibet
AG2 ..... (See I)
AP ..... Pakistan
AR8 ..... Lebanon
C (unofficial) ..... China
C3 ..... Formosa
C9 ..... Manchuria
CE ..... Chile
CM, CO ..... Cuba
CN ..... French Morocco
CP ..... Bolivia
CR4 ..... Cape Verde Islands
CR5 ..... Portuguese Guinea
CR5 ..... Principe, Sao Thome
CR6 ..... Angola
CR7 ..... Mozambique
CR8 ..... Goa (Portuguese India)
CR9 ..... Macau
CR10 ..... Portuguese Timor
CT1 ..... Portugal
CT2 ..... Azores Islands
CT3 ..... Madeira Islands
CX ..... Uruguay
DL, DJ ..... Germany
DU ..... Philippine Islands
EA ..... Spain
EA6 ..... Balearic Islands
EA8 ..... Canary Islands
EA9 ..... Spanish Morocco
EI ..... Eire (Irish Free State)
EK ..... Tangier Zone
EL ..... Liberia
EP, EQ ..... Iran (Persia)
ET ..... Ethiopia
F ..... France
FA ..... Algeria
FB8 ..... Amsterdam & St. Paul Islands
FB8 ..... Kerguelen Islands
FB8 ..... Madagascar
FC ..... Corsica
FD8 ..... French Togoland
FE8 ..... French Cameroons
FF8 ..... French West Africa
FG8 ..... Guadeloupe
FI8 ..... French Indo-China
FK8 ..... New Caledonia
FKS8 ..... (See OE)
FL8 ..... French Somaliland
FM8 ..... Martinique
FN ..... French India
FO8 ..... French Oceania (e.g., Tahiti)
FP8 ..... St. Pierre & Miquelon Islands
FQ8 ..... French Equatorial Africa
FR8 ..... Reunion Island
FU8, YJ ..... New Hebrides
FY8 ..... French Guiana & Inini
G ..... England
GC ..... Channel Islands
GD ..... Isle of Man
GI ..... Northern Ireland
GM ..... Scotland
GW ..... Wales
HA ..... Hungary
HB ..... Switzerland
HC ..... Ecuador
HE ..... Liechtenstein
HH ..... Haiti
HI ..... Dominican Republic
HK ..... Colombia
HL ..... Korea
HP ..... Panama
HR ..... Honduras
HS ..... Siam
HV ..... Vatican City
HZ ..... Saudi Arabia (Hedjaz & Nejd)
I ..... Italy
I, AG2, MF2 ..... Trieste
I5, MD4, MI4 ..... Italian Somaliland
I6, MD3, MI3 ..... Eritrea
IS ..... Sardinia
JA, KA ..... Japan
JAØ ..... Bonin & Volcano Islands
K ..... (See W)
KA ..... (See JA)
KB6 ..... Baker, Howland & American Phoenix Islands
KC6 ..... Caroline Islands
KC6 ..... Palau Islands
KG4 ..... Guantanamo Bay
KG6 ..... Mariana Islands
KH6 ..... Hawaiian Islands
KJ6 ..... Johnston Island
KL7 ..... Alaska
KM6 ..... Midway Islands
KP4 ..... Puerto Rico
KP6 ..... Palmyra Group, Jarvis Island
KR6 ..... Ryukyu Islands (e.g., Okinawa)
KS4 ..... Swan Island
KS6 ..... American Samoa
KV4 ..... Virgin Islands
KW6 ..... Wake Island
KX6 ..... Marshall Islands
KZ5 ..... Canal Zone
LA ..... Norway
LA ..... Svalbard (Spitzbergen)
LI, MC1, 2, MD1, 2, MT1, 2 ..... Libya
LU ..... Argentina
LX ..... Luxembourg
LZ ..... Bulgaria
M1 ..... San Marino
MB9 ..... (See OE)
MC1, 2 ..... (See LI)
MD1, 2 ..... (See LI)
MD3 ..... (See I6)
MD4 ..... (See I5)
MD5 ..... (See SI)
MD6 ..... (See YI)
MF2 ..... (See I)
MI3 ..... (See I6)
MP4 ..... (See VU7)
MP4 ..... Kuwait
MP4 ..... Oman
MS4 ..... (See I5)
MT1, 2 ..... (See LI)
OA ..... Peru
OE, MB9, FKS8 ..... Austria
OH ..... Finland
OK ..... Czechoslovakia
ON ..... Belgium
OQ ..... Belgian Congo
OX ..... Greenland
OY ..... Faeroes
OZ ..... Denmark
PA ..... Netherlands
PJ ..... Netherlands West Indies
PK1, 2, 3 ..... Java
PK4 ..... Sumatra
PK5 ..... Netherlands Borneo
PK6 ..... Celebes & Molucca Islands
PK6, 7 ..... Netherlands New Guinea
PX ..... Andorra
PY ..... Brazil
PZ ..... Netherlands Guiana
SM ..... Sweden
SP ..... Poland
ST ..... Anglo-Egyptian Sudan
SU, MD5 ..... Egypt
SV ..... Greece
SV ..... Crete
SV5 ..... Dodecanese (e.g., Rhodes)
TA ..... Turkey
TF ..... Iceland
TG ..... Guatemala
TI ..... Costa Rica
TI ..... Cocos Island
UA1, 3, 4, 6 ..... European Russian Socialist Federated Soviet Republic
UA9, Ø ..... Asiatic Russian S.F.S.R.
UB5 ..... Ukraine
UC2 ..... White Russian Soviet Socialist Republic
UD6 ..... Azerbaijan
UF6 ..... Georgia
UG6 ..... Armenia
UH8 ..... Turkoman
UI8 ..... Uzbek
UJ8 ..... Tadzhik
UL7 ..... Kazakh
UM8 ..... Kirghiz
UN1 ..... Karelo-Finnish Republic
UO5 ..... Moldavia
UP2 ..... Lithuania
UQ2 ..... Latvia
UR2 ..... Estonia
VE, VO ..... Canada
VK ..... Australia (including Tasmania)
VK1 ..... Heard Island
VK1 ..... Macquarie Island
VK9 ..... Papua Territory
VK9 ..... Territory of New Guinea
VK9 ..... Norfolk Island
VO ..... (See VE)
VP1 ..... British Honduras
VP2 ..... Leeward Islands
VP2 ..... Windward Islands
VP3 ..... British Guiana
VP4 ..... Trinidad & Tobago
VP5 ..... Cayman Islands
VP5 ..... Jamaica
VP5 ..... Turks & Caicos Islands
VP6 ..... Barbados
VP7 ..... Bahama Islands
VP8 ..... Falkland Islands
VP8 ..... South Georgia
VP8 ..... South Orkney Islands
VP8 ..... South Sandwich Islands
VP8 ..... South Shetland Islands
VP9 ..... Bermuda Islands
VQ1 ..... Zanzibar
VQ2 ..... Northern Rhodesia
VQ3 ..... Tanganyika Territory
VQ4 ..... Kenya
VQ5 ..... Uganda
VQ6 ..... British Somaliland
VQ8 ..... Chagos Islands
VQ8 ..... Mauritius
VQ9 ..... Seychelles
VR1 ..... Gilbert & Ellice Islands & Ocean Island
VR1 ..... British Phoenix Islands
VR2 ..... Fiji Islands
VR3 ..... Fanning Island (Christmas Island)
VR4 ..... Solomon Islands
VR5 ..... Tonga (Friendly) Islands
VR6 ..... Pitcairn Island
VS1 ..... Singapore
VS2 ..... Malaya
VS4 ..... British North Borneo
VS5 ..... Brunei
VS5 ..... Sarawak
VS6 ..... Hong Kong
VS7 ..... Ceylon
VS9 ..... Aden & Socotra
VS9 ..... Maldive Islands
VU ..... India
VU4 ..... Laccadive Islands
VU7, MP4 ..... Bahrein Island
W, K ..... United States of America
XE ..... Mexico
XZ ..... Burma
YA ..... Afghanistan
YI, MD6 ..... Iraq
YJ ..... (See FU8)
YK ..... Syria
YN ..... Nicaragua
YO, YR ..... Roumania
YS ..... Salvador
YT, YU ..... Yugoslavia
YV ..... Venezuela
ZA ..... Albania
ZB1 ..... Malta
ZB2 ..... Gibraltar
ZC2 ..... Cocos Islands
ZC3 ..... Christmas Island
ZC4 ..... Cyprus
ZC6 ..... Palestine
ZD1 ..... Sierra Leone
ZD2 ..... Nigeria
ZD3 ..... Gambia
ZD4 ..... Gold Coast, Togoland
ZD6 ..... Nyasaland
ZD7 ..... St. Helena
ZD8 ..... Ascension Island
ZD9 ..... Tristan da Cunha & Gough Island
ZE ..... Southern Rhodesia
ZK1 ..... Cook Islands
ZK2 ..... Niue
ZL ..... New Zealand
ZM ..... British Samoa
ZP ..... Paraguay
ZS1, 2, 4, 5, 6 ..... Union of South Africa
ZS3 ..... Southwest Africa
ZS7 ..... Swaziland
ZS8 ..... Basutoland
ZS9 ..... Bechuanaland
3A1, 2 ..... Monaco
3V8 ..... Tunisia
4X4 ..... Israel
9S4 ..... Saar

• The following are each considered separate countries, but have no regularly assigned prefixes: Aldabra Islands; Andaman & Nicobar Islands; Antarctica; Bhutan; Clipperton Island; Comoro Islands; Easter Island; Fridtjof Nansen Land (Franz Josef Land); Galapagos; Ifni; Jan Mayen Island; Jordan; Marion Island; Mongolia; Nepal; Qatar; Rio de Oro; Spanish Guinea; Tannu Tuva; Tokelau (Union) Islands; Wrangel Islands; Yemen.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W1VMW

On Facing Page —

UP-TO-DATE COUNTRIES LIST

• For the information of DX-Contesters, DXCC members and aspirants, this *QST* reproduces in full the official postwar ARRL Countries List, including all modifications and additions made to date.

How:

After last Thursday's club meeting at Bigswitch O'Riley's, some of us hung around to see how his new squirter would perform on an almost dead band. It was while we watched him call some Pacific stuff that Rhombics Roberts drew our attention to the "body english" our host was throwing into each and every call.

When Bigswitch sent a dash, his right foot struck the floor with the impact of a brick; on every series of dots he yanked at the lobe of his left ear with enough force to shorten his neck by an inch or more. The observation touched off an interesting discussion.

IRC Smith, who has the best QSL percentage in the club, recalled a W7 friend who had equally intriguing operating characteristics. "When starting to send," said IRC, "the fellow would transform his breathing into irregular grunts and wheezes, clamp a cigar upward against the tip of his nose and narrow his eyes to slits of awesome determination. It really got results."

Clippers Clark, our top 'phone DX man, brought up the case of a W8 acquaintance. "While calling the rare ones, Zeke would doodle all over his log sheets, swing his monitor gain control continuously and apply vicious scissors-holds to the right front leg of his operating table. They usually came back!"

"That's nothing," countered Hi-fi Hanson. "I knew a W5 who, when monitoring, kept snapping his right earphone like a pair of two-bit suspenders — invariably finished a DX test with a splitting headache. But he always did roll up mean scores."

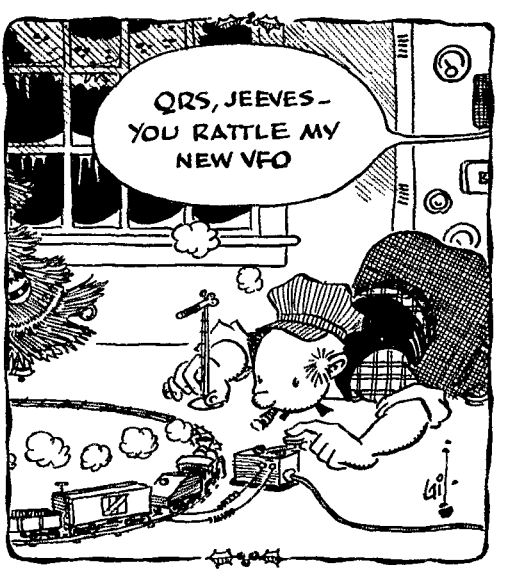
Evidently 'tain't so much what you do to raise 'em. It's *how* you do it. What's your system?

What:

Lower-frequency goings-on deserve looking into at this time of year. W1ATE reports that *seventy-five 'phone* has been sounding just like good old twenty on occasions. From 2100 EST well into the wee hours, Chad's ears have been dented by terrific signals from DI4LL, G2PU, **HB9MS** (3782), OX3WX, ZS6DW, **ZS6KD** (3790), **ZS6OW** (3792) and many others. Conditions have been so hot that even W6s and W7s are getting good cracks at such stuff . . . . . W2WZ was in there slugging, too, and came out with **EA2CQ** (3789), HB9MS, **OK1MB** (3800), **HR1BG** (3785), **VPs 6CJ** (3797), **6SD** (3778), **9AX** (3787), **9BG** (3800), 9G (3771) and **VQ3BU** (3784) . . . . . W1ATE says a fairly efficient vertical (nothing overly high or fancy) and a little soup will really bring home the bacon. More stations, and particularly more DX stations, should give it a good try.

On *eighty c.w.* things are hopping, too. W7MQY/KA2 is hearing our Novices in Japan — WN7QXD was really boiling in . . . . . EA9AP at 0030 AST, EIs 7S (1917), 9J (2043), 9Q (2140), CN8AF (1832), FP8AP (1900), DL7AU (2040), CT1DJ (1953), OE13RN (2111), OZ5PA (1926), PAØXYZ (2045), VP4LZ (2113) and numerous British Islers fill VE1JD's log. EI7S was running a mere two watts and all these stations were found between 3500 and 3515 kc. Liz has been hearing 4X4BX but no QSO so far. Don't forget that VP4LZ goes for South America and may be convenient for your 80-meter WAC . . . . . W4FWZ was among those to encounter ZK1AN/MM and he also nailed VP5BH of the Caymans . . . . . EAs 1AB 1BC, FA9RZ, F9RS, OKIs HI HM, SP3PF, ZD4AB and 4X4DH are other entries to be heard haunting 80's low edge — this should be an interesting season. Let the WACs *fall where they may!*

Twenty, as a rule, doesn't propagate too well when the lower freqs are jumping. But we do have a note or two on the band. W8HEV came through with **CP1BX** (14,050), **CRs 5AC** (040), **6AC** (044), **6CC** (070), **CTs 2BO** (010), **3AA** (011), **3AB** (030), **CN8MZ** (060), **EA9AP** (001), **FF8AG** (075), **FQ8AP** (040), **HB1IL** (001), **KA2IM** (060), **MI3US** (020), **OA4AK** (035), **OE13HS** (020), **OQ5LL** (050), **PJ2AD** (015), **TF3MB** (005), **TG9s AC** (010), **RB** (040), **TI2ES** (007), **ST2GL** (007), **VPs 2MD** (025), **5BL** (030), **5BH** (005), **7NB** (025), **8AT** (060), **VQ4DO** (033), **YV5s ES** (010), **EZ** (005), **ZE3JM** (040), **4X4RE** (020) and **5A3TU** (065). Tom is parting with his 813 rig in favor of a Viking II. He certainly made a fast rise up to 90 countries . . . . . Getting his Lazy H back up, W9IHN collected **CR7LU** (050), **F9QV/FC** (035) in Corsica, **FKS8BC** (010), **MF2AG** (030), **OE13RN** (065), **SP5AB** (010), **VQ4FCA** (043), **YU1AOP** (105), **ZC4IP** (050), **ZK1BC** (015), **3V8AN** (078) and **5A3TZ** (055) . . . . . ZC4IP was W8DLZ's first Asian after many years — W8NOH picked up **CR6CZ** (040).



* DX Editor, *QST*.

Colombian ham enthusiasts (front, *l. to r.*) HKs 6JH, 7BX, 3DJ, 4BI, 6ES, 3AO, 6ES' 2nd oprs.; (rear) HKs 5FN, 4DP, 6FU, 6FI, 6CG, visiting Capt. A. Sanchez, 3CZ, 6HI, another visitor, and 3LS hold monthly meetings at Manizales.

«

YU1DQ (012) and TG9RB . . . . . FF8AJ, FQ8AG, HC1JW, OQ5RA, VQ2KR and VP5BH were grabbed by W4TVQ . . . . . When you're up over 200, new countries come hard. **LB6XD** (019) was W2QHH's first 1952 trophy along this line . . . . . W6ZZ installed a new beam rotator in time to work CP1s BK BX, DU1DO, EA8BF, EL1DFX, KB6s AX AY, KAs 2KW 2US 8AB, KC6QL, KJ6AR, KX6AI and VR2CO. Miles would like to swap his 150-watter for some real soup, but he's doing okay . . . . . DU1MB, GD3UB, JA3AF, KV4AA, TF3AS, YU1CY and ZS3K are among W2AYU's latest successes. An 838 at 200 watts does the job for Walt . . . . . W1UPO wants it stressed that the gang at M1T's W1MX continue to keep the bands warm. Their DX log contains stuff like CT3AV, FF8AN, GC4LI, HR1AT, IS1AHK, MB9BJ, OE13HL, PZ1OY, SP3PF, TA3AA, TF3SG, YU1DA, ZS3s U Q, 4X4RE and 9S4AX — you can't find such on slide rules . . . . . W3SNY's first crack at 20 produced HB9HF. Thereafter he scored with CE3CD, FP8AP and an OK1 . . . . . ZD7A, ZS3Q and LB6XD brought K2BU up to 144. W2GVZ also caught ZD7A but W4RNP let him get away . . . . . West Gulf DX Club's *DX Bulletin* tells of **AP2K** (100), **CRs 4AE** (090), **4AF**$_6$(076), **6AR** (060), **EL2C** (004), **FB8s BB** (050), **BE** (050), **BI** (060), **ZZ** (050), **FD4AD** (080), **FG7XA** (019), **FM7WD** (150), **FR7ZA** (020), **KM6AX** (085), **LZ1KAB** (020-050), **MP4s BBD** (050), **KAI** (089), **PJ2CF** (025), **SP2KGA** (060), **TF5SV** (106), **VK1S JN** (090), **PN** (087), **VQ3BM** (054), **VRs 2BZ** (051), **4AE** (145), **VP8s AE** (102), **AN** (108), **AU** (050), **VS6CG** (044), **VU2JG** (022), **YO2BC** (058), **ZB2I** (064), **ZC4RX** (091), **ZP5AY** (080), **ZS7F** (070), **5A2TV** (017), **5A3s TA** (025), **TR** (102) and **9S4MQ** (028) . . . . . Heard but not QSOd by W2AYU were CR5JB, FY7YC, MI3s JV SL, UG6KAA, UA9KC, VS9AW, ZE5s JN and JL.

On *twenty 'phone*, **AP2L** (14,120), **CR6s AC** (142), **AI** (138), **AT** (170), **BX** (122), **FB8s BA** (150), **BC** (160), **BI** (200), **FF8AP**, **FM7s WD** (150), **WF** (132), **FO8AD** (140), **GDs 2FRV** (140), **3UB** (171), **HZ1MY** (135), **KAØIJ** (200), **MI3s JV** (190), **LK** (200), **MP4s BBI** (130), **HBK** (170), **PZ1WK** (107), **SU5CC** (270), **TA2EFA** (189), **TA3AA** (195), **VPs 1AB** (180), **2SE** (180), **3LF** (144), **3YG** (111), **VQs 2DC** (140), **3BU** (150), **3CH** (180), **4AA**, **5AU** (150), **VSs 1AY** (194), **7EA** (181), **7FG** (197), **7NG** (100), **7PW** (142), **7WA** (181), **9AW** (140), **VU2ET** (224), **ZDs 2CDI** (180), **6RD** (170), **ZK2AA** (192) and **ZS9G** (118) are active A3ers specified by W5KUC and the West Gulf boys.

Fifteen has its good days and W4COK doesn't miss many of them. Bill is up to 59 countries on 21 Mc. — EA9AP, ZK2AA and 4X4RE are his latest. W4COK heard AC3PT trying out the band but no QSO luck . . . . . Operating only on week ends, KP4KD found **CE3AG** (21,060), KH6YL, KZ5DE, **TA3AA** (030), **VQ4HJP** (060), **ZD9AA** (045) and **9S4AX** (015). Short skip brings Ev fill-ins from the Caribbean area and he notes CT3s AB and AV doing a land-office 21-Mc. trade . . . . . W9NSL's first affliction of 15-meteritis brought him PY6DU, VP7NM and ZS6CM

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Louis Fonseca, VP3LF, is British Guiana's senior amateur licensee. Thanks to VP3LF, that country is quite available on 10 and 20 'phone. (*Photo via W2AIS and VP3WO*)

. . . . . Times and frequencies from W8NOH: **PY2CK** 1025 (050), **LU9AX** 1740 (025), **VQ4HJP** 1315 (074), **ZE2JP** 1238 (062), **ZS2A** 1050 (045) and **FY7YC** (021), all EST . . . . . W6ZZ snagged KA2FE, OA4DI, T12TG and ZE2JV while hearing CN8MI, OQ5GU, YV5DE and ZS3K.

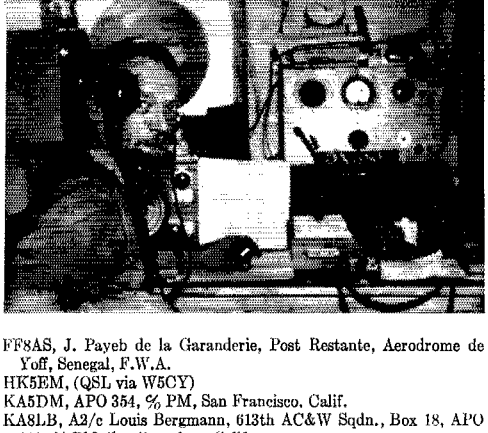
Let's see what's been popping up on *forty*. Asia eluded W3HH for 25 years until 4X4RE came along on 7 Mc. Gil added EA8BI, FF8AG, PJ2AD, some VPs and YV5DE. ZSs and VKs are also represented on his list . . . . . **HK5CR** (7033), **KM6AX** (041) and **VP5RU** (053) were tracked down by W9LMC . . . . . Look what W7QJV rounded up with only 10 watts to a 6V6: KL7APY, VKs 2ACP 5XK, VPs 7ND 9BG and ZL3GQ. Business is so good John doesn't bother to list his KH6s . . . . . W6ZZ scored with KX6AH while W8NOH tangled with **FF8AG** (024), **TI2PZ** (024) and ZS2A . . . . . HR2ZE, VPs 4TR 5BF, 3A2AB, 5A3TR and an FF8 were captured by W4TVQ . . . . . Six more countries will make it an even 100 40-meter total at W2QHH . . . . . A new ground-plane deal at W1MX did the trick for CT3AB, EA8s AW BF, HR1AT, LUs 1ZI 4ZI, OK3IA, TA3AA, VR2CG, YUs 1AFG 1CY 3AIJ 3AJK 3DO, TF5SV, ZC4RX, ZD4AB, ZE3JP, ZS3s Q U, 4X4RE and a 5A3. Yugoslavians really hit forty with a lead pipe! . . . . . Other goodies noted on 7 Mc. are HC1FG, VP8AJ, VQ4DO, ZK2AA, ZS3K, ZS9I and **MP4BAU** (011) of Qatar.

One-sixty opened with a large bang last November 9th at W1LYV. Lanny worked 10-watters G6BQ, GW3FSP, G3HYG and G3GGN in that order beginning at 0530 GCT . . . . . A letter from G6LB to W1LYV warns that Ws calling DX between 1800 and 1810 kc. are often blotted out by local Dutch Navigational 'phone station, "Scheveningen Radio." Looks as if we'd best do our European calling above 1810 kc. this season during the 160-Meter Trans-atlantic Tests (see Dec., 1952, *QST*, pp. 64-65).

Where:

VERON (Netherlands) emphasizes that its bureau is the only representative one for PAØ QSLs. Send your PAØ-bound cards to VERON's listed address . . . . . May we remind you there's nothing necessarily "official" about the QTHs we gather for these monthly listings — they range from first-hand-via-mailbag authentics down to the scuttle-butt variety, all presented in the hope they may lead you to a fast QSL. Here are those we have on hand:

CN8FI, (QSL via WØCEW)
CR6CC, Box 219, Luanda, Angola
ex-D2KW, (QSL to G8KW or via RSGB)
ex-D4AEP, (QSL to W8OKN)
FB8BI, Box 587, Tananarive, Madagascar
FF8AP, Louis Maurel, Box 6020, Dakar, F.W.A.



FF8AS, J. Payeb de la Garanderie, Post Restante, Aerodrome de Yoff, Senegal, F.W.A.
HK5EM, (QSL via W5CY)
KA5DM, APO 354, % PM, San Francisco, Calif.
KA8LB, A2/c Louis Bergmann, 613th AC&W Sqdn., Box 18, APO 919, % PM, San Francisco, Calif.
KA9AA, Fred B. Westervelt, U.S.A.H., APO 309, % PM, San Francisco, Calif.
ex-KC6QL, R. W. Hammond, R.D. 7, Box 72, Greensburg, Pa.
KH6ARA, Pat Miller, P.O. Box 942, Hilo, Hawaii, T.H.
KR6HX, (QSL to W9FNB)
ex-KW6AR, (QSL to KZ5IL)
ex-KW6AW, D. Lynch, Box 888, Fairbanks, Alaska
KZ5IL, Ivan C. Lundblom, P.O. Box 35, Cocoli, G.Z.
LB9IC, (QSL via NRRL)
ex-SU1AD, W. R. Jarvis, 5 Stratford Pl., Westwood Gardens, Babylon, L.I., N. Y.
TG9AC, Box 12, Guatemala City, Guatemala
VP6UN, (QSL via VP6JR)
VP7NV, Wm. D. Frerichs, W4COK, 223 Beverly Rd., Cocoa, Fla.
VP8AP, Box 243, Port Stanley, Falkland Islands
VS2DQ, J. C. Pershouse, Baling Estate, Kuala Ketil, Kedah, Malaya
YV5ES, Box 2285, Caracas, Venezuela
ex-ZC1AL, (QSL to VS2DQ)
ZD2CDI, P.O. Box 173, Lagos, Nigeria
5A2TZ, Box 372, Tripoli, Libya
5A3TA, S/Sgt. M. Nissen, 41st ATS, APO 231, % PM, New York, N. Y.
5A3TK, T/Sgt. M. T. Edmonds, AF31446906, 102nd AC&W Sqdn., Box 158, APO 231, % PM, New York, N. Y.
5A3TU, Box 372, Tripoli, Libya

The preceding thanks to the good offices of W1s ILO RWS, W2CJX, W3MZE, W4s LVV LXX, W6YK, W8s HEV NOH, W9CFT, OQ5RA and the *DX Bulletin*. If *you* run across an address or two somebody may need, ship it along.

Tidbits:

Asia — VU2JP is the first Indian station to make post-war DXCC on 'phone or c.w., according to W6YYN/1 . _ . _ . _ W4TFX attends high school in Yokohama and Dad W4IA writes that, under new regulations, U. S. amateurs operating in Japan are more properly termed Auxiliary Military Radio Operators and Stations. U. S. Security Forces in Japan may operate 10, 15 and 20 meters but no mobile privileges are authorized at present . _ . _ . _ Chandernagore hams should be signing the VU prefix as of May, 1950; the French pulled out at that time. This would include FN8AD. The French Indian cities of Pondichery, Yanaon, Mahe and Karikal are still tagged with the FN8 prefix for permanent as well as temporarily installed amateur stations. F8TM of REF writes to invite U. S. "ham tourists" to visit French India for some *real* DX operating. [We'll drop right over after supper. — *Jeeves.*] FI8 amateur work, adds F8TM, is still highly unauthorized . _ . _ . _ Second Class ops in Japan may operate only the spot frequency of 7087.5 kc., and that with power output not to exceed eight watts. There, certainly, is a crying need for some out-of-this-world selectivity! . _ . _ . _ VS2DQ (ex-ZC1AL) has been putting a good signal into Europe with a 20-watter while he readies a 120-watt 'phone rig for the fray. James writes to KR6JL that the U.S. "Island Gang" put terrific signals into Malaya with kilowatt gear.

Africa — OQ0 will be the new prefix for Ruanda-Urundi as soon as administrative powers-that-be get off the dime. OQ5RA, our informant, is limiting his current ham activity to Saturdays only, while he studies in preparation for various technical examinations of a commercial nature . _ . _ . _ OQ5AV came back from a stay in Belgium to settle himself in Ruanda-Urundi; he should be radiating from there by the time you scan this stuff . _ . _ . _ OQ5LL returned from his U.S.A. wanderings and is hitting 20 meters hard to make up for lost time . _ . _ . _ FQ8AP removed from Brazzaville to Fort Archambault and is also back at it once again . _ . _ . _ VQ8CB will minimize his Chagos ham activity in favor of more work at his VQ8AB, Mauritius, set-up . _ . _ . _ In WGDXC's *DX Bulletin* we learn that FF8s are now permitted 200 watts on 80, 40 and 20 meters, 300 watts on 15 meters and below. . . . FR7ZA finds that U. S. East Coasters have been leaking through to Reunion best between 1100 and 1300 GCT. . . . FB8s BA BB BC BE BH and BI are Madagascar calls now assigned.

Oceania — KH6ARA moved to Hilo after signing up as chief engineer for KHBC . _ . _ . _ KC6QL pulled out of Truk in mid-October after falling seventeen countries short of his intended Carolines DXCC. Bob regrets he was unable to squeeze more W/VE QSOs into his log but ham-band conditions down that way were generally quite spotty during his stay. KC6QL's shutdown will spill a load of on-the-air Carolines pressure over to KC6QY of Ponape . _ . _ . _ KR6HX (W9FNB) zipped back to the States almost before his Okinawa QTH appeared in "Where." He and friend W9OLU/4 are but recently separated from the service . _ . _ . _ Rapa Island, QTH of quite-active FO8AD, carries a separate designation for REF's *DUF* award. There are four other such designations in FO8-land. W1NWO offers to fill anyone in on details concerning this award.

South America — Paraguay call signs took a shuffling as of late 1952. The letter following the numeral in a ZP call formerly indicated geographical location but now that task is up to the numeral itself — ZP3, for instance, holds for Concepción-Amambay and ZP5 for Asunción. There are nine zones in all with ZPØXA-ZPØXZ used for experimental (non-amateur) work and ZPØAA-ZPØZZ for amateur mobile. ZPs 3AC and 9GA have collaborated to publish an anthem for their Radio Club Paraguayo of which ZP5AJ is President and ZP5CF, Secretary.

—•••—

Jeeves urges that we add this important expression to our DX equations in terms of countries: OE1 + EQ + FI8 + HS1 + PK = 0.

Amateur radio means a lot to OX3SF of the isolated Greenland outpost at Kangerdlugssuak. Though they may take a year or more to arrive, Greve vows QSLs for all QSOs. He prefers 14-Mc. c.w. work.

HB9GJ is one of Switzerland's most active amateurs, as his shack walls will verify. You may have worked Fritz as HE1GJ. HB9GJ holds DXCC, WAC, WAS, WBE and H-22 awards. Mrs. HB9GJ looks on.

January 1953

Correspondence From Members-

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

HAM TEAMWORK

707 Sheridan Rd.
Evanston, Ill.

Editor, *QST:*

Ham radio as a hobby of real importance suddenly struck me as unique among the personal-ability avocations. It takes more than just the hobbyist to make it work; it takes others to go along with him. It isn't an introvert sort of thing, as so many "making" or "collecting" games can be, but combines the feature of one's being able to stay by himself for the building of gear if he wants solo time, and then gives him the whopping crowd of other hams to mingle with when he operates. No wonder it appeals!

— *Temple Nieter, W9YLD*

RADIO ECHOES

6520 Horrocks Street
Philadelphia 24, Penna.

Editor, *QST:*

Robert Landstrom might send himself a QSL since the radio path must have approached 186,000 miles.

The Editor's suggestion, however, is not the only answer possible and here is one with far more zip and fancy!

In about 1928 echoes were recorded from a Holland station where delays as great as 20 seconds were noted. This curious event was brought to the attention of Dr. Van der Pol. At this point, I lose track of the story until the final theory of the suspected cause is outlined by Dr. Stromer. All the above data and the following suggestion is mentioned in a book by Harlan T. Stetson called "Earth, Radio and the Stars."

It seems that the earth is located in the inner diameter of a toroid. This toroid is a current sheet device made of electrons or other charged particles of negative polarity which approach the earth from interstellar space. The polar axis of the earth is along the common axis of the toroid.

The presence of this shell prevents primary charged particles from reaching the earth except at the polar regions. When the received density is high the particles ionize the atmosphere, producing the aurora, both northern and southern. At the same time, the inner surface presents an excellent reflective medium for electromagnetic waves.

Echoes based on this reasoning were predicted and actually observed.

Could it be that since you were broadside north that the density was high enough to reflect back an echo, coupled with a Heavyside critical frequency which allowed your signals to pass through?

If, as the Editor suggests, the wave was trapped by multiple reflections the band would have been open. This apparently was not the case and the band was dead, in good agreement with what would be expected for this suggestion. Further, the toroid density may even be part of the reason for a thin Heavyside condition. It would be interesting to find out if an aurora display were in progress on or about the date when the echoes were noticed.

The ARRL has a chance here to act as a clearance house for such phenomena observed by amateurs when the data is useful to the various scientific groups. It is just possible that one fact gained here may prove much to the common good on which we base our existence.

— *Benjamin Dyner, W3KBD*

715 Woodside Way
San Mateo, Calif.

Editor, *QST:*

A possible explanation for the echo signals referred to by W9FUR in the September *QST* is that his 14-Mc. signals were being reflected back from the moon.

The mean distance of the moon is 384,400 kilometers; twice that is 768,800 — divided by 300,000 (speed of light in kilometers per second) gives 2.59 seconds delay for the reflected signal.

The dead condition of the band could have been caused by absence of a reflecting layer, which would allow signals to penetrate to outer space. Was the moon above the horizon at that time?

How about some experimental moon QSOs?

— *Margaret J. Hartley (age 13), W6JPI*

HELP

R.R. 3
Elkhart, Ind.

Editor, *QST:*

Help! Amateurs are being struck, strangled, harassed, and restricted by the greatest spree of bureaucratic regulations since the war. Every month when I open my *QST* I find changes in regulations, either enacted or proposed. Now it is Docket 10237. I have been thinking of retaining a lawyer to advise me while I operate.

Somebody must be taking the attitude that amateur radio is a business or profession. I myself do not have unlimited time to spend on amateur radio. I have a duty to my employer, my family, my church, and others. I am also interested in other hobbies: astronomy and dog breeding.

Now in my radio operation I have to keep up with changes in frequency allocations and sub-allocations, docket this, and docket that. I like to do some construction. I have to investigate TVI. When can I get on the air for a rag-chew?

— *Rolland Jackson, W9QQT*

QRP

17625 Salem
Detroit 19, Michigan

Editor, *QST:*

Just a line to say that I have experienced very good results with the one-tube (6V6) transmitter that you described in your booklet *How to Become a Radio Amateur*, on pages 20–21. The whole rig (and I had to buy most components new) cost about $15. I appreciated the fact that I was able to get on the air so inexpensively, thanks to the ARRL. I have made a couple of 100-mile contacts, and can do 20–25 miles without any trouble.

The only change I made was to add a d.c. milliammeter, and I wound my tank and output coils on inverted Alka-Seltzer bottles with the caps bolted to the chassis, dipping the bottles and coils in paraffin after getting proper spacing to make the deal mechanically solid. I use a Marconi antenna with about 33 ft. of flat-top.

— *Steve Parker, WN8LJO*

DISHONEST REPORTS

2097 Norman
Muskegon, Mich.

Editor, *QST:*

Who are we kidding? The "RST" system adequately fulfills all possibilities and yet broad, chirpy, a.c. notes consistently receive 569x reports. This is unfair.

A good operator — and a true ham — will accurately report the other boy's signal. Let's be honest and clean up our bands of rough, chirpy, wobbly notes. Let's quit "thanking each other for the nice report." The burden lies with the sender. A good report originates with the sender — let's get that monitor working, and put a fire under the set-up, not wait for FCC to do it for us. Who are we kidding?

— *Walter A. Peterson, W8IXI*

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
R. L. WHITE, W6YYN, Asst. Comm. Mgr., C.W.
GEORGE HART, W1NJM, Natl. Emerg. Coördinator

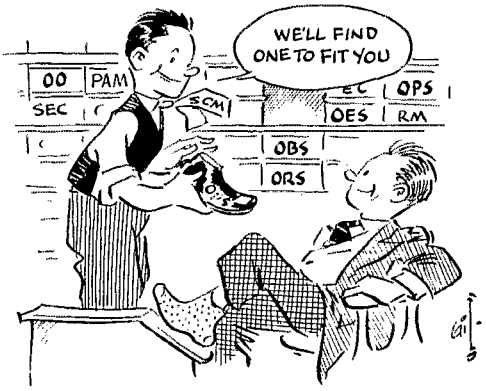
J. A. MOSKEY, W1JMY, Deputy Comm. Mgr.
ELLEN WHITE, W6YYM, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, Administrative Aide

Activity and Progress! The New Year is a good time to take a look at individual operating progress during the past year, and to start going in for participation in the operating opportunities that are here or just ahead. Some are spot or week-end activities that give maximum results for minimum time at your equipment. Others like traffic handling, reporting into your 'phone and c.w. Section Net, or working as many Novices as you can to contribute to their Round-up (Jan. 10th–25th) can be taken a little at a time each day for maximum pleasure and real communications results. All the things that give point to operating are most worth-while and designed to add strength to our institution of amateur radio as well as to furnish enjoyment and a barometer of personal progress, as through our several operating awards.

In the next five weeks you can (1) give the Code Proficiency qualifying runs scheduled from W6OWP and W1AW a whirl; (2) give your v.h.f. gear a real workout in one of the annual outstanding v.h.f.-ARRL events, the V.H.F. Sweepstakes, Jan. 10th–11th; (3) accumulate and send to *QST* your points from Novice QSOs in the 15-day Round-up; (4) become an ARRL SCM appointee, then participating in the CD QSO Party, c.w. section, Jan. 17th–18th, or 'phone section Jan. 24th–25th; (5) get in the ARRL DX Competition for some new countries ('phone sections start Feb. 6th and 20th with c.w. periods to follow); (6) give your frequency-measuring ability a workout Feb. 11th in the Frequency Measuring Test, full announcement next month. What project or band or new proficiency comes next on your list? Operating communications are the final test of your ability as a communicator. Our service record in handling emergency communications, personal traffic for each other and third parties, our membership in AREC, in RACES groups, in Section networks, whether we individually have a *mobile*, or *emergency power* in the home station, spell out our ability as a group as well as our position as a good citizen in the community of amateur radio. We help to write the continuing story of amateur radio progress or we drag our feet. It depends on seizing the opportunities around us, in staying an active instead of becoming a dormant sort of amateur sitting on the sidelines as history is written.

May we cordially invite all readers to take part in any or all operating activities scheduled in '53. We spell out all real progress through *activity!*

There's Point to Appointment. Elsewhere in this issue we are presenting some information, first of a series, about ARRL's Official Relay Station and Official 'Phone Station appointments. Next month (and the next) we expect to explain additional organizational posts to which every amateur and League member should aspire. The Communications Department aims to have something for every operating amateur along the line of his natural interest, even aside from the many



awards and spot activities to assist progress and enjoyment. As Gil's cartoons make clear, there is a needed spot every self-respecting amateur should fill. Most of our posts exemplify the "of, by and for" the amateur, helping us to serve each other better and build amateur fraternity values in which we can each be proud. Your SCM (see page 6) will be happy to entertain your request for more appointment information.

About Ham Sportsmanship. The real sportsman is fair and generous, a good loser as well as a graceful winner. Those to watch are those that so grasp for the *symbols* of winning that they lose their spirit of operating enjoyment, comradeship and responsibility. Those few amateurs who do not meet up to general ARRL standards can hurt the amateur game as well as cheapen themselves. The chap who sneaks off frequency by so much as a kilocycle to get some DX is *practically always* heard. He risks and may get an FCC citation; almost always, however, he gets logged by his DX brethren. Even if contact is made, instead of getting special credit he becomes openly talked about and despised.

Most keen operators enter contests for the operating sport and station workouts involved

and keep themselves above the barracks-room lawyer contest approach. Getting their pleasure from the operating made possible, without overemphasis on just score tokens of progress, one is less tempted to stoop to inconsiderate-selfish practices. In so operating truly for fun the spirit as well as the rules of the competition are easily met.

Secrecy of Communication. The provisions of Sec. 605 of the Communications Act apply to *all persons*, including licensed operators. Information specifically addressed, whether in record communication (messages) or after a definite sequence of radio call signal identifications (which confine transmissions to individuals or groups) are covered by the all-inclusive wording of this important section of the Act. Amateurs of course are required to know and observe the provisions to the letter, application of the section very often being a part of FCC examinations. Significant extract:

"Except in case of broadcasts or information for the general public or relating to ships in distress, no person receiving or assisting in receiving or sending radio information shall divulge, publish or use such, to any person other than the addressee, his agent, or attorney, or one employed to forward such communication to its destination . . . also, no person not authorized by the sender shall divulge the existence, substance or meaning of such intercepted communication to any person . . . or use the same for his own benefit or the benefit of another not entitled thereto. . . ."

Helps for the Novice. We invite any Novice or prospective Novice to request our Reference Guide tabulation of information on code helps which gives articles of reference and information on the availability of code records, etc. The W1AW transmission schedule is probably one of the best helps of all. One of the items ARRL has to assist through *clubs* is a club-award type of code proficiency certification. Such special certificates are adaptable to code-receiving or code-transmitting (hamfests) contests or club programs for the new man to reward step by step proficiency increases. They are similar but of broader application than the Hq. Code Proficiency certifications based on submission of copy on W1AW or W6OWP, after practicing on W1AW and W6JZ. The only requirement is that a full report of each club's award be reported to ARRL on the proper form. The program has to be supervised properly so the certificates mean just what they say when issued under local auspices. The Camp Gordon Radio Club, among others, is a leading group in issuance of these certificates. ARRL invites inquiries from any clubs that will start programs for the Novice or others this fall which would like some suggestions for this part of the program with information about *club* certification.

— *F. E. H.*

ELKHART LAKE ROAD RACES

Amateur radio is well on the way to being indispensable to the running of the annual Elkhart Lake Road Races. For the second year communications at this event were supplied by the Milwaukee Radio Amateurs' Club.

These races are an annual amateur racing event sponsored by the Sports Car Club of America. In 1952 they attracted *130,000 spectators! The race course comprises the main* street of the town of Elkhart Lake and the winding concrete highway that runs around the lake, a distance of six and one-half miles for each lap. The start-finish line is located in the town and nine additional check points were established at strategic points around the course.

The Elkhart Lake races present a big communications job. They are run on both Saturday and Sunday, this year September 6th and 7th, and it is necessary to maintain the communications system each day from 9:30 A.M. to 5:00 P.M. MRAC's emergency radio truck, W9HRM/M, left Milwaukee at 4:30 A.M. Saturday morning accompanied by several 75- and 10-meter mobiles and was stationed at the start-finish line as control station. A doublet was erected for operation on 3950 kc. with the 32-V transmitter, an HRO and a ground-plane for 29,640 kc. with the Harvey-Wells transmitter. Reception was provided by an RME converter and NC-57. For convenience in contacting both groups of mobiles the control station was arranged to control and modulate both transmitters simultaneously. While the truck was operated from commercial power, its emergency 2½-kw. a.c. generator was available as a stand-by.

Some thirty-five mobiles were used, many of them participating on both days. The amateur radio personnel were designated as "Emergency," a top priority rating permitting their free movement anywhere, except on the track, during the races. Mobiles were assigned to each of the nine track check points. When available, two cars operated alternately at a single location to provide absolute reliability.

Assignments of MRAC's personnel at the truck included a press relations man, two photographers, clerks, loggers, stand-by mobile radio crew, control operators, assistants, messengers, and two crews with emergency mobile radio units for use on the track. One of the latter was called into service when a serious accident marred the Sunday morning event. A racing driver lost control of his car, went through a snow fence and baled hay, broke off a telephone pole and plunged into a group of spectators. Fortunately there were no fatalities, but nine persons suffered broken bones. At the first report of the accident, the Chief Track Steward had the control truck transmit instruction for a "yellow" light at all positions. This signal limits speed on the track to fifty miles per hour and all racing cars are required to maintain their relative positions. Next instructions put four ambulances and two "wreckers" on the track accompanied by an amateur mobile unit. With more than fifty racing cars on the track at the same time, this assignment was quite dangerous and certainly exciting!

Mr. R. H. Underwood, Director of Civil Defense Communications in Milwaukee (and Superintendent of Western Union at Milwaukee), was present to observe the operation and made a complete report to the Milwaukee Civil Defense and Disaster Committee. Mr. Underwood estimated that

◆

MRAC members record sound effects for a film record made of the Elkhart Road Races. *L. to r.:* W9ONY, W9GLA, Lester R. Moldenhauer, W9SNK, W9CUW, W9GPI, W9PWG (barely visible behind W9GPI), and Raymond Underwood. Standing at rear of truck is WN9BVZ. (*Photo by W9DTK.*)

more than 500 messages were handled at the control station!

In the two days of operation there were no failures in the entire communications set-up. Sports Car Club officials and Elkhart Lake Chamber of Commerce officials were lavish with their praise of the service performed by the amateurs. Excellent press notices were received in the *Milwaukee Journal* and the *Chicago Tribune.*

All operations were under the supervision of Charles Kaetel, W9SNK, Director of Mobile Activities for MRAC. Each of the following amateurs contributed materially to the success of the operation: W9s ANA, BPR, BTQ, CUW, DTK, ESE, ESJ, FY, FPA, GLA, GPI, GZR, HWX, IDW, IFS, IZO, KEU, LFP, LSK, MDG, MGT, MOT, MPF, NLY, ONY, OOI, OPS, ORQ, OVO, PYM, SNK, SZH, TFX, UH, VLK, VQD, WK, YDI, and WN9VBZ.

— *H. Charles Kaetel, W9SNK*

CODE-PRACTICE STATIONS

The following is an up-to-date list of all stations transmitting code practice in the ARRL Code Practice Program:

W1MNG, Arthur Zavarella, 1702 Main Street, Agawam, Mass. 29,400 kc., Tues., Thurs. 1900–1930 EST, beginners' speeds.

W1SRB, Al Vesce, 84 North Main Street, Thompsonville, Conn. 29,600 kc., Mon., Wed. and Fri. 1930–2030 EST, beginners' speeds.

W1VBG, Carl Norris, 128 Meadow Street, Westfield, Mass. 29,400 kc., Tues. and Thurs. 1900–1930 EST, advanced speeds.

W2FSL, Adolph F. Elster, 53 Commercial Avenue, Avenel, N. J. 3675 kc., Sat., Sun. and holidays. 0730–0800 EST, beginners' speeds.

W4RUR, E. J. Blatt, 536 16th Avenue So., St. Petersburg, Fla. 28,050 kc., Mon. and Wed. 1900 EST, beginners' speeds.

W6JZ, Ray Cornell, 909 Curtis Street, Albany, Calif. 3590 kc, Mon. and Fri. 5, 7½, 10 and 13 w.p.m. Wed., 15, 20, 25, 35 and 45 w.p.m. 1845 PST, ten minutes at each speed.

W7FWD, O. U. Tatro, 513 N. Central, Olympia, Wash. 3646 kc., Mon. through Fri. 1700 PST; 4, 6, 16 and 25 w.p.m. Ten minutes at each speed.

W7PUL, Kentworth F. Buxton, 4113 N. Jefferson, Spokane, Wash. 28,740 kc., Mon. through Sat. 1930–2000 PST, 5–13 w.p.m.

W7RKA, Zane Casey, Route 2 Box 73, Hood River, Oregon. 7280 kc., Mon. through Thurs. 1930–2000 PST, 3, 5 and 8 w.p.m.

W7WJ, Hal C. McCracken, 4603 N.E. 28th Ave., Portland, Oregon. 3595 kc., Tues., Thurs. and Sat. 1900–2030 PST, 7½ and 15 w.p.m.

W9ODD, Stephen P. Victor, 615 N. 15th St., Milwaukee, Wisc. 29,224 kc., Mon., Weds. and Fri. 1930–2030 CST, beginners' speeds.

WØEGQ, Robert McMullin, Route 1, Leigh, Nebr. 3690 kc., Mon. through Fri. 1700–1745 CST, 5, 7½, 10 and 13 w.p.m. with text from the Braille Technical Press.

WØPXH, Quentin Johnson, 125 N. Berry Rd., Glendale 19, Mo. 29,500 kc., Mon. and Weds. 1900–1945 CST, 3, 5 and 7 w.p.m.

WØBOL, R. A. Prehm, 1130 Delaware Avenue, St. Paul, Minn. 29,200 kc., Tues. and Wed. 1900–1930 CST, beginners' speeds.

WØSEF, Harold Lantow, Persia, Iowa. 3710 kc., Mon. through Fri. 1700–1730 CST, 8 w.p.m.

W1AW OPERATING SCHEDULE

(All Times Given are Eastern Standard Time)

Operating-Visiting hours:
Monday through Friday: 1500–0300 (following day)
Saturday: 1900–0230 (Sunday)
Sunday: 1500–2230

Exceptions: W1AW will be closed from 0300 January 1st to 1500 January 2nd in observance of the New Year's Day holiday. On February 11th, W1AW will transmit a Frequency-Measuring Test instead of the regular code practice. On January 19th and February 17th W1AW will transmit a Code Proficiency Qualifying Run instead of the regular code practice.

General Operation: Refer to page 65, October, 1952, *QST* for a chart showing W1AW general operation. This schedule is still in effect and is not reproduced herewith for space considerations. Mimeographed complete master schedules of all W1AW operation in EST, CST or PST are available upon request.

On Saturdays and Sundays during which official ARRL activities are being conducted, W1AW will participate in the activity concerned.

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 W1AW 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. Next certificate qualifying run from W1AW is scheduled for January 19th; from W6OWP, January 3rd.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....249	WØYXO....242	W3GHD....237
W8HGW.....245	W6ENV....241	W3JTC.....236
W6VFR.....244	G2PL.....241	W3CPV.....235
W3BES.....243	W6AM.....238	W3KT.....235
	W6SN.....235	

RADIOTELEPHONE

W1FH.....222	W1NWO....204	ZS6BW.....195
PY2CK.....218	W8HGW....202	W2APU.....194
VQ4ERR.....216	W9RBI.....200	SM5KP.....194
XE1AC.....213	W1JCX.....198	

From October 15 to November 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

W5EFC.....154	G3CMT.....106	W9WFS.....101
W2ZVS.....130	ZL1AH.....104	G3CDC.....101
EA1AB.....111	EA5BD.....103	W1CKU.....100
VU2JP.....111	W3IL.....101	W4CRI.....100
W1AJO.....107	W8AAI.....101	G3BDS.....100
	EAØAB.....100	

RADIOTELEPHONE

I1RLH.....108	SM5FL.....102
CT1FL.....102	EA3GI.....100

ENDORSEMENTS

W3JNN.....221	W5EB.....162	W6QDE....133
W8KIA.....220	W3CGS....160	W1ZW.....131
FA8IH.....204	G3FNN....160	LA5S.....131
W6RBQ.....200	KL7PI....160	G8UG.....130
W8HFE.....192	VQ2GW....159	G2YS.....123
W2TXB.....191	GM6MD....154	W2PZM....122
W5LXY.....184	W6NGA....151	SM3EP.....122
W8DAW.....183	W6NIG....151	W1VG.....120
HB9CX.....182	G3DOG....150	W5BNO....120
W1IAS.....181	SM5FL....148	HB9MQ....120
W2IMU.....180	WØAIH....145	F8CW.....112
W8CVU.....180	YV5AE....143	GM3CFS....112
W8UAS.....180	ON4GL....141	W4EEO....110
OQ5RA.....179	W5MET....140	W9NN.....110
W6MHB.....171	DL1QT....140	PAØXE....110
W4HA.....170	W2AZS....137	EI3R.....110

RADIOTELEPHONE

ZS6Q.....181	G4ZU.....151	ON4AR.....123
CE3AB.....172	W4OM.....145	G8UG.....121
W3JNN.....170	G2MI.....141	W2WZ.....114
ZL2GX.....170	W2VWN...130	W5EB.....112

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for October traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6IAB	59	2842	2614	111	5626
W3CUL	247	2458	1752	667	5124
W6KYV	194	1473	317	1139	3123
W4USA	78	1020	943	66	2107
WØTQD	5	1049	998	26	2078
W7IOQ	48	939	4	948	1939
KA8AB	83	832	774	58	1747
W2BTB	41	729	698	31	1499
W9JUJ	26	669	666	25	1386
K4WAR	134	560	502	58	1254
K5WAC	28	536	518	18	1100
K5FKF	42	502	467	77	1088
W6GYH	13	503	346	157	1019
W4PL	8	496	430	54	988
W2BO	25	420	380	85	910
W2ZOL	5	419	408	11	843
WØQXO	15	400	365	33	813
W6YDK	68	360	241	112	781
WØCPI	4	384	383	0	771
W6HK	129	286	241	45	701
W3PZW	75	270	199	71	615
WØSCA	7	295	296	3	601
W7BA	55	272	179	79	585
W4SDK	156	212	144	68	580
WØBDR	7	273	263	5	548
W9YIX	10	265	105	148	528
W4PJU	32	246	206	40	524
K6FAL	69	219	195	24	507
WØJXJ	5	250	211	39	505
W6IZG	11	264	190	39	504

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

K3USN	386	K7FAG	144	W1NJM	118
W1AW	166	W9UMS	130	WØWQM	111
W4SHJ	164	W5TFB	126	W4ZD	110
W5MN	156	W2EC	120	W5TGV	108
W4EJC	149	W9NZZ	119	W5QHI	104

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.

TRAFFIC TOPICS

There are two ways of building a traffic system. One is to try to tie together existing miscellaneous and spontaneous facilities so that a semblance of nationwide liaison is achieved, changing this liaison freely at the whims of the many little traffic empires which are served by it. The other is to set up a structure, define your goal, and then go to work to achieve it. The first is the easy way, the second the hard way. The first is more realistic, the second more idealistic. The first way is likely to get the immediate support of the majority, the second the initial support only of those who are able to or want to take the trouble to see the whole picture; but these few, after they put the system on its feet, will be joined by the others later.

Both ways were considered before the National Traffic System was established; yet, the second method was chosen when we knew it would get less initial support and was, for that and other reasons, harder to accomplish. Many traffickers have asked why; why pursue an elusive ideal when the same objective can be achieved, even if not as well, in a manner both easier and more popular? Why try to change things, when the old way was "good enough"?

The answer is that the world and amateur radio changeth, and we have to change with it; old and young, it's time we all realized this. Old ways of doing things that were "good enough" have to give ground to new ways that are *better*. If the achievement of an integrated National Traffic System is an elusive ideal, so was the achievement of a nationwide amateur organization in the first place, and if we at headquarters are idealists it is because we are working under the influence and tradition of men like Maxim, Tuska and Warner — who were also idealists.

And so we have set out to organize the National Traffic System — a traffic system which has a nationwide structure, a goal, an ideal to achieve. The traffic men fit into NTS; we cannot and do not alter NTS to suit the convenience of individuals. But there is room in the over-all structure for nearly every amateur who can spare one or two evening hours once per week. There is probably room for you.

How to find out? The first thing to do is to drop us a line for the lithographed pamphlet entitled "The ARRL National Traffic System." It explains all about NTS. Every amateur at all interested in traffic work should know about NTS — including many who just *think* they know about it. Then, drop into NTS where you fit best — at section, regional, area or inter-area (TCC) level.

— • • • —

Several comments have been received concerning our November offering about "refusing traffic." We mention this because we want to make sure that all and sundry who read this column (both of you) understand that comments, favorable or unfavorable, on the content hereof, are welcome. *Sure* we're busy, but somehow we can always find time to talk traffic. Let us in on your thoughts.

— • • • —

National Traffic System. Unfavorable propagation conditions have raised havoc with our TCC schedules and the amateurs who are trying to keep them. This was noticeable in October and, if anything, was worse in November. What happens is that a TCC man gets traffic from his area net, calls his schedule at the appointed time and frequency but hears nothing; so naturally, he assumes he is stood up. Meanwhile, the guy at the other end is hearing the same thing (i.e., nothing) and making the same assumption. So they both go away mad and at the first opportunity write us (instead of each other) a nasty letter saying they are through with TCC unless we can get them a schedule that will be kept. And whom does that leave in the middle? You should ask?

However, a recent TCC bulletin outlined some alternative routings for stymied inter-area traffic, and we hope Mother Nature will turn more kindly toward us. We want to handle our own traffic if we can.

October reports:

Net	*Sessions*	*Traffic*	*High*	*Average*	*Most Consistent*
1RN	44*	410	32	9.3	E. Mass.
2RN	46	313	17	6.8	NJN
3RN	50	316	21	6.3	MDD
4RN	46	249	25	5.4	Va.
RN5	28*	159	15	5.7	Tenn.
RN6	56	661	31	11.8	SSN
RN7	54	318	26	5.0	Wash.
8RN	36	116	11	3.2	Mich.
9RN	28	492	86	17.6	All 100%
TEN	43	689	39	16.0	Ia., Kans., Minn., Mo.
TRN	46	90	10	1.1	Ont.
EAN	25	806	52	32.2	All
CAN	25	579	41	23.1	All
QIN (Ind.)	69	561	34	8.1	
TLCN (Ia.)	20	297	40	14.8	
QKS (Kans.)	23	96	14	4.2	
MSN (Minn.)	27	161	16	6.0	
Total	766	6313	86	8.2	
Record	766	10,766	197	28.6	

* Out of 46 sessions held.

With four section nets reporting, in addition to all regional and area nets except TWN and PAN, we establish a new record in the number of net sessions reported in a month. The next-highest number reporting was 678 in December, 1951.

W3BIP put out an excellent 3RN Bulletin going into net policy and operating procedure in some detail. It shows that recent recipients of 3RN certificates include W3s HKS PZW RCG RJA RJB and W2IVS/3. To date 13 stations from MDD, 9 from E. Pa. and 6 from W. Pa. have earned their certificates. Is 160 meters a possibility when conditions are stinko on 80?

W5MRK doesn't feel he is doing a good job on RN5 and wants to resign as manager. We are trying to find someone to replace him.

W6JQB is the new RN6 manager and starts off with a

complete and detailed report. Everybody agrees Al should be a natural for this job.

W7NH is resigning from RN7 managership on December 1st. W7CZX again hits 100% attendance for October.

W9MQV and W9LIR have earned 9RN certificates.

W9JUJ reports 100% attendance from all regional nets and EAN on CAN. Certainly an encouraging outlook.

We understand PAN is on the march again, with W6ELQ doing the ram-rodding, and W6JZ, W7NH and W7FIX taking on NCS duties.

SUPPLEMENT TO NET DIRECTORY

The following list of nets will supplement and correct the listing on page 66 of November *QST*. An asterisk (*) indicates correction from previous listing. This includes all information received up to November 19, 1952.

Name of Net	*Freq.*	*Time*	*Days*
Ala. Emerg. Net B*	3575	1900 CST	Daily
All College Net (ACN)	3575	1715 EST	Thu.
Anthracite Net (AN)	3610	1900 EST	Mon.–Fri.
Arizona C.W. Net (AZN)	3515	2000 PST	Mon., Wed., Fri.
Bergen Co. C.D. Emerg. Net (N. J.)*	29,510	1945 EST	Wed.
Blackhawk Co. (Iowa) Emerg. Net (WOO)	29,600	0800 CST	Sun.
Brookhaven Town Radio C.D. Net (N. Y.)	50,400	1000 EST	Sun.
Calif. Civil Defense Net (CCDN)	3501	1900 PST	Mon.
Chittenden Co. (Vt.) Emerg. Net (CCDN)	29,568	1800 EST	Sun.
Colo. Emerg. 'Phone Net	3890	0830 MST 1730 MST	Sun. Tue., Thu.
Crawfish Net (CFN)	7175	0900 CST	Sun.
Eastern Shuttle Net (ESN)	7120	1030 EST	Daily
Evansville (Ind.) Mobile Emerg. Net	29,600	1930 CST	Last Thu.
FARM Net	3935	1900 MST	Mon.–Fri.
Great Lakes Net	1680	1930 EST	Tue., Thu., Sat.
Houston Emerg. Net	28,712	2000 CST	Wed.
Iowa 160-Meter Net	1983	1830 CST	Daily
Kankakee (Ill.) Emerg. Net (KEN)	1820	2030 CST	Wed.
Kans. C.W. Net (QKS)	3610	1845 CST	Mon., Wed., Fri.
Kansas 75-Meter Fone Net	3920	0800 CST 1230 CST 0645 CST	Sun. Tue., Fri. Thu.
Kans. Slow Speed Net (QKS-SS)	3610	1845 CST	Tue., Thu.
Lakeland Emerg. Net (N. J.)	147,150	0830 EST	Mon.–Fri.
Lancaster (Pa.) Emerg. Net	146,000	2000 EST	Mon.
Malden (Mass.) Emerg. Net	29,540	1930 EST	Mon.
Mesabi Net (Minn.)	1895	1900 CST	Mon., Fri.
Minnesota Fone Net	3820	1205 CST 1800 CST 0900 CST	Mon.–Sat. Mon.–Sat. Sun.
Minnesota Junior Net*	3710	1700 CST 1500 CST	Wed. Sat., Sun.
Minn. Section Net	3595	1900 CST	Mon.–Fri.
Missionary Amateur Net	7050	1915 CST	Fri.
Mo.-Kans. Net (MK)	28,964	2100 CST	Wed.
Mo. Valley Emerg. Net	28,850	2000 CST	Mon.
Mobile Amateur Radio Corps (Minn.)	29,590	2000 CST	Daily
Muskingum Emerg. Net (Ohio)	29,616	2200 EST	Fri.
New Bedford (Mass.) Emerg. Net	29,000	0830 EST	Sun.
N. B. Civil Defense Net	3728	1900 AST	Mon.
N. Y. C.-L. I. Section Traffic Net (NLI)*	3630	1930 EST	Mon.–Fri.
N. Y. C.-L. I. Section Training Net (NLT)	3710	1930 EST	Mon.–Fri.
N. Y. Slow Speed Net (NYSS)	3595	2000 EST	Mon.–Fri.
Northland Net (Minn.)	1910	1900 CST	Mon.–Fri.
Ohio EC Net (OEC)	3695	2000 EST	Mon.
Ont. Forty Metre Net (QON)	7267	1930 EST 1300 EST	Daily Sun.
Overseas Traffic Net	3955	0700 EST	Mon.–Fri.
Province of Quebec Net (PQN)*	3570	1900 EST 2200 EST	Mon., Wed., Fri.
Quarter Century Wireless Assn. Net	3810	1900 EST 1100 EST	Wed. Sun.
Rhode Island C.D. Net*	3993	1000 EST	Sun.
Sea Gull Net (Me.)	3960	1730 EST	Mon.–Fri.
Skrew Ball Net (Minn.)	3980	0700 CST	Mon.–Sat.
So. Dak. 'Phone Net*	3870	1830 CST 0930 CST	Mon.–Sat. Sun., Hol.
St. Paul (Minn.) Mobile Corps	29,520	2000 CST	Thu.
Tacoma Emerg. Net (TEN)	29,300	2000 PST	Odd Wed.
Tenn. C.W. Net (TN)*	3635	1900 CST	Mon.–Sat.
Toronto Ten-Meter Net	28,250	2200 EST	Sun.
Transcontinental 'Phone Net (TCPN)	3970	1730 EST	Daily
Trunk Line I (TLI)	3780	2030 MST	Mon.–Fri.
29,520 Net	29,520	2000 CST	Tue.
Twin-City Ten-Meter Net (Minn.)	29,200	2100 CST	Tue.
Virginia C.W. Net (VN)	3680	1900 EST 2200 EST	Mon.–Fri.
Wayne Co. (N. Y.) C.D. and EC Net	3853	0830 EST	Sun.
W. Va. C.W. Net (WVN)	3570	1900 EST	Mon.–Fri.

TRAINING AIDS

If you're a member of an ARRL-affiliated club and have not yet seen the films available to your group, ask your club secretary to write the Communications Department for a list of current training aids. At present, they include 28 motion picture films, 12 film strips, one slide collection, reviews, and ten different quizzes. Several new slide collections are in the works and will be completed just as soon as possible, but the material available *now* can furnish your club with many a lively and educational evening! Whether you're interested in the basic theories of capacitance and inductance, or the effect of the ionosphere on radio wave propagation, there's a film for you! The film strips are an excellent source of basic material and have an advantage over motion picture films in that they can be stopped; discussion and explanation can be held before going on to the next frame. Since the film strips have not been used much, we're making them available to *all* clubs, whether or not they are affiliated. This applies to quizzes also. Requests from affiliated clubs will continue to receive priority, however.

This is Russ and Tina Marquis, Mr. and Mrs. WØBDR. Russ has made BPL twice the "hard" way. He is vice-president of the Central Iowa Amateur Radio Club and a member of the Iowa Tall Corn Net, Iowa 75-Meter 'Phone Net, TLJ/9RN, Tenth Regional Net and TLAP. Both he and Tina are visually handicapped.

We have heard it said by certain irate amateurs that RACES is just a device for opening certain of the amateur bands to non-amateurs, and this is the topic of our discussion this month. We approach it with some trepidation, for it is absolutely true that under RACES it will be possible for non-amateurs under certain conditions to operate in segments of our bands. But those *conditions* make the difference.

Let's revert to history to develop the background. In World War II we had WERS, thrown at us almost a year after we were already embroiled in war. It was not an amateur service, but it borrowed amateur frequencies and amateurs, in the main, constituted the supervisory personnel. However, there were not nearly enough amateurs to run it, and use had to be made of third class commercial radiotelephone permittees to supplement our then-dwindled ranks. At that time, two thoughts dominated the consciousness of every amateur in WERS: (1) that we should have started preparing for it years ago; (2) that we ought to have more frequencies than the "impractical" four megacycles of the "2½-meter" band.

In preparing for a possible third world war, these lessons have been remembered. What some amateurs now feel are "evils" of a new service are actually preventives against evils which were known to have existed in a somewhat similar situation in past years. True, we are not now at war and the kind of amateur radio we have always loved is still in operation; but by RACES we are *preparing* for the worst, this time *before* the war starts — and this time we *have* more frequencies on more amateur bands to work with (although, of course, it is still not enough). We also know that, come the war, nearly half the amateur body will have military duties to discharge, and about half of the other half will be unavailable for RACES for one reason or another. Optimistically speaking, perhaps 20,000 radio amateurs will be available to implement RACES; yet FCDA's own estimate of the number of communicators needed to implement the RACES program is 200,000. Where are they coming from? The answer is, of course, that they will have to be trained, trained in great numbers, trained by us amateurs because we are going to run RACES. This time it *is* an amateur service.

But the appearance of these non-amateurs in the RACES picture can hardly be said to be an "invasion" of the amateur bands by non-amateurs. Actually, they will operate under the closest surveillance, and they will operate only when told to do so, and when they do operate it will be in accordance with a pre-set operating procedure. Not for them the joys of casual chatter, of calling and working DX, or of participating in contests. They will have to stick strictly to business.

Make no mistake about it — the use of parts of our bands for RACES is going to be an inconvenience to our daily enjoyment of amateur radio. The whole aspect of World War III is decidedly an inconvenience. It would not be quite correct to say that we share these frequencies with RACES, because we *are* RACES. It is just that we have temporarily set aside portions of our bands for this work, with official government sanction and blessing. If, by our own QRM, we make operation therein impractical, we have only ourselves to blame for the outcome. There are enough inimical influences at work to take away from the amateur that which rightfully belongs to him. Let's not create any of our own to detract from the success of this, the first specific service function which has ever been assigned to the amateur — the Radio Amateur Civil Emergency Service.

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Just to complete the record on the Midwest Floods last April, we want to mention the work done by amateurs in Sioux City, which has just been reported to us. WØENS was established as net control, and a station was placed at the police station under the call WØERG/Ø using the transmitter of WØHWM. Two portables of the Sioux City Amateur Radio Club were placed in service, one at Dakota City and one at a motel near Crystal Lake. This latter one had to be moved out within 36 hours due to high water. All stations were manned 24 hours per day by members of the club. The call used at Dakota City was WØKUX/Ø, and that at Crystal Lake, WØVJF/Ø. On April 12th, WØPOY/Ø was set up at Riverside. WØENS, the net control station, was secured at 2030 on Tuesday, April 15th, after 120 hours of continuous operation. The following participated, in addition to those mentioned above: WØs AHQ AZR BGB CXN DJU DTB EEU ENS EQN ERG FNF FQI FVO FZO*GDE HFT HUH HWM JED KUX MBW OSO POY SVS URB VJF VRU WFB YMH YNW YSK ZLD and W9OOL.

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On Sunday, August 31st, W1HXD/1, W1QVF/1, and W1SPX/1 provided communications at the Insurance City Open Golf Tournament held over Labor Day week end in Hartford, Conn. All three operated Civil Defense portables as described in May 1952 *QST* to provide a link between the Club House and the greens. The maximum distance covered was ¾ mile over rolling terrain. After operating from 1000 to 1630 the gang produced a set-up with higher power to use as a control station. This enabled them to make a much better impression on the officials and public. Signals were S9 both ways, and communication was solid. Newspaper reporters made use of the information given via the amateur set-up, thus saving themselves considerable leg work. A quite severe rainstorm failed to break up the contest, so of course the hams stuck to it, though tempted to sign MM, due to the high s.w.r. (standing water ratio). — *W1QVF*

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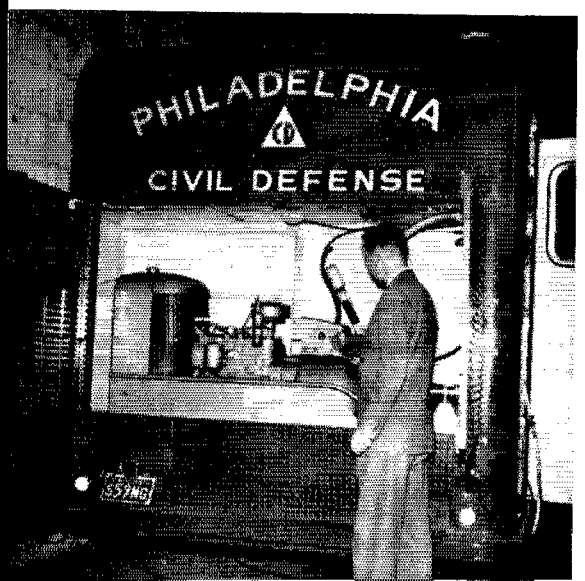
The Detroit area Hams were very "Public Service" minded these past two months. Under the coördination of the Inter-County Amateur Radio Emergency Committee, three services were performed for the public, and for organizations who needed communications. The first of these was for the 6th International Model Plane Contest held August 21st–22nd at Selfridge Field, and August 23rd–24th on Belle Isle. Communications were provided between their headquarters in the Shelby Hotel, and the contest points. Because of the coördination by mobiles, more free-flight models were recovered than at any previous contest. Some of the mobiles even made their own roads across fields to keep the models in sight.

The second event was the 5th International Aviation Exposition held August 29th, 30th, 31st, and September 1st at the Detroit-Wayne Major Airport. Communications



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Philadelphia's new Civil Defense mobile Communications Center is equipped with a 10-kw. gasoline-engine generator, making it completely independent of commercial power if need be. The unit contains an amateur transmitting position by means of which it can maintain contact with members of Philadelphia's active AREC organization.

between the two control towers, Security Officer, State Police, Red Cross, motor pool, crash trucks, and the Plane parking area were provided as well as communications to coördinate the entire exposition and Air Show.

The Silver Cup Speedboat Race was the third event. It was held August 30th and September 1st on the Detroit River. Coördination between the Race Committee, on the judges stand, and the boat pits was part of the job. Mobiles were spotted around the course at intervals, and attached to each mobile was a sound car. As the boats proceeded around the course, each mobile transmitted a running description of the race as it passed in front of him. This description was available to the sound cars, and to the Race Committee. In this way, the public watching the race knew just what was happening on parts of the course they were unable to see, and the Committee was able to keep track of the boats at all times. Congratulations to all of you on a job well done!

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The amateur stations that participated in the New York State Election Return Net on November 4th did a perfect job. Returns moved rapidly and smoothly from about 2200 until 0117, Nov. 5th, when the upstate counts had been more or less completed. The net was established at the request of WNYC. Ham stations throughout the state in many cases used mobiles stationed at campaign headquarters or at county seats, whence the tabulations were sent to a 75-'phone or 80-c.w. station on v.h.f., then relayed to a New York City station, where a two-meter radioteletype circuit was in operation from 6 P.M. to closing time. The RTTY circuit, maintained by W2BFD and W2QGH, functioned without a hitch for the nine-hour period, and at no time was there a delay of more than a few seconds.

Late in the evening the 75-meter 'phone band went out, breaking the net entirely. W4IIHQ and K4WDF assisted in relaying information and acting as net controls.

Reports came in steadily on the c.w. net, with some difficulty. Frequencies used were 3509.5 and 3993 kc.

— *W2BGO*

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Seventeen SEC reports on behalf of 3362 AREC members were submitted for September activities. Two new SECs, those of Nebraska and Iowa, are added to the list of reporters in 1952. This makes a total of 29 out of a possible 72 SECs who have submitted one or more reports in 1952. Forty-three report-delinquent SECs, please take notice!

CODE-PROFICIENCY AWARDS

Have you received an ARRL Code Proficiency Certificate yet? Twice each month special transmissions are made to enable you to qualify for the award. The next qualifying run from W1AW will be held on January 19th at 2130 EST. Transmissions will be made simultaneously on 1887, 3555, 7120, 14,100, 28,060, 52,000 and 146,000 kc. The next qualifying run *from W6OWP only* will be transmitted on January 3rd at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of *QST* text is reversed during certain of the slow-speed transmissions. To get sending practice, hook up your own key and buzzer and attempt to send in step with W1AW.

Date	Subject of Practice Text from Nov. *QST*
Jan. 2nd:	*Push-Pull 6146s at 144 Mc.*, p. 11
Jan. 6th:	*Where is Your Mobile Signal Going*, p. 15
Jan. 8th:	*More Effective Utilization of the Small Power Transformer*, p. 18
Jan. 12th:	*"Packaging" 35 Watts for 80 and 40*, p. 21
Jan. 14th:	*The Reception of Single-Sideband Signals*, p. 25
Jan. 20th:	*Bandswitching the Antenna Tuner*, p. 28
Jan. 22nd:	*The Coffee-Can Receiver*, p. 38
Jan. 28th:	*Turret Switching for the Receiver or VFO*, p. 32
Jan. 30th:	*Technical Topics*, p. 41

OCTOBER CD QSO PARTIES

The contact totals reported by participants in the October CD QSO Parties indicate that there were plenty of ARRL appointees on the air! Top c.w. score honors, which have been evenly divided between eastern and western stations during the last year, this time go to W6YHM, who nosed out eastern contender W4FKC with a final tally of 146,335. W4KFC chalked up the terrific contact total of 481, the highest made in any CD Party for a mighty long time! The only other contestant to go over the 400 mark was old-time CD Party hound W1EOB, who made 421 contacts to score 126,260. In the 'phone party W4KFC was also outstanding with 103 contacts, 37 sections and 20,350 points. W4FV came through with his usual fine performance for second place, and W2ZVW, who has been hot after that top position for some time, finished up third. Listed below are the other high claimed scores. The figures following each call indicate the claimed score, number of contacts and number of ARRL sections worked. Final and complete results will appear in the January CD Bulletin.

C.W.

W6YHM	146,334-277-58	W2ZVW	59,925-228-51
W4KFC	143,960-481-59	W7OPO	59,616-144-46
W1EOB	126,260-421-59	W9NH	59,080-205-56
W3FQB	106,315-380-55	W1ODW	58,500-234-50
W1MX	97,255-364-53	W3BIP	58,310-231-49
W4SAT	87,980-327-53	W2VNJ	57,860-256-44
W2COU	85,525-304-55	W1AQE	57,600-240-48
W8NBK	84,975-302-55	W4FF	57,340-238-47
W3JSH	81,090-299-53	W4UWS	56,990-273-41
W9ADM	80,850-327-49	W4NH	56,165-261-43
W4MXU/9	80,730-292-54	W1AYC	55,650-265-42
W3LVF	76,560-319-48	W7MLL	55,614-131-46
W3KUN	74,160-302-48	W4SHJ	55,380-206-52
W6WOO	73,000-160-50	W5AQE	55,120-202-53
W3EIS	72,860-310-46	W3NOE	54,675-243-45
W3HHK	72,250-284-50	W1AW[1]	54,390-217-49
W1JYH	71,285-263-53	W2CWK	53,100-230-45
W4UHG	69,920-300-46	W8DAE	50,760-209-47
W4AKC	68,880-287-48	W4OGG	50,745-194-51
W2GFG	68,400-278-48	W1CRW	50,600-220-46
W4BZE	64,800-267-48	WØEOZ	50,490-198-51
W2CPN	64,500-258-50	W4PNK	50,020-244-41
W2MHE	63,685-271-47		

'PHONE

W4KFC	20,350-103-37	W4KMS	6,890- 53-26
W4FV	18,720- 95-36	W9RZS	6,580- 47-28
W2ZVW	14,400- 83-32	W3MLY	6,500- 50-26
W8PBX	13,860- 84-33	W1AQE	6,300- 63-20
W2MHE	10,920- 84-26	W1FZ	5,890- 57-19
W8HOX	9,940- 66-28	W1AW[2]	5,600- 51-25
WØYMP	8,265- 54-29	W4SHJ	5,320- 49-19
W8ZJM	8,235- 55-27	W1JYH	5,130- 48-19
W9ACU	7,150- 48-26	W1CRW	4,600- 46-20

[1] W1WPR, W4KVM, W1QIS, oprs. [2] W1WPR opr.

A.R.R.L. ACTIVITIES CALENDAR

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)
Feb. 6th-8th: DX Competition ('phone)
Feb. 8th: CP Qualifying Run — W6OWP
Feb. 11th: Frequency Measuring Test
Feb. 17th: CP Qualifying Run — W1AW
Feb. 20th-22nd: DX Competition ('phone)
Mar. 6th-8th: DX Competition (c.w.)
Mar. 13th: CP Qualifying Run — W6OWP
Mar. 18th: CP Qualifying Run — W1AW
Mar. 20th-22nd: DX Competition (c.w.)
Apr. 3rd: CP Qualifying Run — W6OWP
Apr. 11th-12th: CD QSO Party (c.w.)
Apr. 16th: CP Qualifying Run — W1AW
Apr. 18th-19th: CD QSO Party ('phone)
May 9th: CP Qualifying Run — W6OWP
May 15th: CP Qualifying Run — W1AW

Station Activities

• 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. Net: 3610 kc. Communications for a highly successful civil defense demonstration were furnished by N.E. Philadelphia amateurs on Oct. 18th. 2AZL and 2UK were the principal speakers at a dinner meeting of the Electric City Radio Club (Scranton) on Oct. 18th. V.h.f. DX was the main topic. The Lancaster RTS, now conducting weekly code classes for potential hams, participated in the October S.E.T. This outfit will operate the local Naval Reserve Training Center's station, K3NRL, during c.d. demonstrations. They also report a new society, namely, the Lancaster Brasspounders, operating under the call TQV. On Oct. 9th, the Philadelphia Wireless Assn. adopted a new constitution and on Oct. 16th elected the following officers: PST, pres.; JWC, vice-pres.; RNF, rec. secy.; QLI, corr. secy.; NHX, treas.; HHK, memb. dir. The York Road RC banquet, held at Casa Conti on Oct. 24th, was a big success. The E. Pa. Net is rolling along in fine style with NOK and K3USN as new additions, also orchids to some high-scoring OOs in this section for their work in the recent F.M.T. CUL and K3USN make BPL this month. ADE is TVI-proofing his rig. FPC reports that anyone interested in joining the 10-meter MARS net should contact SLF. KEW has been working DX with 90 watts to an indoor beam. PDJ has new all-band 813 final. QLZ was appointed NCS for 3RN (second session). QV, PDJ, and PSH all received commercial 'phone tickets. RCG's 813 rig is taking shape and he also is building 2-meter rig with 4D21 final. SNY has joined the 20-meter gang with his first taste of DX and 33 states to his credit. WN3TBR is now active on 80 meters using an 807 final and WN3UQT can be found on 144 Mc. Both are YLs. There are seven hams in Elizabethtown, which has a population of about 5000 people, and four Novices about ready for General Class exam. Appointees are reminded to have reports in no later than the 5th of the month. Traffic. (Oct.) W3CUL 5124, K3USN 426, W3BIP 320, QLZ 81, AXA 76, PDJ 46, ELI 39, ADE 37, RCG 26, NOK 23, AD 20, DUI 16, BFF 15, CHW 8, PVY 8, QEW 6, VR 4, EAN 2. (Sept.) W3RCG 13, SNY 2. (Aug.) W3QLI 3.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, James W. John, W3OMN — The Baltimore Polytechnic Institute Radio Club got under way with the following officers: ROU, pres.; SDT, vice-pres.; URJ, treas.; SDU, secy. On Oct. 22nd the Club visited TV station WAAM. The Chesapeake Amateur Radio Club held a "Symposium" on amateur radio for the Oct. 13th meeting and on Oct. 27th Steve Allen, of Bendix Radio, described "How a TV Set Works" and discussed what makes it susceptible to ham TVI. At the Oct. 20th meeting of the Baltimore Amateur Radio Club 6GKN's topic was "Introduction of Single Side-Band." Motion pictures on shop techniques and practices were shown at the Oct. 25th meeting of the Washington Radio Club. An equipment demonstration and gabfest was held Oct. 10th at the Kensington Cabin by the Rock Creek Amateur Radio Assn. On Oct. 24th the Club held a successful auction. The Capitol Suburban Radio Club visited SUA, Ray Goode's station, on Oct. 17th. OBR acquired a new Viking from AWS. FQR has 3 watts on s.s.b. Visitors at AIR's shack find the OM has completed a de luxe operating room. QZC received Extra Class license. CVE, Net Control for TCRN, reports net qualifications as follows: 25 to 30 w.p.m., copy traffic with typewriter, at least 100 watts output, monthly traffic reports to Net Manager, and 100 per cent delivery on all traffic. BWT still is QRT pending completion of a new rig. PZ has high-power exciter into circularly polarized antenna on 420 Mc. RE reports prop pitch motors should be checked for water in the gears. CDQ has the Viking TVIed now. The Washington Area was well represented at the Roanoke Division Convention and brought home 1st and 2nd prizes. Traffic: W3PZW 615, COK 128, QZC 120, CVE 116, AKB 79, NNX 40, MCG 39, MCD 24, CQS 22, JE 22, NOE 20, RJA 11, JHW 9, PKC 8, PTZ 8, HC 6, PZ 2.

SOUTHERN NEW JERSEY — SCM, Lloyd L. Gainey, W2UCV — EWN has been appointed Section Mobile Emergency Coördinator in an effort to build up our strength in this service and direct large-scale drills. UA has been appointed Emergency Coördinator for Burlington County. UA has been directing the amateur group in the Moorestown Area and making numerous talks through Burlington County to stimulate emergency communications planning. The Moorestown C.D. Council has purchased a transmitter, power supply, and other equipment to outfit its c.d. control center. WN2BLV has passed his General Class exam and dropped the "N." ASG has his beam back on the roof after a very extended overhaul. ZI coöperated in a recent press interview on 75 meters between the *Boston Herald* and the Ketch *Miru* nearing the end of an 11,000-mile voyage. DMR now is active on 20 meters running 350 watts with a swell signal. The October meeting of the SJRA featured a very interesting talk on "The Modulation Processes in Color TV" by John Wentworth of RCA. YNJ now is serving in the Field Artillery in the Far East. The Camden Civil Defense Council is negotiating for the purchase of four 2-meter portable transceivers for ham emergency use. Traffic: K2BG 268, W2RG 160, ZVW 94, ZI 28, ASG 17, HAZ 2.

WESTERN NEW YORK — SCM, Edward Graf, W2SJV — SEC: UTH. RMs: RUF, COU. PAM: GSS. NYS 3615 kc., 7 and 10 P.M.; 3980 kc., 6:30 P.M. NYSS 3595 kc., 8 P.M. NYS C.D. 3509.5 and 3993 kc., 9 A.M. Sun. QNA reports new officers of the Niagara Radio Club are KEC, pres.; UMS, vice-pres.; SYM, secy.; KYM, treas. ZOL has been appointed Zone 8 Coördinator by the N. Y. office of c.d. SCZ reports that best results are obtained if pi-network and antenna tuner are used with antenna 136' long fed 45' 4" from end with 300-ohm line. KBT meetings are devoted to auction night and demonstration of pi-networks. Our thanks to the Albany Radio Club for staging the Hudson Division Convention which afforded an excellent opportunity for your Director, GEG, and your SCM to meet with members. For those interested in traffic and wishing to gain experience in traffic, we call your attention to our NYSS slow-speed net on 3595 kc. The Rochester Mobile Club invites all in the area to join up and participate. REN participated in the S.E.T. with the following active: VBH, RMS, SGJ, QYT, UTH, ZUR, YPR, RDG, PPR, YPW, CZT, RMJ, SNI, VVG, CBA, and QY. WUB acted as a relay station when needed. Out-of-town stations who helped were TQY, HYN, FE, CYQ, ZOL, WH, and CYD. FBA worked ZD7A. CZT is on 75 meters. RUJ is back on 80 meters. QY won a log book (first prize) for originating the best message and sending to N.Y. c.d. headquarters. DYD is heading for W4-Land. ZHB gave a talk on weather conditions and their effect on v.h.f. propagation at the RARA v.h.f. group in the home of OWF. WN1WOY/2 has 5-over-5 on 2 meters. YIE has 829B final on 2 meters. New officers of the LARARA are Helen Palmer, pres.; Peggy Egan, vice-pres.; Lois Williams, treas.; Carroll Dixon, secy. COU and ZRC enjoy an on-the-air chess match, with GP kibitzing. A Section Net certificate was issued to FGL. RUF is on at 7 A.M. in TCC EAN. UTH visited ABC and VEP on SEC duties. The largest OT Nite ever held in the area took place recently in Rochester. Chairman ICE had CB with a 1-kw. spark rig in operation as part of the program (dummy load we hope) with QHH working DX. CJA dropped the "N" in his call. Z8F is stationed in Japan. VPX now is Advanced Class. Congrats to FE on his accurate measurements in the F.M.T. Appointments and endorsements as EC: CBA, QXV, PYC, DEX, WQO. IPC now is General Class. The Utica Amateur Radio Club meets on alternate Monday evenings at 11 Herkimer Rd. Traffic: (Oct.) W2BTB 1499, ZOL 843, RUF 451, COU 202, KEL 96, DJF 68, OE 63, ZRC 49, SJV 45, K2DG 20, W2RJJ 20, RZP 17, JWU 12, QHH 8, QZI 8, FE 6, ZHU 4. (Sept.) W2OE 30.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — From Emporium way, we learn through club paper, *The Bucktail Hamster*, that an election of officers took place. We understand DNO is president of the Bucktail Radio Club. Some of the members of this club are KCJ, KUN, NMJ, DNO, VBL, OLB, TCP, TMA, OGN, RLH, NGZ, IIX, RMX, PTU, RPE, and OYG. KUN is working lots of 80-meter DX. The Radio Assn. of Erie reports that WN3SLM, Erie's youngest ham, only 12 years old, joined the Silent Keys. Newly-elected officers of the Steel City Amateur Radio Club are MTP, pres.; NRQ, vice-pres.; LKA, rec. secy.; Jack Engle, corr. secy.; and RIK, treas. The Amateur Transmitters Assn., through *ATA News*, tells us that K8R received a Public Service certificate

(*Continued on page 76*)

SELECTIVITY... in a Communications

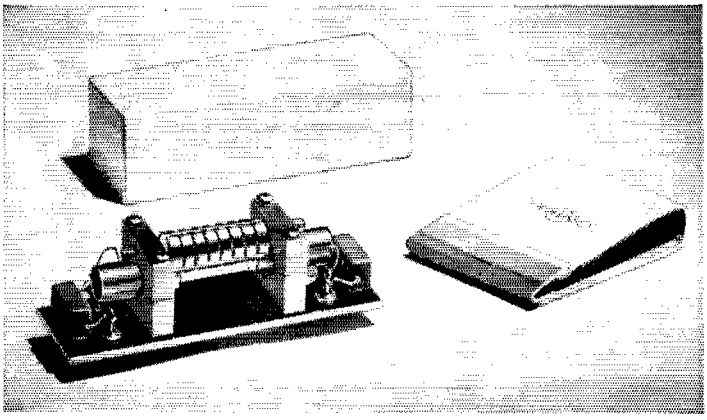
The selectivity curves shown here tell the story of a new concept in receiver performance. The Mechanical Filter recently developed by Collins and incorporated in the 75A-3 receiver represents an entirely new approach to the attainment of selectivity. Using resonant mechanical elements rather than tuned electrical circuits, the Mechanical Filter gives a close approach to the ideal rectangular selectivity curve. Each 75A-3 receiver has plug-in provisions for two Mechanical Filters. A 3 kc Filter is standard factory equipment and when still greater selectivity for CW operation is desired, the 1 kc plug-in unit is available as an optional accessory. With both the 1 kc and 3 kc Filters in the receiver, a switch on the front panel provides instantaneous choice of selectivity characteristics. When required, the crystal filter may also be switched into the circuit to notch out interfering signals and heterodynes.

The nearly flat top and sharp cutoff at the sides of the selectivity curve of the 3 kc Mechanical Filter permit all AM signals to be tuned so as to accept the carrier and either one of the sidebands at will, while the other sideband is rejected. Thus much distortion due to fading is eliminated, and susceptibility to interference is greatly reduced. Alternatively, both AM and SSSC signals may be received with carrier supplied by the BFO; and the ideal selectivity curve of the Mechanical Filter permits full advantage to be taken of the benefits of local carrier reinsertion.

Because of the Mechanical Filter's straight-sided selectivity curve, the 75A-3 receiver can be tuned near a strong signal without responding to that signal. As the receiver is tuned across the band, signals suddenly appear and disappear. This is because of the absence of broad skirts which "drag out" the tuning of conventional receivers.

All of the proven features of the 75A-2 have been retained in the 75A-3. These features, such as crystal controlled front-end, highly stable variable frequency oscillator, and accurate dial calibration, to name but a few, combine with the new Collins Mechanical Filter to give unequalled performance.

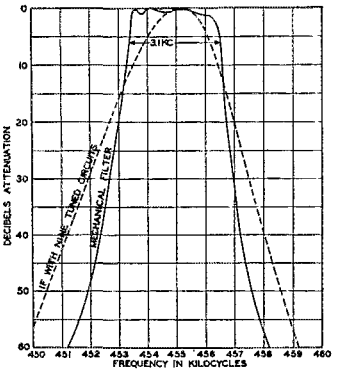
Whether you ragchew, handle traffic, or work dx, here is the receiver for solid contacts. The straight-sided, flat-topped, selectivity curve and the excellent frequency stability of the 75A-3 make it a natural for the single-sideband operator.

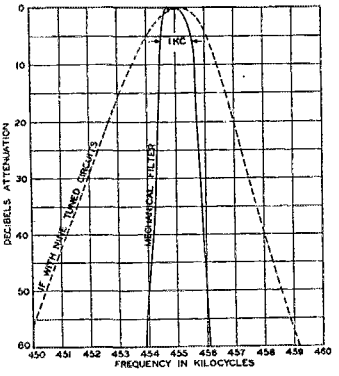


The Mechanical Filter is a resonant mechanical device that is coupled into the receiver's 455 kc IF strip by means of magnetostriction. As shown here, it consists of three general sections: an input transducer, a mechanically resonant section consisting of a number of metal disks, and an output transducer. A 455 kc electrical signal applied to the input terminals is converted to a 455 kc mechanical vibration at the input transducer. This mechanical vibration travels through the resonant mechanical section to the output transducer, and is converted to a 455 kc electrical signal which appears at the output terminals. The Mechanical Filter is enclosed in a hermetically sealed case and requires no adjustment.

never before achieved Receiver

The Collins 75A-3 with Mechanical Filter. A 3 kc Mechanical Filter is installed at the factory. The Filters are plug-in units, and a 1 kc Mechanical Filter may be installed at any time.





The curves above show a comparison between the selectivity curve of a good IF strip using nine tuned circuits, and typical selectivity available in a Collins 75A-3 receiver incorporating a 1 kc and a 3 kc Mechanical Filter. When both Mechanical Filters are installed in the receiver, either one may be selected at the flip of a switch. These curves show performance without the crystal filter. When required, the crystal filter may be called into play to phase out unwanted signals or heterodynes.

ATTENTION 75A-2 OWNERS

75A-2 owners can return their receivers through the Distributor to be modified at the factory to incorporate the new Mechanical Filter arrangement. Modifications can be made, effective immediately, and will consist of the installation of a 3 kc Filter, minor repairs and complete realignment of the equipment. Modification, F.O.B. Cedar Rapids $125.00

Conversion kits are available from your distributor, complete with instructions and a 3 kc Mechanical Filter.
Conversion Kit $100.00

Net Domestic Prices:

75A-3 receiver including 3 kc Mechanical Filter $530
1 kc Mechanical Filter plug-in unit, $75
10-inch speaker in matching cabinet, $20
8R-1 plug-in crystal calibrator $25
148C-1 plug-in NBFM adapter ..$22.50

For the best in amateur radio, it's . . .

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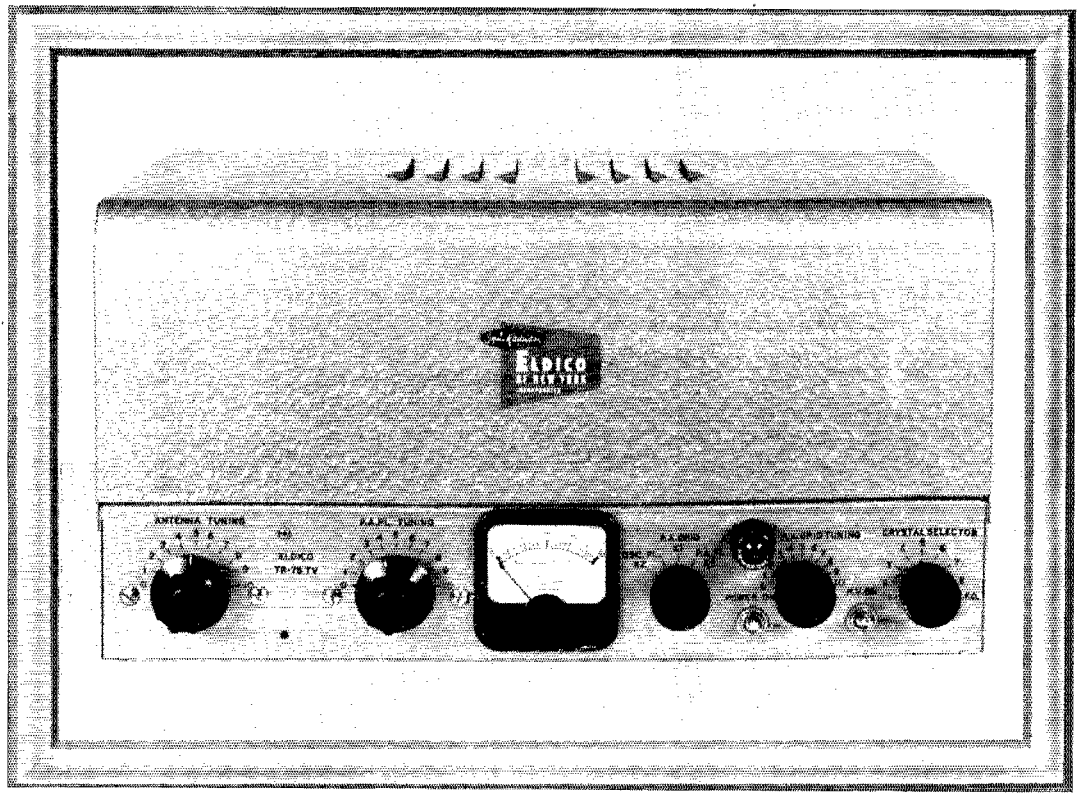

ELDICO TRANSMITTER KIT TR-75TV

Eldico's TR-75TV is a 60 watt all-band cw transmitter sensibly priced, solidly designed. With thousands of these transmitters now on the air—unsolicited letters on actual performance are being received daily. Here are but a few excerpts from typical letters demonstrating the approval of hams everywhere.

I recently purchased an Eldico TR-75TV and am extremely pleased with the quality of the components and the easy to follow detailed instructions.

SM5-2542

I have been operating your TR-75TV since last Spring. It does not interfere with the TV sets next door although the TV stations are 125 miles away.

W9RGJ

I have had your TR-75TV transmitter on the air for several months. I have had no complaints of TVI from any of my neighbors. A friend of mine down the street has four notices from the F.C.C. and numerous TVI calls. He is even running less power than I.

W4TMV

Thought I would let you know that I have been on the air about three weeks using an Eldico TR-75TV and the results are fine; good signal reports everywhere.

W2DGZ

Just ordered a TR-75TV, Joe. Your signal (W8EHC) sold me on it sight unseen.

W8WVL

(Above taken from QSL Card received by W8EHC)

When my TR-75TV arrived I had it completely assembled and wired on the second day and on the air that evening. I now have the MD40P with the TR-75TV. On phone worked Argentine, Barbados, Ecuador, Canal Zone, Cuba, Chile, Brazil, Colombia and Guatemala with S9 reports.

W4JOU

Signals of Distinction

YOUR FREE COPY OF CATALOG '52-'53 NOW AVAILABLE AT YOUR DISTRIBUTOR

ELDICO OF NEW YORK INCORPORATED

44-31 DOUGLASTON PARKWAY, DOUGLASTON, L. I., N. Y. • BAyside 9-8686

BY THOUSANDS!

LOOK AT THESE OUTSTANDING FEATURES OF THE TR-75TV:

- Simple enough for the beginner to assemble, sturdy enough for years of trouble-free operation.
- Uses the time proven crystal oscillator final amplifier combination.
- Circuit permits use of 80-meter or 40-meter crystals to cover all bands.
- Plug-in coils eliminate trick circuits.
- Husky power supply employing a 5U4G rectifier delivers 500 volts d.c. to the final.
- Antenna tuner output simplifies loading of transmitter with all types of antennas; ideal for multi-band operation.
- All stages are metered using a meter which can be switched to oscillator plate, final grid and final plate.
- A terminal strip is provided to connect a modulator if radiophone operation is desired at a later date. Eldico's MD-40/MD-40P Class B 6L6 modulator is designed expressly as a companion unit.

Over-all size with cover 17" x 10" x 9". Complete kit (less crystal) . . . not another bolt or wire to purchase, including a smartly styled shielded cabinet to minimize television interference. For 110-120 v, 50–60 cycles.

TR-75TV, complete kit with instructions..... **$64.95**

Factory wired and tested..... **$94.95**

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(*Continued from page 70*)

for his work in the Ohio River flood of Jan. 1952. NXU, corresponding secretary of the Western Penna. Emergency Net, is monitoring the net frequency, 29,425 kc., continuously with a broad-band receiver employing a squelch circuit. NLU reports that PWV, SFP, TWP, and K2ASV have joined the staff at YA, Pennsylvania State College. The club station at YA is a 1-kw. all-band transmitter. Our lone correspondent in Jeannette, UVD, is working hard to get up a well-balanced 80-meter antenna. TVA is heard chasing DX on 80 meters. NUG, RM for the W. Pa. traffic net, says the new officers of the Amateur Transmitters Assn. are OVM, pres.; UL, treas.; QPQ, secy.; RFX, AAX, LMM, and NUG, directors. CA has an HRO-60. JSH piled up a nice score in the recent CD Party. AER is experimenting with a new type of hermetically-sealed relay. MWV, QCN, and QHS, along with their families, attended the Western Penna. c.d. meeting at Van, Pa. New officers of the Mercer County Radio Assn. are GEG, pres.; CJF, vice-pres.; NCD, secy.; and SYZ, treas. WN3SYZ now is a full-fledged W3. Although handicapped by total blindness, George is very active on the air and has been club treasurer for several terms. Your SCM's term of office runs out in March and nominating petitions for that office are now solicited. I urge all of you to seek out the man best suited for that job. Traffic: (Oct.) W3UHN 79, KUN 19, CA 11, MIZ 7, LXE 3. (Sept.) W3UHN 15, AER 11, JSH 7, CA 5. (Aug.) W3JSH 4. (July) W3JSH 9.

CENTRAL DIVISION

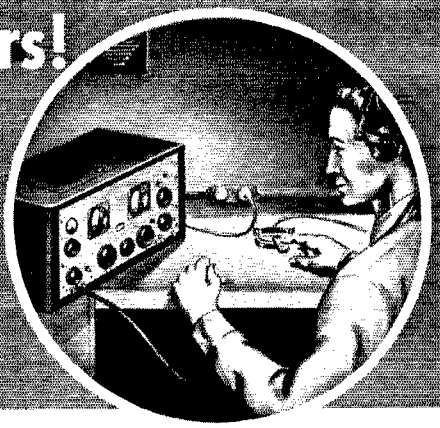
ILLINOIS — SCM, H. F. Lund, W9KQL — Section Nets: ILN 3515 kc.; 1EN 3940 kc. SEC: QLZ. Asst. SEC: HPG. RM: BUK. PAM: UQT. BA had a 5-minute interview over KSGM in connection with the S.E.T. UFM has received his old call and will be heard signing 6CIW/9 from Highland Park. Newcomers to ILN are JC, at Columbia, and KOU, in Carterville. SRO took the summer to build a 10-over-20 beam. SKR QSYed to 40 meters but reports that the indoor antenna doesn't work as well there as on 20 meters. BXC, with an XYL and a small apartment, has gone 28-Mc. mobile. New calls in Zion are VBN and Novices VNG, VPR, VNX, and VTQ. VNG is the XYL of DOR. With APX as Net Control, the S.E.T. was successfully carried out in St. Clair County. Mobiles in action were BA, JAC, KUC, KQO, MDB, and QJY. Assistants were END, NDC, BAE, and 2LXG. The Synton Club in Champaign is under the guidance of AEI, pres.; ACA, vice-pres.; RDQ, treas.; R. Derby, secy. The sponsor is SEH. The club call is YH and the fellows are active on all bands, 80 through 10 meters. Under the direction of HPG the Chicago Area totaled 1030 points with 115 stations active in the S.E.T. There were 74 mobile and self-powered stations in operation. PQB has been elected secretary of the Egyptian Amateur Radio Society to replace HTL, who has moved to Iowa. Club membership includes YLs PHH, PNK, TUO, and ZTJ. Graduates from the Novice ranks include PLT, PQB, PND, and QLL. NQK has an SCR-522 with a five-element beam on 144 Mc. Visitors at MBI included EQC, FQN, and WN9REM. LNI has built a 5C5U vertical. PRN is 144-Mc. mobile in Springfield. WFS made DXCC with 102 confirmations. WN9SOC uses the power lines for director and reflector to make his 80-meter wire a three-element beam. Traffic: (Oct.) W9YIX 528, CSW 198, HPG 129, DUA 113, LGR 80, SXL 76, CEE 72, W6CIW/9 64, W9LXD 58, BUK 43, KQL 39, CTZ 38, W4MXU/9 33, W9STZ 26, SYZ 18, WFS 9, LXJ 8, MRQ 8, ICF 7, BGN 4, DOR 3, BPU 2, PRN 1. (Sept.) WN9SOC 12, W9JLL 9.

INDIANA — SCM, Clifford C. McGuyer, W9DGA — DWF, IFC, and JOD have mobiles on 1805 kc. PAS has new 4-65 rig. KLD has moved to Illinois. DRJ is manager of the Calumet Area Emergency Net. AJO worked 6OW on 160 meters. GRA, IAC, and DRJ have vertical antennas for 160 meters. New officers of the Wabash Valley ARA are EHT, pres.; QPD, vice-pres.; WN9SYM, secy.-treas. IHO reports they have a dozen mobiles on 50.6 Mc. OXO, HIT, and JVF have new homes. JUQ has new all-band TVI-proof transmitter. The hams working for Western Electric Co. at Indianapolis are forming a club to be affiliated with ARRL. LQE has new exciter with crystal oscillator and VFO both operating in the range of 437.5 to 500 kc. New officers of TARS are NJR, pres.; KVE, vice-pres.; OVB, secy.; and BBN, treas. OWZ now is RCC and has new 80-meter antenna. GUX runs 250 watts to a 304TL. NTA is superintendent of the Grassyfork Fisheries. JBQ reports RFN traffic as 148. The Martinsville ARC was host to the IRCC. New Officers of the council are KDV, chairman; QLW, vice-chairman; FZW, secy.; and DKR, treas. KDV, JVN, DUD, VFY, and NTA provided communications for the National Guard while fighting a forest fire. NTA has new HQ-129X. CC is a new call in South Bend. BKJ reports IFN traffic as 223 covering 82 active stations. TT is working on a new rig. CMT has new 75A-2 and Viking II transmitter. GSY moved to Muncie. LOZ has 220-Mc. crystal-controlled rig. KAS has a 55-foot mast. PMT visited HGV. New officers of the FWRC are DKS, pres.; MHS, vice-pres.; NYK, secy.; PMT, comm. mgr.; UDD, CXP, and BKJ, directors. UQQ has new Elmac rig. ASL has new VFO. APJ has a pair of 807s. DPL reports nice openings on 15 meters.

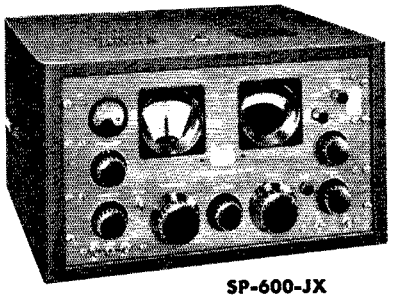
(*Continued on page 79*)

One was in your father's shack—
One should be in yours!

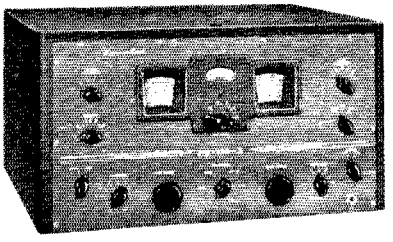
Two generations of satisfied discriminating hams is PROOF of the superiority of Hammarlund's Professional Approach to Receiver Design.



HERE ARE TODAY'S CHAMPIONS



SP-600-JX



HQ-129-X

With the "SP-600-JX", *the* professional receiver now available to hams, you have facilities for six crystal-controlled fixed frequencies. This designates it as the perfect receiver for point-to-point and network operations. Pre-arrange day and night fixed frequencies. With crystal control you can select your desired channels immediately.

Whether you want to operate on a fixed-frequency for contact with an individual station or network, or roam the six bands from 540 kc to 54 mc, you just can't operate a finer receiver.

Professional quality in the "HQ-129-X" is evident in its conveniently placed dials and controls, carefully positioned to provide maximum operating ease. With this receiver you rest your arms on the table for all important control movements—no continuous reaching or other tiring movements during long contest runs.

In addition, the calibrated band-spread dial for 3.5-4 mc, 7-7.3 mc, 14-14.4 mc and 28-30 mc, make it an extremely valuable receiver for operating in today's crowded ham bands.

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NOW! a 5 Band MOBILE CONVERTER

The RME MC-55

For 10-11, 15, 20, 40 and 75 Meters

RME is proud to bring hams a new mobile converter designed for coverage of FIVE bands. With possible opening of 15 and 40 meters to phone operation, the MC-55 is all ready to do a superlative job on those bands as well as 10-11, 20 and 75 meters.

Many of the features so well liked in the RME VHF-152 and HF 10-20 converters, are incorporated in the MC-55. Other brand new features, found only in the MC models, make this small, compact mobile converter an outstanding performer.

Write for illustrated specification sheet.

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features

- HIGH SENSITIVITY. 1.25 micro-volts on all bands.
- THREE GANG TUNING. Individual slug-tuned coils for each band.
- BUILT-IN NOISE CLIPPER. Highly efficient automatic noise-limiter all ready to connect into car radio. Handy IN-OUT switch.
- SEPARATE INPUT CONNECTIONS. An input connector for the regular car antenna, switched from front control knob, does away with loss of "punch" on the broadcast band.
- SMOOTH, SOLID TUNING. 25-to-1 worm gear drive assembly provides smooth, effortless tuning, rock like stability, NO backlash.
- LOW POWER REQUIREMENTS. All miniature low-drain tube line-up. Requires only 25 ma. at 150-180 volts. Uses 6AK5 rf. amp. 12AT7 osc. and det. 6BJ6 if. amp. 6AL5 noise limiter.
- FOUR TUNED CIRCUITS in if. output stage. Output frequency 1550 kc.
- TRANSMIT-RECEIVE SWITCH. Transmit position removes converter "b" plus, makes 6v available at rear terminal strip for operating relays.
- LARGE, ATTRACTIVE EDGE-LIGHTED DIAL calibrated for 26.4-30 mc, 21-21.45 mc, 14-14.3 mc, 7-7.3 mc, and 3.5-4 mc.
- SMALL, COMPACT AND RUGGED. Easy to mount in any handy location. Attractive cabinet blends nicely in any car. Complete with tubes, connecting cables and instruction sheets.

Amateur Net $69.50

JUJ reports QIN traffic as 561. DHJ built new VFO. EUJ works 80-meter c.w. with low-powered VFO. DLI and HDB have 2-meter mobile gear. BRN has Extra Cl. license and is operating KX6AI and AR from Eniwetok. KOZ has new mobile rig. EVR works 80-meter c.w. New members of IRC include STW, PPS, OKW, WN9s UQG, UQW, and URT. A new Novice in Yorktown is WN9TLR. HKQ and KLR are the only known active hams in Jasper County. New ARRL appointees include OWZ as OBS, NTA as OPS, OLX as ORS, KLR as OES, and KAS as Marion County EC. Traffic: (Oct.) W9JUJ 1386, TT 220, NZZ 186, KDV 181, LZI 161, UMS 157, BKJ 154, HSC 150, JBQ 106, TG 90, WBA 87, FYM 74, QID 65, DGA 60, DHJ 45, NTA 38, PPS 38, FZW 36, DOK 33, GUX 27, DKR 22, CMT 20, KAS 20, VNV 20, FSA 18, IFR 17, MUR 16, PMT 11, BDP 6, WN9UQP 6, W9NH 4, YVS 4, UIA 2. (Sept.) W9OWZ 35, KAS 30, AB 19, GUX 6.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAM: ESJ. RM: IQW, SFL. 'Phone Net (BEN) 6 P.M. daily, 3950 kc. c.w. Net (WIN) 3625 kc. 7 P.M. daily; slow speed 6:30 P.M. Mon.-Fri. State Mobile Emergency and C.D. frequency, 29,620 kc. IQW reports as WIN NCS: Mon. DR, Tues. FCF, Wed. CBE, Thurs. SFL, Fri. KKM, Sat. ERW, Sun. IQW. SFL reports as NCS on WIN slow-speed net: Mon. VLL, Tues. UCR, Wed. NLH, Thurs. SFL, Fri. PVH. CXY handled urgent Guam traffic on 14 Mc. while telephone circuits were out because of the hurricane there. Congrats to MQV, who received A-1 Operator Club certificate. FCF is rebuilding VFO and exciter. UCR has had over 500 QSOs in his first three months of operating from Campbellsport. 4YCV, ex-9YCV, has completed his tour of duty as chief of MARS-Army, and expects to be on soon from new location as KL7. IHW is QRL Air Force Reserve duty. RKP has 79 countries confirmed out of 96 worked. SDK is back with a rig on 3.5- and 7-Mc. c.w. and 4- and 14-Mc. n.f.m. CSU had an average error of only .00014 per cent in the September F.M.T. A new Lysco 600 VFO has been added to NUW, the WVRA control station. OPA now has Advanced Class ticket. HDV reports the Green Bay Mike & Key Club was on land, on sea, and in the air for the S.E.T., with KIZ airborne mobile, and FWO maritime mobile. NLH put up 10-meter ground plane vertical. SBH is building a new rig. JM built a new mobile converter. LSK has the rig on 28 Mc. after cleaning up a case of TVI. New appointments: SDK as ORS. Appointment renewals: VHA as EC, LSK as ORS, OVO as OPS. On 144 Mc.: LEE is working on a new p.p. 4-125A final. WN9TTP worked DSP, JBF, NYS, and LEE, and is pouring DX juice into his converter for better response. The NWRC established an informal 144-Mc. net at 8 P.M. daily. KXK has moved into a new QTH and has rotary on a 55-ft. pole. Traffic: (Oct.) W9CXY 134, MQV 104, DR 72, ODD 57, FCF 51, SFL 51, NUW 38, RQM 33, IQW 30, UCR 29, LSK 28, CFP 26, ERW 26, HDV 16, OVO 13, IFS 9, SDK 3. (Sept.) W9DR 32.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Everett E. Hill, WØVKP — North Dakota appointments now in effect are RRW as SEC, YEQ as PAM 75 'phone net, OEL as PAM 160 'phone net, GZD as Grand Forks Area EC, AOX as RM 80 c.w. net. KZZ, new in Fargo, has a Viking 2. KZK is in the Bismarck Hospital with a broken leg. All YL operators in the State, please register with KOY for YLRL registration. LWX is a new call in Adams. DQB wants more information in this column, so let's turn in some reports to your lonesome SCM. I appreciate hearing from you with news for this column. RRW and JWY went duck hunting near Westhope. The SARA will enter the Grand Forks Hobby Show. GND is new editor of the SARA *Feedline*. ARB, a major in the CAP, is Wing Communications Officer. LHS has the teletype about ready to go. Your SCM has mimeographed copies of the State Emergency Corps Network ready for mailing. It includes a map and all information on nets for the State. Contact him for your copy.

SOUTH DAKOTA — SCM, J. W. Sikorski, WØRRN — SEC: GCP. RM: OLB. UVL, Pierre, has moved into his new shack. Trot's rebuilt rig is now cabinet-mounted. The *South Dakota 160-meter net meets nightly, 2000* CST, 1905 kc., with FKE as NCS. The Prairie Dog 160-meter net operates nightly on 1985 kc. WNØIQX attends U.S.D. at Vermillion. DSK, formerly of Parker, now is in USN radio school in San Francisco. EUJ, Viborg, has his Advanced Class ticket. New tickets: LTS, Aberdeen; WNØLXN and WNØLXQ, Sioux Falls. FJS now is located in Madison, with REA, and is Lake County EC. SDE, Mitchell, is Davison County EC. GCP added four full and one supporting AREC members this month. The c.w. net needs your help — 3615 kc., Mon., Wed., and Fri., 1900 CST. LXD, newly-licensed, is working portable at State College, Brookings. Let's all start promoting activity for our call-letter license plates. Director PHR visited Black Hills ARC and Pierre ARC in October. RRN is teaching a weekly ham radio class of telephone men. Traffic: WØEHO 53, PHR 46, GCP 17, W1SWX/Ø 16, WØDTB 16, AEN 12, WUU 3.

MINNESOTA — SCM, Charles M. Bove, WØMXC — Asst. SCM, Jean Walter, ØKYE. SEC: BOL. RMs: RPT, DQL. PAMs: UCV, HEO. The Minn. Junior Net is coming

(*Continued on page 80*)

(*Continued from page 79*)

along OK. K6EA/Ø now is back in Bemidji. WQM made BPL this month. You will notice by the heading that we have some new appointees. New OPS are BUO, FYT, OPA, and FIT. A new club at the U. of M. was started this fall. The club station will be FID. Members are FID, GFY, MQO, MDF, HTX, and KH6OJ. AIH is attending Concordia College. WEF is going to Tulsa for the winter. The Mobile Amateur Radio Corps helped in locating a lost baby at Bush Lake. CRO was in charge. JIE now is OPS. BUO and BOL are teaching code and theory at the Vocational School in St. Paul. DQL wants everyone to check into the MSN on 3595 kc. at 1900 CST. HTX is going to the U. of M. BAS is in the hospital at Glen Lake. The Mobile Amateur Radio Corps has furnished him with a receiver and soon will have a transmitter for him. The first session of the Minnesota State Net was held Aug. 3, 1941. Net control was W9VVA (WØSW). NXZ has a new baby boy and ZWW has a new baby girl. ANU has a new HRO-60 receiver. BYR now is W9VTN at Rock Island, Ill. KG6ADO now is portable and mobile Ø. FDS has a new tower for a ground plane on 10 meters. RXL is de-TVling his rig. IRC has an HT-17 on the Novice band. LYU and LZD are new hams. PQS now is in the Army. W5BAM now is WØLWH. Gene is with the FCDA and is using an SC-274N unit on 7 Mc. JNC is using a new Viking. TOF also has a Viking transmitter and an SX-71 receiver. DXZ and BJR are interested in building a single sideband rig. LLW is rebuilding his single sidebander. WET has moved to Minneapolis. A drive is now on to increase membership in the nets. Join now! Traffic: WØDQL 226, WQM 138, HFY 113, UCV 113, RXL 53, MXC 36, DYD 31, RQJ 31, BUO 27, TJA 22, GGQ 19, HRY 17, BRA 16, CTW 16, IYP 16, ATD 11, KNR 11, OPA 4.

DELTA DIVISION

ARKANSAS — SCM, Fred Ward, W5LUX — The meeting at Carlisle really was enjoyed by everyone and you fellows who missed it sure missed a swell time. Everything, including the WX, was perfect. Officials of the National Guard were present and plans were made for closer coöperation between the services during disasters. All ECs should recontact their local guard batteries and perfect their emergency plans. OEF has new power supply and is doing a good job on OZK. VN is a new OO, so better watch those chirps. VN is EC for Flippin and has new ORS appointment. There are several new calls on 75 meters this month. TLC is on with a nice signal. STV has 250 watts on 75 meters. TIZ is on with 115 watts and TTG has new 150-watt rig. RYM has new Advanced Class ticket and is going to get on in place of RDT while he is in school. HLW is new EC for Eudora. Many appointments are expiring, so watch the dates on your certificates and send them in for renewal as soon as convenient. Sure appreciate the nice stack of reports this month, fellows. It makes my job a lot easier. Traffic: W5EA 43, LUX 30, RWJ 14, PX 11, VN 7.

MISSISSIPPI — SCM, Norman B. Feehan, W5JHS — VQL, the XYL of PFC, and TXK, the XYL of SRU, were promoted from Novice to General Class. AGB/FM, floating mobile, is working T3 at the North Pole. Look for Fred between 8 and 10 P.M. on 14,280 kc. UTN is very busy as NCS for the Mississippi MARS Net and flying a plane for the forestry service. JHS is having trouble with the long skip and the Hurricane Net, but has not missed a roll call as yet. WWI is working 80- and 40-meters c.w. KYC is active on TCPN. WXD is ex-9OSO. QMQ and IBO are checking into the Hurricane Net again. NYV is mobile on 75, 20, and 10 meters. Please note last month's *QST* activities report. Someone played a trick on the old man and inserted the word "your" in front of the following: "SCM is now Advanced Class and is on with 500 watts." Thanks for the high power but I have had my Advanced Class a long time. Traffic: W5KYC 66, RIM 66, JHS 61, UTN 3.

TENNESSEE — SCM, Mark M. Bowelle, W4CXY — SEC: AEE. RM: AGC. PAM: PFP. Both the c.w. and 'phone nets are well into the swing of winter traffic work and, although there are few messages originated in the State, delivery of G.I. traffic from overseas has been prompt on both nets. OGG is back in the home diggings of Memphis, beating out the traffic and still fighting his new rig. PL is getting steamed up for the winter with consistent BPL totals. IIB still is one of the most active on MARS and, while he is resting, acts as NCS of TPN. WQW is moving and de-TVling. New stations QNI the c.w. net are UNS, UWS, UZZ, VNE/4, 5TUV, K4WBF, SPN, SJ, YFW, SPE, FVM, TYU, and NPS. WAX and OGG are a big help to AGC in meeting RN5 and CAN. PMR is a new OO. Traffic: W4PL 988, PFP 466, OGG 203, IIB 119, AGC 100, APC 87, WAX 73, CXY 54, HHQ 37, RHO 15, VAB 8, RMJ 4, PMR 3.

GREAT LAKES DIVISION

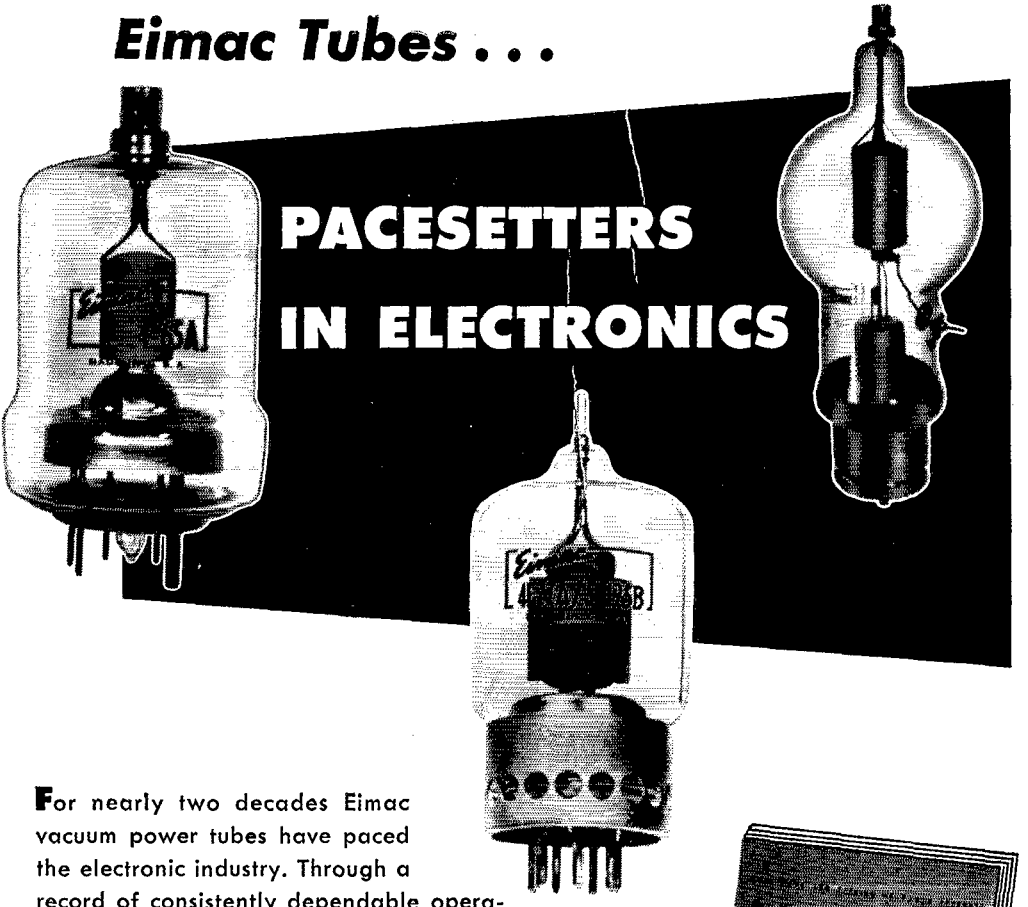
KENTUCKY — SCM, I. W. Lyle, Jr., W4KKG — NBS is working hard organizing an emergency net in the Paducah Area. DXT received Extra Class license. He and MEY are building a kw. rig as their senior project at U. of L. AHL reports that the Blue Grass Radio Club now has 32 members. UWA runs 12 watts and with this works DX and handles traffic! URF has a new beam, new rack and cabinet rig, and helped out in fire emergency net. TPA received his General Class license. WBG, with new chief operator, ØMWV, racked up a nice traffic total. PRT reports things are humming down Lexington way. CDA says he can handle overseas traffic. BAZ extends a cordial welcome to all amateurs to sign up with the CAP. FYD works on KYN and likes ragchews when the net is not busy. WSC, a newcomer to KYN, is doing FB. We have saved the last lines to pay a great big compliment to MWX, our Route Manager. Sprig has been untiring in his efforts to promote a bigger and better KYN and has done a wonderful job. He puts in many hours operating and also prepares and mails out his net bulletin. A great big vote of thanks to you, Sprig, for a wonderful job handled in an outstanding fashion! Traffic: K4WBG 297, W4MWX 172, MGT 120, BAZ 66, WSC 47, CDA 36, PRT 36, UWA 29, FYD 17, URF 15, KZF 5.

MICHIGAN — SCM, Norman C. MacPhail, W8DLZ — Asst. SCMs: R. B. Cooper, 8AQA; M. C. Wills, 8CPB; J. R. Beljan, 8SCW. SEC: GJH. RMs: UKV, YKC, ELW. New appointments: EC to WFA (Mich. Area #1), FCP (Mich. Area #2), FGB (Berrien Co.), NS (Oakland Co.), HRD (Gogebic Co.); ORS to NOH; OO to GBU. ALD is permanent NCS of the GREN. New officers of the Genesee County Club are FBO, pres.; RTN, VHB, and GOL, vice-pres.; GPF, secy.; FOV, treas. The Catalpa Amateur Radio Society's new officers are VVD, pres.; CLZ, vice-pres.; GCP, secy.-treas. This club has a monthly civil defense drill NCSed from its club station, HLD. GPF reports seven of the 2-meter gang in Flint are active on the Wednesday night net. They are ACW, RTO, ITZ, LSW, IOF, GPF, and WXO. DOL sends 73 to the Michigan gang, and says he may be twiddling the bug at K2USA shortly. KOY, CYH, and FGB are NCS on the Great Lakes Emergency Net. BVY reports the Midland AREC gang put on a 100 per cent drill with local police. The Twin Sault Radio Club has built up a Viking I for c.d. work, according to word from CPB. A 160-meter net in the U.P. is in operation Sun. at 1100 EST on 1890 kc. For the first time in history a "Network for God" was operated in Western Michigan. Working with Methodist ministers LLD, YNG, AVJ, BKL, and KTV handled traffic daily for a week between churches across the State. FGB reports HAT is now Advanced Class while WN8LRM is the newest Novice in Benton Harbor. SWF says there are plenty of mobiles in the Detroit Area with YEY on 75 and 160 meters. EGI reports 8FBY (ex-2FBY) is now located in Lansing. TIC is working on a TVI-proof (he hopes) 813 rig. SJF (SCW's XYL) now is active on QMN and 8RN. Hey, fellows, do you know where these news items come from? From the little notes you put on the traffic-report form. We sure can use more of 'em. How about taking the time to jot down any local items of interest to the gang? Thanks. Traffic: (Oct.) W8NZZ 309, ELW 246, NOH 188, DAP 137, RTN 125, SPF 80, CPB 71, QIX 61, ILP 54, GNS 52, DLZ 48, JYJ 42, IV 37, EEF 19, TQP 19, FGB 17, HKT 17, LR 11, SWF 9, GJB 8, LLD 8, MGQ 8, FX 6, EGI 4, PUV/8 4, TIC 4, WVL 4, ENX 2, ZEE 1. (Sept.) W8RTN 68, JYJ 34, IKX 31, AXP 30, WNT 15, EGI 14, CPB 13, YIN 9, COW 8, LR 8, PUV/8 8, FFG 6, SCW 6, NQ 1, ZEE 1.

OHIO — SCM, John E. Siringer, W8AJW — Asst. SCMs: C. D. Hall, 8PUN, and J. Erickson, 8DAE. SEC: UPB. PAM: PUN. RMs: DAE and PMJ. New appointee is RO (ex-RJ) as ORS. AQ now is living a few blocks from his old QTH. INW is a newcomer to 220 Mc. DAD has a new mobile rig on 160 meters. CTZ is area director for TCPN, 3970 kc., with LMB and GDB serving as his assistants. Ohio traffic may be put into the net from 1730 to 1800, prior to starting time. TLAP again is going full blast. DG has received his Extra Class license. EKA has worked six countries on 21 Mc. with 2 watts. GZ is recuperating from a broken ankle and wrist via the wheelchair treatment. We don't believe Windy will be held down for long. The Toledo gang held its pot-luck picnic Oct. 17th. Most of those who attended are well on the road to recovery. The BSWRA held a QSO Party for Summit Co. Nov. 8th. UZJ and SRF have had their appointments reinstated. They threaten to become very active traffic-wise. 8RN is entertaining the thought of moving the net from 3530 to 3645 kc. so as to give the DX boys and girls a break. It seems like a good idea. The OCARC held its fall meeting Oct. 25th. The CACARC all-band WAS Contest was won by ET. He also won the c.w. section and AJW was declared the 'phone winner. QIE is back on the air after being laid up for three months. Glad to see him on the road to recovery. NSS has deserted the Buckeye State and has taken up residence in Hastings, Mich. YGR spent three weeks vacationing in Ontario. The University of Toledo Radio Club has been reorganized and will gladly accept free equipment with no questions asked. On Oct. 15th the Canton gang held its final outdoor get-together for the season. 20-meter mobile is the big noise in the Queen City with WWG, LOM, AQV, SDD, MGP, 4CHP, and 4JYS making most of the racket. SDD worked from the "VE3" and "4" call areas during his vacation. The Dayton *R. F. Carrier* states that GQ, HB, and HOH finished one-two-three, respectively, in the most recent hidden transmitter hunt; the club held a WAS Contest on Oct. 12th; the ZQUs have a new

(*Continued on page 82*)

Eimac Tubes . . .



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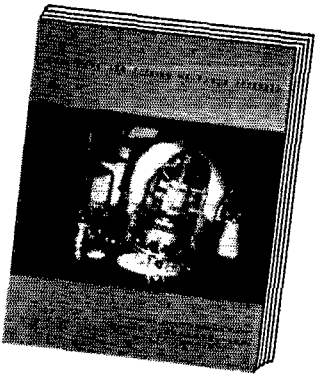

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(*Continued from page 80*)
male harmonic; and the daughter of FYR and FYT has passed her General Class exam. The newest bulletin received here is the *Listening Post* of the Queen City Emergency Net. Suffice to say UPB, our SEC, is one of the chief contributors. All in all it's an excellent publication. The Columbus *Carascope* and the Toledo *Shack Gossip* did not arrive this month. The Bureau of Motor Vehicles is currently mailing out applications for call-letter license plates. Traffic: W8CTZ 319, DAE 121, LMB 81, DG 62, EKA 48, WE 28, FYO 27, BEW 18, EQN 18, QIE 18, AJW 15, GZ 14, RO 12, RN 9, AL 8, YGR 8, ET 7, LBH 4, BUM 3, UZJ 3.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W2ILI — RMs: TYC, KBT. PAMs: IJG, K2CA. IFP has new all-band exciter and will add an 813 final soon. Dave is active on NYS and is working DX on 7 Mc. HEI is very active as OBS and with the traffic nets. MHE had a fine time in the CD Contest. EFU, Zone IV Ccördinator, still finds time for activity on TXN, ESN, and NYS. AARA offers its sincere thanks to LRW for the excellent wiring job on the Viking transmitter, this in connection with the recent Hudson Division Convention. Marce can be found on MARS and NYS. HCS again is active on 3.5 Mc. EWO, secretary of RVWARS, announces a QSO Contest between members. New members on NYSS are WSS and DGW. AWF and the Albany County AREC gang handled the election returns with much success on 144 and 3.5 Mc. HF is selling the XYL the idea of drilling holes in the side of his new ranch wagon for the mobile antenna. Herb's XYL is consulting Santa about a new 32V-3. NYS meets on 3615 kc. Mon.-Sat. at 7 P.M.; Mon.-Fri. at 10 P.M.; NYSS on 3595 kc. at 8 P.M. daily. NYS 'Phone Net meets on 3980 kc. at 6:30 P.M. daily and 8:30 A.M. Sun. Please don't forget to send in your traffic reports no matter how small. ANB will have his teletype gear fired up about the time that you read this and is a new OES in the section. MRR and PSH are working hard on AREC organization. LXP is working much DX on 14 Mc. AFI is doing a fine job as OO. The rig at ILI is back on after a complete breakdown. Appointments: ANB as OES. Traffic: W2TYC 127, IFP 43, EFU 41, WSS 35, KBT 31, LRW 23, DGW 15, HEI 15, MHE 10.

NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, jr., W2OBU — Asst. SCM, Harry Dannals, 2TUK. SEC: KTF. RM: VNJ. PAM: YBT. The Annual S.E.T. was a big success, with reports received from Nassau, Queens, and Suffolk Counties. Over 200 AREC stations were on and a mass of traffic was handled. More than 70 mobiles participated. FI, Nassau EC, states that over 100 stations were active in the S.E.T., both on 10 and 2 meters, and Nassau now has 17 stations permanently located at c.d. headquarters. In Brookhaven Township, IVX, the EC, and BGO, NYSCD, witnessed the drill in which 15 mobiles on 6 meters took part. KFV set up a mobile unit at Mineola Police office, relayed election returns to LBJ in Sands Point, who relayed to JVG in Manhattan, from which point the returns were teletyped to WNYC. FI monitored 2 meters just in case. Five minutes was the total time consumed in complete reporting of election returns from Mineola to WNYC. YBT, PAM for the 75-meter section 'phone net, tells us the net has increased membership and the amount of traffic being handled. Outlets are needed in many parts of the section. The net meets on 3910 kc. 1000 on Sundays. VNJ, RM for the NYC-LI (NLI) Traffic Net, which meets Mon. through Fri. at 1930 on 3630 kc., has started the BRAT awards for attendance and traffic scoring. OJM and IDK are the newest members of the net and both have earned ORS appointment. JXM, chief operator at the Columbia University Club, AEE, announces an NLT training net on 3710 kc. Slow-speeders and Novices are invited to take advantage of the training program. JBQ now is operating /2 from new QTH in Baldwin. LPJ is going to town with a new Viking. The October CD Party was a real scrap between two NLIers. Watch the January *CD Bulletin* and see how close it was. DLO is the newest Nassau County AREC member after changing QTH from Brooklyn. WN2IEH is active on 144 Mc. and really stirring up c.d. in Levittown. IRK has received OO and OBS appointments. WDT has been appointed OBS in the Brooklyn Area. WOD is back on 75 meters again after a long lay-off. JBP has left Tokyo and now is on Guam and plans to operate from KG6AAY. K2ALH, Williston Park c.d. station, has new 522 on 2 meters. K2AAN and LTQ are the latest to join the New York Radio Club. The Northern Nassau Radio Club elected the following slate of officers for 1953: NFU, pres.; ZDB, vice-pres.; CJY, rec. secy.; CNN, treas.; and GFF, corr. secy. To date the Tu-Boro Club has issued certificates to 24 stations, each of which contacted club members on various bands. The same is offered to all stations — no time limit. LGK now is Advanced Class license holder after 14 years. Newest member of the Tu-Boro Club is ZPQ. Things are picking up on 420 Mc. these days. PAA, SMY (Babylon), CEP, AOD, VSA (back on 420 again after 17 months in Korea), K2ALL, and GNB (East Meadow) all are livening up the band with changes in gear and antennas. IN changed QTH to the house next door. BQM has been appointed OBS. Traffic: W2BO 910 ,VNJ 252, EC 243, IVS 133, GP 98, LPJ 82, LGK 60, JZX 53, OBU 48, AEE 44, VVP 35, OJX 24, BQM 18, IDK 18, CLG 16, PF 12, IN 11, YBT 11, IAG 9, JXM/2 8, EEY 4, TUK 2.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR: Asst. SCM: D. Reid, W2FMG. SEC: NKD. RMs: WCL and NKD. Monmouth County c.d. organization meeting was held at Freehold Nov. 10th. FMG, nearing completion of disaster communications trailer, will contain four portable transmitters and receivers, a 2-kw. generator, flood lights, field telephones, wire and portable switchboard, first-aid equipment and mobile kitchen unit with food provisions for self-sustaining emergency field operations. The GSARA Radio Club now is operating 144-Mc. rig with 3 skirt ground plain type vertical antennas on top of a 90-ft. mast. The Club is sponsoring FMG for the Edison Radio Amateur Award as announced by General Electric Co. in Oct. *QST*. LOP reports Union County AREC meets 8 P.M. Tues. on 146.7 Mc., 8:30 P.M. Tues. 29.6 Mc. 10- and 2-meter. UCAREC Nets had a hidden transmitter hunt on Oct. 7th. Hidden stations were CCY and LOP. COT reports Maplewood c.d. radio unit is building portable-type transmitters for local c.d. work. WCL reports K2BCK and K2WAO now are regular members in 3695-kc. net, located at Navy Ammunition Depot and Fort Dix Areas, respectively. HWH was elected treasurer of the Bloomfield Radio Club and has a new 500-watt transmitter, TZ40s p.p on 80-40- and 20-meter c.w. HIA is active with traffic in Middlesex County Net Fri. 7:30 P.M. on 147.150 Mc. and N. J. 'Phone Net 9:00 A.M. Sun. 3900 kc. OUS, NCS Monmouth County Emergency Net, meets 9 P.M. Mon. on 147.150 Mc. and Jersey C.D. Net Sun. at 9:30 A.M. on 3993 kc. The Northern New Jersey Radio Assn. meets the 2nd and 4th Mon. at 60 Grand Ave., Englewood. New members are EOV, KMR, BAP, KN2AXQ, and KN2AUC. CVF, Bergen County EC, reports a new record attendance for the c.d. net Oct. 1st, 114 stations checking into the net. Bergen County LO-NITEskeds are 6:00–6:30 P.M. on 3900 kc., 7:30–8:00 P.M. on 29.510 Mc. Traffic totals show NKD very busy in net operations. The following stations submitted reports on the Sept. 10–11 Frequency Measuring Test: ZT, VCX, MPP, ATE, HIA, and HYV. ZT, the section winner, had an average error of 11.4 parts per million in 16 measurements on 3.5 and 7 Mc. New EC appointments: ASY, Allendale; AIF, Bergenfield; VKR, Closter; JWN, Cresskill; GJF, Carlstadt; FUM, Edgewater; BSF, Glen Rock; HEJ, Hawroth; IQJ, Leonia; NRM, Lodi; EOV, New Milford; AGA, Ridgefield; ND, River Edge; AR, Woodcliff Lake; ICT, Wallington; EPM, Wyckoff. OO reports from TPJ and NIY show a total of 16 violations logged during October. NIY reports WN2MNN has dropped the "N." EAS reports net activity very heavy during October. Raritan Valley Radio Club notes: The club house is being refurnished and a new porch is being added. GRZ proved himself an excellent carpenter doing the remodeling. NQA has built crystal converter for 144 Mc. IBF gets a kick from working 75-meter mobile on morning trip to business. OGU, ISX, NMJ, and BVS visited RVRC and BVS gave a talk there. Traffic: (Oct.) W2CUI 302, WCL 137, EAS 91, NKD 88, HIA 17, FMG 13, CVF 11, CJX 10, OUS 10, NIY 4. (Sept.) W2CJX 12, LOP 4, COT 2.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — QVA reports three new members of TLCN — BLH, FDM, and EDZ, the latter 14 years old. DIT has a new Viking. BDR and his XYL visited QVA and all had a swell time. HKN has been released from the Air Force and now is attending Drake. SEF bought a home in Des Moines. YTA got his discharge from the USMCR in time to prevent his recall to active duty. SCA and BDR make BPL again. BVE took it easy and didn't quite make it. NYX reports two new Waterloo hams, WNØKGH and WNØLGE. SCA, BDR, PP, and BBZ attended our Director's meeting at Omaha where good progress was made in his Federation of Clubs project. BQJ renewed his ORS appointment. HDX sent in a very complete report of the Cedar Rapids Club's c.d. activities. It's refreshing to learn of such fine activity. CZ sent in his first traffic report and it was greatly appreciated. VRA reports that Black Hawk County had a nice S.E.T. Oct. 12th, racking up 170 points. He reports three new ECs — KWT, Independence; LGB, Iowa Falls, and BDL, Garrison. Looks like the Iowa section is off to a good season. Keep the reports rolling in, fellows. Traffic: WØSCA 601, BDR 548, BVE 252, QVA 115, YTA 109, CZ 83, PZO 59, NYX 41, BBZ 35, SEF 29, BLH 13.

KANSAS — SCM, Earl N. Johnston, WØICV — SEC: PAH. Asst. SEC: UPU. RM: KXL. PAM: CIK. The 75-meter 'phone net is increasing in numbers with such FB stations as VGX of Satanta, DHR of Medicine Lodge, ERA of Fredonia, CFM of Centerville, NVB of Great Bend, and KXB and SKW (who has a new Viking) of Topeka. KXL has thirty QKS members in his c.w. nets. QCH, secretary of the Garden City Amateur Radio Club, reports that Garden City gave the Club a building in the city park for a club house and installed three 60-foot poles for antennas. The c.d. furnished Viking I, RME-69 receiver, and emergency power plant. The emergency net, comprising six mobiles and the c.d. station, operate on 29.070 Mc. Zone 1,

(*Continued on page 84*)

MALLORY HAM BULLETIN

WHAT TO LOOK FOR IN A UHF TV CONVERTER

Dear OM:

Many communities are preparing to welcome UHF television for the first time. As a result it is probable that you will be called upon by friends, neighbors, and relatives for technical advice regarding the possibility of using a VHF television receiver for the reception of UHF channels.

For your information, UHF reception *is* entirely possible from a conventional VHF TV receiver provided a suitable outboard Converter is employed ahead of the set. In such a combination, the original TV receiver functions as an i.f. amplifier, and UHF tuning is accomplished solely by means of the Converter.

Unfortunately, the effectiveness of this arrangement depends almost entirely on the skill with which the Converter was designed and manufactured. It is true that a well-designed Converter will tend to overcome some of the deficiencies of a mediocre TV set. On the other hand, it is just as true that a poorly designed Converter will always produce inferior results no matter how good the TV set might be. In view of this, a very deliberate study of every angle of UHF Converter design is justified before recommending purchase of this or that UHF Converter.

One of the points which must be considered is the tuning range of the unit. Does it provide reception of all UHF channels? Or does it limit the user to a choice of only a few of the available channels?

Does it have antenna pre-selection? (The answer to this question is exceedingly important to the amateur, because of the ever possible TVI as a direct result of poor input selectivity!)

Can it be employed with any conventional VHF TV set? Can it be installed without special tools and by non-technicians?

Is it stable in operation? Is it easily tuned, so that even a child can enjoy UHF television?

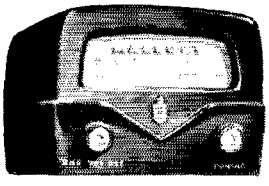
Does it have built-in low-noise i.f. pre-amplification to guarantee the best possible signal-to-noise ratio at all times? Is it complete? Does it have its own power supply?

Strictly from an operating standpoint, the size and appearance of a UHF Converter is of little importance. However, it is a well-known fact that recommendations to wives, mothers, daughters, sisters, and aunts must be made in good taste. So, the question of appearance must be considered!

Your analysis of a UHF Converter suitable for unqualified recommendation to associates should result in clear-cut affirmative answers to each of the above. Anything less, means that you haven't examined the characteristics of the Mallory TV101, Inductuner® equipped, UHF Converter. The TV101 design definitely includes each of the above . . . plus. Your QSL, letter, or msg. directed to TV101 Bulletin, P. R. Mallory & Co. Inc., Box 1558, Indianapolis 6, Indiana, will get you additional information.

73,

Your Mallory Reporter



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MALLORY

(Continued from page 82)

the Wyandotte-Johnson County Area, held an S.E.T. Oct. 11th, with 13 mobiles and 3 fixed stations operating on 29.6 Mc. HAW, of Hamlin, says there will be 17 new Novices in his town soon. At Wichita DSY has a new 60-foot tower for a beam and FJC has a new rig with 4-125As. 5JAV Ø, mobile on 75 and 160 meters, is a new station in Dodge City. QQQ, of Manhattan, is active on five nets. BNU is rebuilding antennas, operating position, and also a new Viking. CHJ is working 21 Mc. and landed G2DPY and KV4AA the first two contacts. Thanks, fellows, for the traffic reports. Traffic: WØBLI 168, NIY 145, BET 32, FUF 31, FDJ 30, KSY 23, WMQ 22, ZGK 22, WGM 18, QQQ 9, GHR 8, ICV 8, BNU 5, SKW 4, LIX 3, EBB 2, CHJ 1, GVI 1.

MISSOURI — SCM, Clarence L. Arundale, WØGBJ — SEC: VRF. At the recent Divisional Conference at Kansas City, under the direction of OZN and MVG, considerable progress was made in organizing the Federation of Clubs. The HARC provided facilities for the meeting. The Tri-State Radio Society held its S.E.T. Oct. 11th under the direction of EC FKM. RCE reports successful S.E.T. operation in St. Louis with a score of 409 points. EBE, Springfield EC, had a very successful S.E.T. activity. On Oct. 27th the Red Cross alerted EC EBE, in Springfield, for possible assistance in communications involving a bad grass fire in the Walnut Grove Area. However, the fires were brought under control and emergency communications were not needed. QMF's XYL gave him a surprise birthday party with about 15 hams and XYLs present. Brownie, of KØWBD, has been transferred to the Far East. CKQ has a new rig to operate on 2, 6, and 10 meters. BPD now has motor mounted on his 10-meter beam. FXU is assembling a Viking II. BHC got an HRO-50-T1 and Viking II for his new shack. LD/Ø keeps a schedule with his XYL, DTK, on 75-meter 'phone. HUI has installed a new mike on the 150-B. ARH is recovering from a recent operation. BUL has moved into his new home and is on with a Viking. JXJ recently attended an SMARC meeting. QXO, CPI, and JXJ did a fine job of traffic-handling and each made BPL. BVG is on with an HRO-50-T and Viking II. BVL reports the Early Bird Net is back in operation with an average of 9.5 messages per session during October. Traffic: WØQXO 813, CPI 771, JXJ 505, BVL 136, GBJ 108, KØWBD 80, WØCXE 70, ZLN 70, KØFAY 59, WØGAR 50, CFL 44, IQY 35, CZE 33, EBE 27, KIK 27, OUD 25, ETW 24, ZBR 22, HUI 21, QMF 20, NNH 12, TGG 10, CKQ 4, WIS 3.

NEBRASKA — SCM, Floyd B. Campbell, WØCBH — VYX has his new rig on and going great guns. RYG is back on the air. OHP is using a "V" type half-wave antenna on 80 meters with excellent results. EGQ is holding code practice on 3745 kc. at 5 P.M. Mon. through Fri. Congratulations are in order for EGQ at Leigh, Nebr. TQD is keeping a regular sked with KG6FAA on 7 and 14 Mc. AIN now has his 400-foot antenna for 80-10 and has worked 26 countries on 14 Mc. in the last 3 months. The NEB c.w. net, with LJO as manager, is getting 95 per cent reporting each night. JDJ informs us that there is very little interest shown in NSS (slow-speed net). Traffic: WØTQD 2078, JDJ 78, VYX 39, KCK 34, KDW 33, FQB 25, SAI 18, AIN 17, CBH 14, CC 14, QOU 14, ZJF 11, ASI 10, HQQ 10, ZNI 9, DHO 8, EGQ 8, THF 8, YNA 8, HXH 4, JED 3, VPR 2, LEF 1.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Roger C. Amundsen, W1HYF — SEC: LKF. RM; KYQ. PAM: FOB. CN-3640 kc., CPN-3880 kc., CEN-29,680 kc. NJM and AW both make BPL on originations plus deliveries and AYC and SJO turn in excellent traffic totals for the month. The highest number of reports to date were received. OND helped the VA 'Phone Net during the forest fire emergency. NLM enjoyed his first CD Party. HUM is back on TLAP. CUH says he has no TVI now. ORP is on Sunday A.M. SJO is building 1215-Mc. gear. 2VMX/1, formerly at W1AW and now at Headquarters, has applied for a W1 call. APA already had two TV sets and won a third. He had an auto crackup but is OK again. TJX's EC appointment has been endorsed. TWZ is interested in AREC. JSC has gone to Florida for the winter. TD needs sky hook for 80-meter antenna. AOS reports a visit from FXP. STU had fun in the S.E.T. KYQ wonders whether that strong foreign QRM on 3640 kc. will drive us off. Would a net at 6:45 help any or does the gang have any ideas? CARA new officers are BEW, pres.; RTH, vice-pres.; ADW, secy.; UFF, treas. UFF moved to Waterbury. RKA is on CPN with a Viking. The Connecticut Party was lots of fun as usual. KN2BDM and W3TSJ were visitors in Ridgefield. Both 6YYM and 6YYN are active portable 1. CTI is back on after months of inactivity. PCH is on vacation in W2-Land. KGT is selling the big rig. RMZ is hot on recording. Best of Season's Greetings and may 1953 bring your greatest ham thrills. Traffic: W1AYC 391, SJO 338, AW 328, NJM 264, KYQ 155, CUH 116, EMF 116, LV 107, STU 106, BDI 58, HUM 50, HYF 49, RRE 47, TJX 40, RFJ 39, QJM 27, FOB 25, JSC 19, LIG 15, KV 11, NEK 8, AOS 2, APA 2, NLM 1.

MAINE — SCM, Orestes R. Brackett, W1PTL — SEC: BYK. PAM: OLQ. RM: LKP. Pine Tree Net meets on 3596 kc. at 1900 Mon. through Fri. Sea Gull Net meets on 3960 kc. at 1730 Mon. through Fri. BYK has been appointed Radio Officer for the State of Maine for all RACES stations. TJQ, of Belfast, has joined the ranks of 75 meters, along with BX. SSX, Bangor, finally is going on 75 meters and is doing OK. VV is getting a lot of company these days while he is recuperating. BTY, RJR, and BYK and XYL were a few of those who visited. By the way, if you want to read a swell radio column I would suggest that you get hold of a Sunday *Bangor Commercial*. What VV is doing there is really something! He gives all the latest dope about rules, regulations, etc., along with what is happening among all the hams throughout the State. If you like it, by all means write the editor of the paper and let him know. On Jan. 8, 1953, starting at 8 P.M. there will be another of those fine QSO parties between the VEs and the Ws. VE2XO and W1MLJ will be NCS of their respective countries; the frequency will be 3860 kc. This party was started several years before the War and the only times that it has not been held were those years that we amateurs were off the air during World War 2. Traffic: W1LKP 201, OHT 41, KYO 37, PTL 37, QQY 26, EFR 25, VV 19, HXQ 18, BOC 17, SEJ 15, BX 14, OLQ 11, SUK 11, KEZ 2.

EASTERN MASSACHUSETTS — Frank L. Baker, jr., W1ALP — New appointments: UIR as OBS, RM as EC and a member of the Region 5 Committee. Appointments endorsed: CBY, Lawrence, HP Merrimac, AR Belmont, and NSP Fairhaven as ECs; AR as OPS. The Region 5 Committee held its monthly meeting at the Newton c.d. headquarters. DFS, chairman, KTG, secy., BL, RM, TQP, ALP, and IPA were present. A meeting for communications for radiological monitoring in Region 5 was held at PXY's QTH. LSW, HYZ, and ALP were among those present. ZK has been in the hospital but is coming along slowly. UAR is mobile on 28 Mc. BA is on 14 Mc. LYF, UCP, and TWK are on 28 Mc. WDD is a new ham in Fairhaven. WN1WLU, new in Watertown, is interested in Novice net on 3725 kc. MTG is on 3.5-Mc. c.w. AJL is on 3.9-Mc. 'phone. The Yankee Radio Club holds meetings in the Christopher Columbus Hall in Salem monthly. New officers are LQQ, pres.; IXO, vice-pres.; PCE, secy.; RNM, treas.; STG, ham-tamer; PRX and UWH, directors. The El-Ray Radio Club elected SAD, pres.; SPP, vice-pres.; WGE, secy.; JYC, treas.; TSN, act. mgr.; VKA, chief engineer. The T-9 Radio Club held its meeting at IBF's QTH in Sudbury. The Martha's Vineyard Radio Club held its annual picnic with JNM, FZT, RUU, TJW, VDO, SUE, OJE, SLW, NZP, MBQ, SGL, OQT, MMI, UGH, QLL, PMC, QWI, DJK, UNU, VOF, and 2IKE present. BIA has a 32V-2 on 28 and 3.9 Mc. BB and AVY are on Ketch *Miru* Net, ZK1AN/MM, at 6:30 A.M. on 3.9 Mc. WGN has a TBS-50. MHN has a new tape recorder. ME has new Elmac transmitter in the car. KHV is building a kw. rig. UIE is on 28 Mc., fixed and mobile. TZU has rig on 28 Mc. in the car. UID is going after Class B. The Quannapowitt Radio Assn. held its popular bean supper. WKF writes from Guam, where he has been operating KG6FAA. LAO has moved to Limerick, Me., and is on 3820 kc. at 7 A.M. TUJ has Class A. Lt. Comdr. Legare's call is WMS. Paul Corbett is WN1WMO. DOX is on 21 Mc. RZZ, QUY, DOX, RYJ, TDQ, SIX, OLN, REI, and HQO attended the Nashua Hamfest. The T-9 Radio Club held a meeting at HBG's QTH. PST, Brookline EC, has appointed AHB, ATD, and UPZ as Asst. ECs. The Wellesley Radio Society had Frank McCarthy, of Sylvania, give a talk on "Micro-waves." OLP conducted a demonstration with Walpole hams for Red Cross and c.d. officials. RDV has been working DX on 28 Mc. GOU worked two new countries. EMG has ten crystals and rotary switch on the front end of B.&W. 504. RLF is building an all-band transmitter with 813. PJ has mobile rig on 28 Mc. TVZ worked KG4AC on 28 Mc. WN1WLU is NCS of the Ho-Hum Novice Net on 3725 kc. at 6 A.M. BGW, GOU, and WK attended the DXCC meeting. WNs WLV and VTT are new hams in Quincy. The Eastern Mass. Club had a very nice meeting at St. Sebastian's Country Day School. The South Shore Club had a Novice Night with ONV, DDO, and WK taking part. TQS is on from Cape Cod week ends. Eastern Mass. had Ed Tilton from ARRL Headquarters. NF has 50-Mc. vertical antenna. The Old Colony Radio Assn. meets the 2nd and 4th Wed. nights of each month. Traffic: W1EMG 249, JCK 133, UE 110, SS 92, TY 44, AVY 32, NUP 28, BY 26, RDV 21, UTH 21 LM 13, WU 11, HWE 9, CTR 7, QON 5, TVZ 1

WESTERN MASSACHUSETTS — SCM, Roger E. Corey, W1JYH — SEC: KUE. RM: BVR. PAM: RDR. WMN on 3560 kc. at 7 P.M. Mon. through Fri. WMNS (slow-speed net) at 8 P.M. Mon., Wed., and Fri. New ECs are TAY, LJQ, RFU, and KDS. New OESs are OBQ and RVW. A card to the SCM will bring you application blanks for official appointments. BDV skeds his son via BYK. SPF is c.d. radio officer for Worcester. EOB has a new mobile rig. TVJ is looking for contacts on 40 meters. VBG and MNG send code practice at 7 P.M. Tues. and Thurs. on 29.4 Mc. COI has licked TVI and is on 20-meter 'phone again. RHU is busy at M.I.T. and RVG is at Yale. AGM has new 75A-2 and 32V-3. The PRC visited W1AW en masse. KSD moved to Lee from Connecticut and is on 14-Mc. 'phone. JLT is up to 180 countries worked. Trap-shooting is RDR's new hobby. New officers of HCRC are RDR, pres.; KUL, vice-pres.; QUQ, treas.; PHU, secy. LFI has modified his Viking I for 6 meters. IZN and the Pittsfield AREC partici-

(Continued on page 86)

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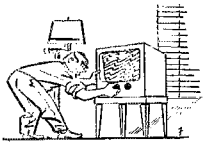
The transmitter kit you've waited for! The JOHNSON Viking II, successor to the Viking I, and the most complete transmitter kit on the market. The Viking II is an expertly designed transmitter, furnished unassembled but complete to the last detail. Includes all necessary parts, hardware, tubes, wiring harness, and cabinet. Assembly manual contains detailed photos, drawings, and *step-by-step* instructions. All amateur bands from 10 to 160 meters, 100 watts phone output, 130 watts CW.

RF section: 6AU6 oscillator, 6AQ5 buffer/doubler, parallel 6146 final amplifier. Modulator: 6AU6 voltage amplifier, 6AU6 driver, pp 807's class AB_2, 6AL5 bias rectifier. Full excitation delivered to the final amplifier on all frequencies. Continuous tuning pi-network amplifier matches a wide range of antenna impedences. All stages metered, dual power supplies designed for economy and operating convenience.

For novice operation, the final amplifier input may be reduced to 75 watts—no transmitter modification is required.



TVI SUPPRESSION MEASURES . . .

The Viking II is enclosed in a heavily copper plated, steel cabinet; perforated top and bottom. Lid bonded with silver plated, phosphor bronze contact fingers. Special shields for meter, dial window, and VFO power socket. Filters at: keying jack, microphone connector, VFO power receptacle, power cord, and antenna relay connector.

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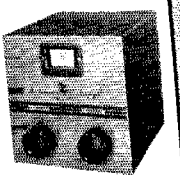

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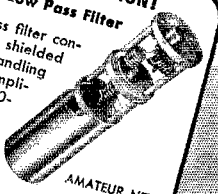

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(*Continued from page 84*)

pated in the S.E.T. and have added two 3.9-Mc. walkie-talkies to their equipment. Nancy, WN1WDX, has been showing the boys how to work DX on the Novice band. WN1UWK is PRC activities manager. EOB received cards from GD and CR5 to make it 130. CCH gets consistent 150-mile coverage with his new sixty-element 144-Mc. rotary. BBT is getting new thrills with s.s.b. on 3.999 Mc. EHH and OME have kept C.D. Region No. 9 on the air weekly. OBQ has p.p. 6146 on 144 Mc. IZN has started 50-Mc. activity in the Berkshires. LIB, LIY, MNG, JYH, NAX, and QOC took part in the 'Phone CD Party. PRC is sponsoring a "Worked All Members" contest. QCT now is K2AQI. Your activity strengthens our section and your reports make this column more interesting to all. Let me hear from you often. Traffic: W1BVR 128, DVW 87, SPF 41, TVJ 37, TAY 21, HRV 18, BDV 6.

NEW HAMPSHIRE — SCM, Carroll A. Currier, W1GMH — RM: CRW. The Great Bay Radio Club sponsored its fall clam chowder to the usual gang, and what a chowder! GTY, Grafton County EC, is calling for volunteers for the emergency net and asks those interested to contact him. RGC now is rebuilding his mobile rig. The Port City Radio Club at Portsmouth has moved to new and larger quarters. SGD worked mobile on his trip to Florida. GMH has Viking II and likes it FB. The Manchester Radio Club is working out fine from its new quarters atop Mt. Uncanoonuc. KYG has new all-band rig for mobile. Many thanks to those who are sending in traffic reports. Don't forget this is your column, so please also send in some news items. IJB and SS gave valuable information at the Hampton gathering about the work of forming the RACES set-up. There now is an RO in each county. TCPN could use some more outlets in the State. Why not call in? JBM is back pounding brass. I take this opportunity of wishing one and all a Very Merry Christmas and a Prosperous New Year. Traffic: W1POK 68, QGU 45, JNC 31, GMH 28, QJX 13, FZ 8, UNV 1.

RHODE ISLAND — SCM, Merrill D. Randall, W1JBB — SEC: MIJ. RM: BTV. PAM: BFB. The R. I. Net meets Mon. through Fri. at 1900 on 3540 kc. The R. I. c.d. net meets Sun. at 1000 on 3993 kc., with OIK and TRX as control stations. With eleven stations and five associates, this net could use some more. Whether the beans or the auction drew them, there was quite a gang at the NAARO supper on Oct. 29th, and all had a good time. NCRC's business meetings are held the 2nd and 4th Mon. — all other Mondays are devoted to code and theory classes. Any ham from anywhere is invited to either. Meetings are held at Seaman's Institute on Mill Street, Newport, just 100 yards from Jamestown Ferry. Still looking for information from other R.I. clubs? That R.I. c.d. net consists of OIK, TRX, ONZ, OMC, Middletown; BVI, OUR, ULG, Newport; BBN, Portsmouth; QYX, Pawtucket; JRZ, Warwick; and QLD, Cranston; as regulars, with AVY, APN, and NNN of New Bedford, Fairhaven, and Swansea, Mass., CPI of Wakefield, R. I., and 2IIN of Elizabeth, N. J., serving in associate capacity. Traffic: W1BBN 38, QYX 24, ULG 16, OIK 8.

VERMONT — SCM, Raymond N. Flood, W1FPS — SEC: JEN. PAM: AXN. RM: OAK. Asst. RM: TAN. The Vermont slow-speed net has been discontinued because of the terrific QRM, 'phone and c.w., on 3740 kc. Conditions reached the point where it was impossible to hear each other, to say nothing about trying to copy. Sorry, Novices. VIP says he can copy 16 w.p.m. on the mill. Nice going, Gordon. VTP has received his General Class ticket and is reporting in on VTN on 3520 kc. JLZ is having fun with 40 watts to an 807 on 75-meter 'phone. TXY is not doing so well. Keep trying, Ralph, it will be all the more fun when you do get on 75 meters. Please fill out ARRL Form #1 and return to me with your local news. Traffic: W1OAK 181, RNA 108, FPS 44, TAN 40, IT 24, JLZ 15, ELJ 11, JEN 10, TXY 7.

NORTHWESTERN DIVISION

ALASKA — SCM, Glen Jefferson, KL7NT — BK is taking time out for home construction on his country acres. ALL is on s.s.b. and conditioning Anchorage contacts to s.s.b. reception. AEV still is working on bugs in his s.s.b. job. ZG, at Golovin, is about to fire up his kw. job after settling down from a tour with his family "Outside." Buddy reports working SM5ALP, VK4ZP, G3BTH, G3HSN, CT1PK, and EA7DJ so I wonder why he worries about more power. AEE now is running a "near" kw. but has not mentioned any rare DX as yet. Communications plans for civil defense are making slow progress with slow response from some areas being the retarding factor.

IDAHO — SCM, Alan K. Ross, W7IWU — Lewiston: IDZ, the new EC, turns in the following: OWA worked XE1 on 29 Mc. for a new country. POZ is the proud papa of a boy. The Lewiston-Clarkston Amateur Radio Club worked with the police on Halloween. IDZ and OOV were at the Police Station working OOW, OWA, POZ, and HDT mobiles. Burley: New officers of the Magic Valley Radio Club are: HAH, pres.; HST, vice-pres.; and NRY, secy-treas. DLA represented Burley in the Oct. S.E.T. Blackfoot: LQU is active on MARS, 4025 kc. New hams are QCU and

(*Continued on page 88*)

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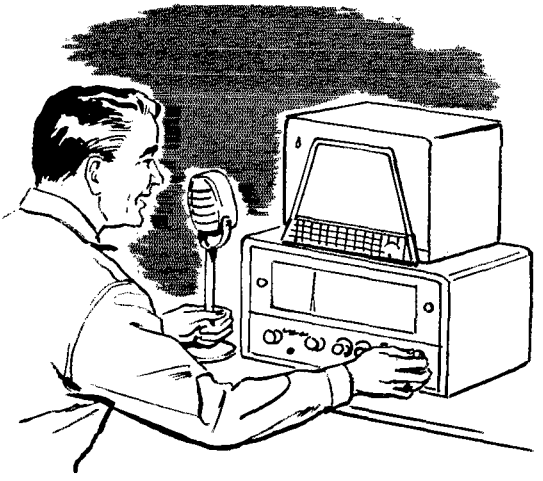

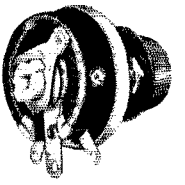

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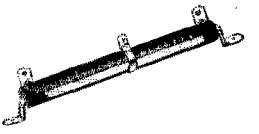

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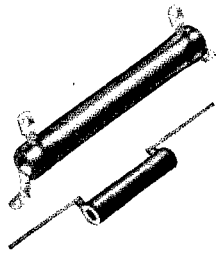

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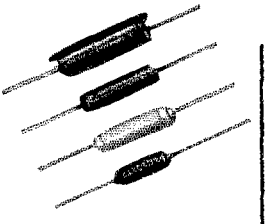

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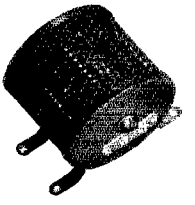
Single-layer-wound on low power-factor steatite or bakelite cores. Seven stock sizes for all frequencies, 3 to 520 mc. Two units rated 600 ma; all others rated 1000 ma.



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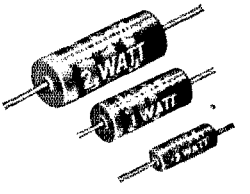

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XYL WN7SMH. Hayden Lake and Coeur d'Alene Area: FIS is active as EC and in three nets, FARM, GEM, and CARS, and also schedules EHZ on 29 Mc. The S.E.T. was handled by EHZ, ISF, BAA, OTD, LJF, ELJ, OBN, RHF, FIS, IPE, WN7RHX, and WN7SAH. Boise: S.E.T. control stations on 3935 kc. were MUT, NVO, MKS, APK, and SHN. On 3638 kc. were ZN, TCI, and GHT. On 1995 kc. were ORJ and NVO. Caldwell: EYR is EC. Traffic: W7TCI 19, FIS 11, LQU 6, DLA 5, HAH 2.

MONTANA — SCM, Edward G. Brown, W7KGJ — Newly-elected officers of the Billings Club are CT, pres.; OPM, vice-pres.; RJL, secy.; PLN, treas.; GFV, editor; and WN7TAT, sgt. at arms. WN7SCG has a new SOJ3. KUI has a couple of new antenna poles so we will be hearing Paul on the air soon. 8BTV/7 just received a Public Service award for his activity in the Ohio River Flood emergency of January, 1952. If the lack of activity and news reports are an indication, ham activity must be at a standstill in Montana, as only a couple of fellows have sent in news and traffic reports since early last spring. Traffic: W8BTV/7 132, W7JDZ 68.

OREGON — SCM, J. E. Roden, W7MQ — RKL got his new mobile going on the 29-Mc. band and is quite proud of his first attempt at such a project, as he is a new amateur. EBQ has given up hamming for the time being, until the newness is worn off his TV set. RQN and SCW are new Novices, recently licensed from Astoria. PAO is TVI-proofing his rig. LQV has just installed a new 29-Mc. rig in his car. The Pendleton gang soon will have quite an array of 10-meter mobiles. HDN still is touring the State with a message in the form of a fine tape recording from the State Civil Defense Director to all radio amateurs in Oregon. QJY is new EC for Morrow County and is much interested in getting things rolling in that County, which has a very meager number of amateurs. Extremely bad skip conditions have kept net operations at quite a low ebb in this State, especially the reports for the monthsly *QST* column. Traffic: W7HDN 120, MLJ 39, MQ 14, OLU 11, ADX 10, KYO 9, PL 9.

WASHINGTON — SCM, Laurence Sebring, W7CZY — SEC: BTV. RM: FIX. PAM: NRB. CWN built broadband converter to use in the car for 75. MBY still is rebuilding his rig. ETK got p.p. 813 final ready to go but still has to put power supply together and rebuild modulator. LVB has a new rig now, 250 watts to a 5514. KTL has his 10-meter mobile going. AWG has more TVI trouble, also QSB. The 10-meter mobile boys in Spokane are QRL on c.d. and coöperated with the police department Halloween night. FWD is running slower speed bulletin at about 16 w.p.m. at 1830 and at 25 w.p.m. at 1845. CCT is back on the air after 17 years' layoff. PUL worked KG6FAB. New officers of the Spokane Radio Amateur Club are OPR, pres.; PCV, vice-pres.; OHI, secy.; JNP, trustee. It is a very active club, with committee meetings, drills, and transmitter hunts being well attended. PXA is at new QTH. PUL and RFP have new 10-meter beams. BVB has coax "J" antenna on 10. As soon as LYA returned home from Vets Hospital, his son-in-law, NLJ, had to go to the hospital. WN7RDR is building a portable rig. PHC has Hylite 10–20-meter beam mounted. JJK/6 is back at Camp San Luis Obispo. GJU is overhauling his HT-19. GWK is revamping the 10-meter beam. PXY passed Advanced Class exam. OEB is de-TVIing his Stancor 202A. KZP and HXA took 5-watter on a hunting trip and checked in to their families each night. JNC and JXR are helping to put the final touches on the ART-13 of VI's. At the Northland Halloween party AWP and his XYL won first prizes with costumes. Mt. Baker Radio Club's new officers are MLU, pres.; NSI, vice-pres.; KWC, secy.-treas. On Halloween the Club had 6 mobiles working with the City Police and four mobiles with the Washington State Patrol. The only casualty was KWC, who was clipped by a city police motorcycle as he stepped from behind his car and suffered a bruised leg. OOF is back from Korea. PUL is Spokane OBS and Official Code Practice Station. RFP is attending Gonzaga University. LYA passed away Nov. 4th. Pallbears were GAY, GZZ, JEM, MER, SJI, and PXA. The Spokane Radio Amateur Club was very active during the evening of Halloween. Traffic: W7IOQ 1939, BA 585, FET 367, CZX 210, AWG 180, ETK 178, FIX 154, PYV 135, OPO 77, FWD 72, KCU 71, JWJ 45, EHH 26, PGY 22, GRM 18, JPA 18, NCS 18, EVW 17, NRB 17, AIB 14, EKT 13, APS 11, LVB 9, EBU 8, PUL 8, KIN 7, CWN 6, PYY 6, GAT 3, PFE 3, KTL 2.

PACIFIC DIVISION

NEVADA — SCM, Ray T. Warner, W7JU — SEC: HJ. ECs: KOA, OXX, TJY, VO, LGS, and ZT. OPS: JUO. NRU is the new MARS member in Ely. TST is a new Ely call heard on 75 meters. QHH, in Reno, is active on 40-meter c.w. with 75 watts. JVW, of Pioche, left for Montana. SLI, of Las Vegas, has his 10-meter mobile perking. Virginia, 13-year-old daughter of SEC HJ, now is WN7SNP. EC MBQ left Henderson for Iron Mountain, Calif. JLN's new QTH is Henderson. LGS, operating K7NRX, was on emergency power throughout the S.E.T. Boulder City hams believe they have more ham stations in proportion to its size than any other place in the world, one amateur for every 271 persons. All Boulder City hams are active in the AREC.

(*Continued on page 90*)

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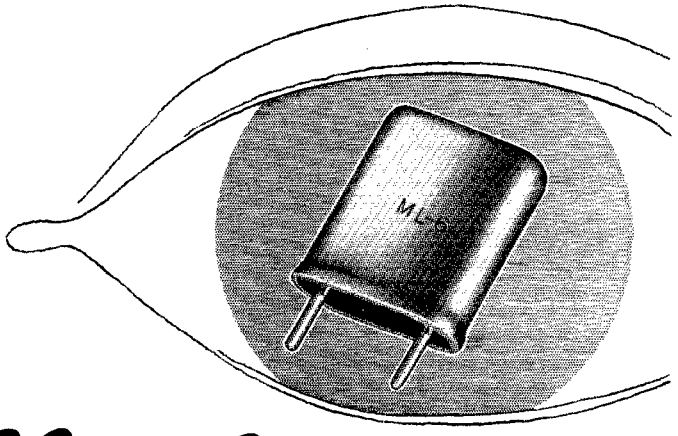

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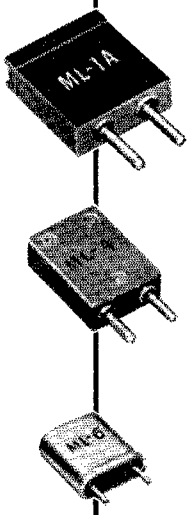

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SANTA CLARA VALLEY — SCM, Roy I. Couzin, W6LZL — Your SCM wishes to thank the fellows in this section for two swell years as SCM, and now that I have been informed that I am to carry on for another two years I would like to ask you to please get your activities reports in the mail the first of the month so I can formulate a little intelligence on a monthly form to send to League Headquarters. I would like to thank Ed Handy for the congratulations and the offer of assistance. The S.E.T. is over and section-wise we did pretty well. The San Mateo group also did very well. An FB c.d. drill was held in Brisbane Mon. evening, Oct. 27th. MHV was control station at the fire house; QIE, UKM, MMG, and WN6JES were 144-Mc. mobile. Club activities included a very fine talk by Dr. Cledo Brunetti on Electronic Miniaturization at the Oct. 13th meeting of SCCARA. On Oct. 8th the Monterey Bay Radio Club had the pleasure of hearing Mr. John Huntoon from League Headquarters. The NPEC had a business session at the first meeting plus opening nominations for officers for the coming year. An auction also was held, which went over very well. At the second meeting the S.E.T. was discussed and nominations were still in order. CAZ reports weekly sked with CYX/KP4 so he can talk to his mother in Mountain View. CIS reports for the last time from this section before settling in Sacramento. HC still manages to keep his fingers in the nets despite a very heavy work schedule. Traffic: W6YHM 52, HC 35.

EAST BAY — SCM, Ray H. Cornell, W6JZ — The AREC turned out in full force for the S.E.T. Oct. 11 to 12. Each local net held emergency drills and handled the Red Cross messages from CXO. The Oakland Radio Club station, OT, was fully manned and relayed several hundred of the Red Cross messages to stations throughout the country. The drills pointed out several weaknesses in the section AREC organization. Plans will be made to correct these and preparation for next year's S.E.T. will be made at the November meeting of section officers to be held Nov. 25th. The East Bay Radio Club held a reorganizational meeting in Berkeley on Oct. 31st. Invitations to join were sent to every ham in the Berkeley Area and the response was gratifying. DNX is the EC for the Berkeley Area. He plans to activate an AREC net in that Area at once. Other new ECs are ATM Vallejo, CAN Napa, FLT Lake County. JIG has new OO appointment and HHX has joined the ranks as ORS. K. W. McKinney, who is not a licensed ham but who is very active in amateur circles, has been appointed Section TVI Chairman. Mac is a hard worker and commands the respect of the public and hams alike. Congratulations and good luck to all you fellows. The Oakland Radio Club enjoyed a talk and demonstration on teletype by ITH at the October meeting. You fellows who do not belong to a club miss half the fun of being a ham. Why not join one in your vicinity Write to me for the address of a near-by club if you wish. The CCRC held the October meeting at LGW's QTH in Alamo. Refreshments par excellence were the highlight of the evening. Chief topic was support of proposed legislation for distinctive license plates for hams. BAN is more active than ever, thanks to IPW and JOH, our hard-working RMs. Be sure to check into this Net on 3635 kc. at 8:15 P.M. PST Mon. through Fri. NIG is Field Day chairman for the NBARA. Joe is an expert, so the NBARA can expect to be in the top ranks in the next contest. Yours truly visited the SRO and the CRTA at Chicago during the week of Oct. 13–18. Through arrangements made by 9KA and 9HPG a swell time was enjoyed right up until my plane left for home. Midwestern hospitality is of the best. Traffic: (Oct.) K6FAL 507, W6IPW 183, JOH 140, HHX 64, EJA 4, YDI 2. (Sept.) W6JOH 163.

SAN FRANCISCO — SCM, R. F. Czeikowitz, W6ATO — Phone JU 7-5561. SEC: NL. Phone Pl 5-6457. *Eureka Area*[2] EC, SLX. The newly-organized Novice net is meeting regularly each Tues. at 2000 PST on 3720 kc. The 10-meter net continues operation on 29.16 Mc. at 1900 PST each Tues. W7KTH has been assigned the call W6TRR and is currently operating on 10 and 75 meters. W6REF and WN7PVW/W6, wife and husband respectively, are moving to Sacramento. Congratulations to JTD and PKJ, who have just eliminated the "N" from their calls. The Humboldt Amateur Radio Club meets the 2nd and 4th Fri. in the YMCA rooms, rear of Municipal Auditorium, entrance on "E" St., Eureka. Many thanks to BME, secretary, and to SLX, for the news. *San Francisco Area:* EC: BYS. Congratulations to the newly-elected officers of the San Francisco Radio Club. They are UEV, pres.; GGC, vice-pres.; PCN, secy.; Harry Witzke, treas. The new board of directors consists of GCV, NAC, URA, AHH, and WXV. NAC has now attained his Advanced Class license, and George Papalias has received his 2nd-class radiotelephone ticket. Speaking for the TVI committee, sincere thanks are expressed to the SFRC for the donation of $150.00 to purchase a badly-needed National Videometer, and to Mr. Victor Zack for his courtesy in providing the instrument at his cost for this very worthwhile purpose. Amateurs in San Francisco, regardless of their membership or non-membership in ANY group or organization, are urged to telephone the TVI committee if in need of assistance or advice. The

(*Continued on page 92*)

investigating heads are GBA, SFW, ZLQ, and NCK, with ATO as chairman. The San Francisco Naval Shipyard Radio Club, and especially BYS, president, and CHP, vice-president, coöperated with the American Radio Relay League to present Philip S. Rand, W1DBM, in an excellent TVI talk to a full house at the National Red Cross Auditorium. Also present were Kenneth Clark, Regional Manager FCC, and F. V. Sloan, Engineer-in-Charge FCC, as well as three other FCC engineers. Among the many guests were Robert Miller, PGE, Gen. Communications Supervisor; Fred Rowe, Nor. Cal. Elec. Interfer. Bureau, and numerous television service managers and service personnel. The HAMS held a successful dinner and dance for its November meeting. The SCM hopes that the newly-formed Cathay Radio Club will send in news for publication. The SFRC meets the 4th Fri. at 51 Lakeshore Plaza, opposite 34th Ave. and Sloat Blvd. The Highfrequency Amateur Mobile Society meets the 2nd Fri. at 1625 Van Ness Ave. *Santa Rosa Area:* EC: LOU. The Sonoma County Radio Amateurs meet the 1st Wed. (temporarily) in the Board of Supervisors Room, County Court House, Santa Rosa. *Marin Area:* EC: KNZ. Tamalpais Club EC: ZUB. The Marin Radio Club meets the 2nd Fri. in the American Legion Hall, Larkspur. The Tamalpais Club meets the 3rd Fri. at 7 Loma Ave., Tiburon, QTH of OZC. Traffic: W6REF 27, ATO 8.

SACRAMENTO VALLEY — Acting SCM, Willie van de Kamp, W6CKV — KJL now is located in Stirling City. EKP is new EC for Marysville-Yuba City Area. LRW is struggling with 10-meter beam. GHP is pushing c.d. in Placer County. NFX has new OO appointment. KRX has discovered the 2-meter band. ZFJ is recovering from an attack of polio. Traffic: W6PIV 25.

ROANOKE DIVISION

NORTH CAROLINA — SCM, J. C. Geaslen, W4DLX — The SCM would like to take this opportunity to remind all official appointees of the importance of reporting to the SCM monthly. Also, send in your certificates for renewal. If you are unavoidably kept inactive, notify the SCM to avoid cancellation. The following were active in the CD Party: AKC, BDU, PIC, PXE, DLX, NYN. BSS and SOD are back from South Carolina. New Novices and ARRL members in Charlotte are WXY and WYA. The N. C. c.w. net has connection with TLAP through IMH. CVQ, Raleigh, hit a band opening on 2 meters and wore out his kw. working a hundred stations. How about reports from other v.h.f. men? If you work 2 meters or higher you qualify for OES appointment. New appointments: BSS as OPS and OES; ONM as EC for Burlington; QDA and SGD as OPS. ZG, our SEC, joins me in thanking the boys who worked so hard in the CD Test Sept. 27–28. A tip to radio clubs that are slowing down and going stale — new blood is necessary. The Novices are just that and their eagerness will bring you back to life. I am very sorry there was no report last month. It was written and I thought it was mailed, but while cleaning the car I found it under the front seat. The Tar Heel Net has a new NCS, QDA of Shelby. LWU meets the Atlantic Net twice weekly. Traffic: (Oct.) W4AKC 215, RRH 135, IMH 98, BDU 41, ONM 39, CVQ 34, REZ 14, RAZ 12, CGL 7, LWU 6, DLX 5. (Sept.) W4RRH 179, PIC 42, BDU 38, IMH 29, CVQ 20, ANU 10, PXE 10, RAZ 9, REZ 5, DLX 4, AJT 2.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — The Florence Club had a booth at the Eastern South Carolina Fair and made daily contacts on 75-meter 'phone, originating more than 100 messages. The Club operated under the call AUL and on one occasion continued operation until 5 A.M., assisting the West Virginia emergency forest fire operations by relay necessary because of a long skip condition. AUL has accepted the post of EC for Florence and BIZ has accepted that post for Charleston County. NTD has a 115-volt a.c. gas-driven generator for emergency power. The S. C. c.w. net meets Wed. and Sun. at 7 P.M. on 3525 kc. with UNO as NCS and Net Manager. The following have reported in to date: ABW, ANK, CSP, CXO, DNR, FM, MPR, NWB, PED, QCC, RYY, TVX, TWW, TWX, UNO, UTZ, and a number of out-of-State stations. Report in and give Jane your support. EDQ and HWZ are Asst. SCMs. HWZ is handling all matters relating to license plates and you are requested to contact HWZ and offer your support. If your community does not have an Emergency Coördinator, contact DX and offer your services. Traffic: W4ANK 139, EDQ 8, FM 8, NWB 8.

VIRGINIA — SCM, H. Edgar Lindauer, W4FF — It was very gratifying to receive reports from 28 stations for a total of 2041 messages handled during the month. With an active station list of 75 to 90 stations on each night, it is safe to assume that we could increase that total traffic figure appreciably. Many of our stations are regular QNI into TCC and Area and Regional nets whose traffic clears through Virginia hams destined for Virginia QTH. Let's report them all to the SCM no matter how small — a radio message will suffice. U. S. Naval Mine Depot, Yorktown, advises of the formation of the Mine Depot Amateur Radio Club (MDARC) with the call YIA. Officers are RHC, prexy; N4WOP, vice-prexy; 9GLR, secy.-treas.; UBP, act. mgr. Other known members are WTT, WRG, LIV, TVT, TVU, VHB, N4WOP, N4YDA, N9VSO. TVT and TVU

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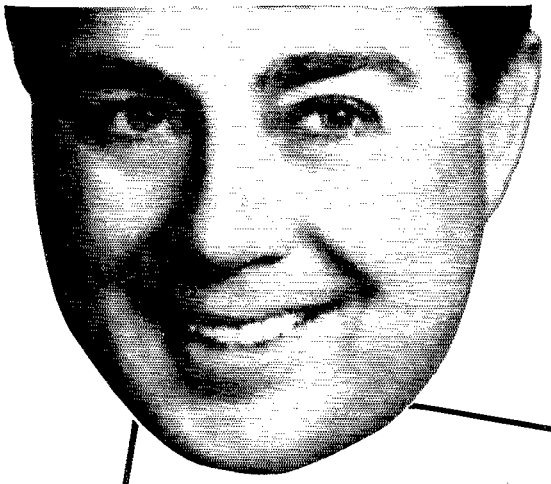

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(10 years old) are XYL and son of RHC. MDARC is equipped with 7.5-kw. gas generator for emergency power. The Richmond Club entertained 50 Novices. WN4YEY is new Danville Novice. SMT and RII were transferred by CAA to Lynchburg. TXH has joined the Richmond Area. VSN and the second session of VN now are going full blast. EMJ finally fired up after a long absence. PXA was visited by SNH. SNH heard complete VN activities with a b.c. receiver on 1190 kc. while in a motor court QTH. SDK and SHJ hit BPL again. TVX has departed for Florida. MWH is getting geared for that big office come January. Traffic: (Oct.) W4SDK 580, SHJ 374, JOT 205, FF 84, FV 79, K4FCC 78, W4MWH 77, UWS 60, KRX 57, CFV 45, OGX 38, UHG 37, MCY 36, KX 31, IJK 26, TVI 26, KFC 24, HQN 23, JZG 18, GR 14, IYI 14, KMS 11, SNH 8, SPE 6, KSW 4, LK 4, WBC 2. (Aug.) W4UWS 80.

WEST VIRGINIA — SCM, John T. Steele, W8MCR — Members of the West Virginia Emergency Net did a bang-up job in the recent forest fire emergency in the State. Complete details as to who participated and the fine job they did are not yet available. However, just as soon as all reports are in full credit will be given to the fellows who were really on the ball with their gear and their time in this serious emergency. The help of the hams in and around Southern West Virginia certainly was appreciated by the State Conservation Commission. The Stonewall Jackson ARC held its annual freeze-out at Jackson Mills over the week end of November 1st. Three transmitters were installed and a good time was had by all. Those operating were PZT, BWD, GIN, GVR, JZO, UHK, and AUJ, with IES working control on the coffee pot. JZO and BVH are building 50-Mc. rigs. YPR, our SEC, reports working on a new emergency control plan for the State. Traffic: W8AUJ 310, GEB 25.

ROCKY MOUNTAIN DIVISION

UTAH — SCM, Floyd L. Hinshaw, W7UTM — It is with real regret that we must accept the resignation of our SEC, JOE, but Jack has to give up the post to devote more time to his work. We will miss Jack but wish to extend thanks for a job well done! All League appointments await applicants. We especially need EC applications from each town in Utah, large or small. TVL now is rebuilt and is on 3.5-, 7-, and 14-Mc. c.w. ZDX/5 puts in an FB signal from El Paso on 3.5 Mc. The Utah net averages 97 per cent attendance every week — that's getting close to 100 per cent, fellows! WN7QVO has licked his TVI and clicks and is getting ready to drop the "N" from his call. Traffic: W7UTM 103.

WYOMING — SCM, A. D. Gaddis, W7HNI — The Sheridan Radio Amateur Relay League elected as officers WN7QVS, pres.; CRP, vice-pres.; JMM, secy.-treas.; NJF, EC; ONZ, code instructor. Plans for the '52–'53 season include Novice classes and an interference committee. JDB is working on 807 and ECO stages and has new whip for his mobile rig. HDS, EUZ, SID, RKB, and HRM are confined to their private work benches with TV-itis. KUB is operating mobile rig OK. HLA has new Lysco and no complaint so far. QDW and 2BRA are new spare-time operators at K7FAO. RDX says his signals go everywhere. MWS is on the air when TV ain't! The Intermountain Net on 1915 kc. is worth listening in on even though you can't work 160.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Dr. Arthur W. Woods, W4GJW — AENB handled 84 messages during October, with a maximum of 14 stations per session. New frequency for AENB is 3575 kc. From Huntsville comes word of interest in 2-meter connections. Please address queries to PTU. PPK is active again, handling many messages to out-of-State points. KIX has a complete battery-operated station in the shack for emergency use. PWS was top man in civilian category for the second period in the MARS Contest and will receive his choice of two radio courses. BFM is one of the few versatile stalwarts who answers 'phone and c.w. nets, and consistently submits activities reports in addition. Traffic: W4PPK 84, KIX 73, BFM 28, GJW 11.

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — The big news for October was the fine bit of operating turned in by RWM on the British Ketch *Miru* incident. Working with RWM were WS, DRD, OIL, JQ, MV, PYE, KGP, MBR, LQQ, ACH, CVQ, NJG, ROD, RSF, QDA, IYM, MVP, DLS, KVJ, and 5KYC. Thanks for showing the Coast Guard and press that ham radio still has its serious side. Gainesville: Gator Club officers are SMK, YAD, SVX, WEG, and CKB. At the University also are RVU, WHV, PDN, OWX, OSX, QCV, TVA, PJG, UQC, OMO, NEV, OGI, TRR, TJU, WN4WEM, W1TPU, and CE2CJ. The Club call is DFU. CKB, OWX, and OSX are using handy-talkies on the campus. Clewiston: PJU makes BPL again. Gratton had a nice 7600-mile tour in the Middle West calling on 56 hams in 15 states. Daytona Beach: TNR has dropped the "N" from his call. RWM now is an OPS. Deland: WS reports seven 144-Mc. stations in Deland. Miami: IYT is working on small emergency units for 3.5 and 7 Mc. St. Petersburg: EYI reports that county c.d. station K1AB2 had a network test along with some good

(*Continued on page 96*)

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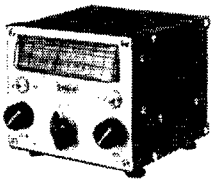

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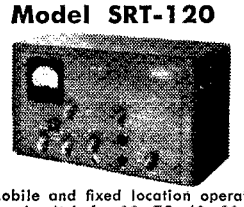

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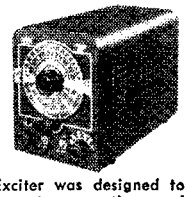

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5.8	375	325	35.00
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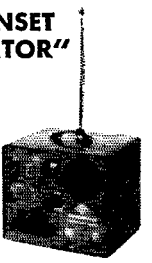

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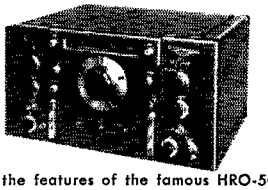

All the features of the famous HRO-50T1 plus 12 permeability-tuned circuits in the 456 kc stages, and dual conversion on all frequencies above 7 mcs. Current regulated heaters in hi-frequency oscillator and 6BE6 mixer, and voltage regulation in hi-frequency oscillator and S-meter amplifier.

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publicity for amateur radio. TDK and TZW have Advanced Class tickets. Good reports on the recent S.E.T. were received from DQA, Orlando; HUY and EYI, St. Petersburg; KJ, New Port Richey; SWI, Key West; IM, Ft. Lauderdale; HWA, Jacksonville; and WS, Deland. The annual report on AREC affairs by KJ, our SEC, has been sent in and we look for Eastern Florida to show up even better than last year. Every EC is duty-bound to make reports and KJ reports that several have not been doing so. Your report IS important so let's make the effort. Thanks to those who did report. Traffic: W4PJU 524, DRD 216, FPC 177, PZT 146, LMT 88, WS 67, IM 26, KJ 25, FWZ 11, IYT 7, NAK 6, BP 2.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PQW. EC: PLE. VCB has completed her WAS on 10 meters in 6 months. UTB has installed a mobile unit. FHQ has new Viking II rig. PQW is meeting the MARS Nets. SZH is operating a ½ kw. on 75 meters. RZV now operates 75 meters only. The Pensacola Amateur Radio Club handled messages for overseas from the Fair Grounds at Pensacola. ART and HIZ are working on 144-Mc. gear. BFD still keeps the late hour QSOs going. PTK and TTM are heard occasionally on 75 meters. NOX keeps things humming on 75 meters. ROM worked PQW/mobile on 75 meters for the entire trip from Pensy to Ft. Walton. KG6ADX is looking for the Pensacola gang on 20 meters to QSO his folks. VR keeps 7 Mc. going. AXP works 7 Mc. MS has a new three-element beam on 20 meters. 3NDK/4 is a welcome newcomer to the section. VCB has a new HRO-60 and wants KW-1. WN4YFF, WN4YFG, and WN4YFH are harmonic, OM, and XYL, respectively. WN4UYS is working on 144-Mc. converter. Traffic: W4PQW 12, MS 8.

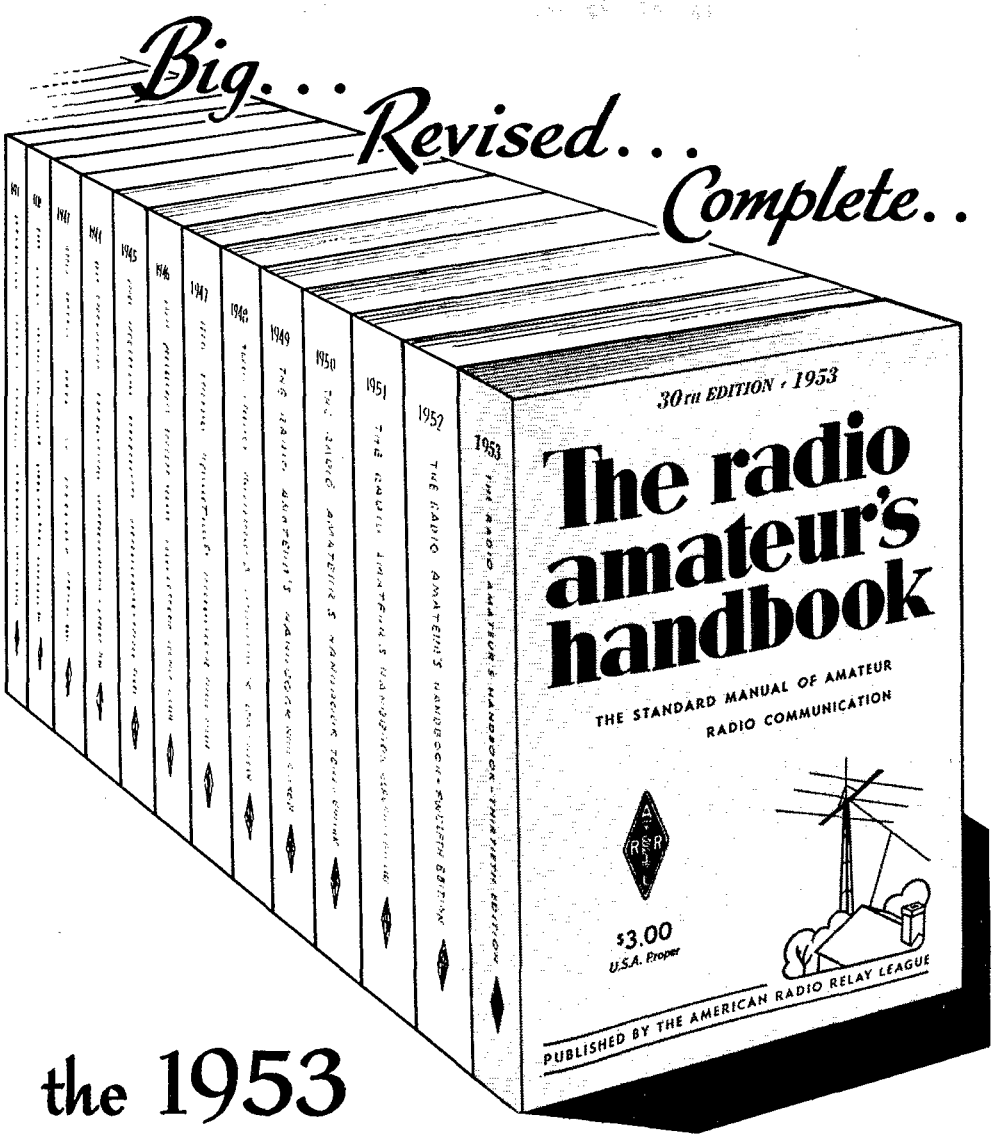
GEORGIA — SCM, James P. Born, jr., W4ZD — The AREC in Georgia is being completely reorganized and all hams in Georgia are asked to contact their local EC, SEC, or SCM and take an active part in the Emergency Preparedness Program in their Community and State. The following is list of ECs continued from last month: OFT as EC for Cobb County; FD as EC for Jefferson and Burke Counties; NDX as EC for Grady and Thomas Counties; IMQ as EC for Polk and Harralson Counties; LXE as EC for Bibb, Monroe, Jones, Crawford, and Peach Counties; BQU as EC for Bleckley, Houston, Twiggs, Pulaski, and Dodge Counties; RFO as EC for Paulding and Douglas Counties; PGV as EC for Wilkes, Lincoln, and Taliaferro Counties; HBE as EC for Coweta and Fayette Counties; GDW as EC for Carroll and Heard Counties; ACH as EC for Dooly, Crisp, Wilcox, Turner, Ben Hill, Worth, Tift, and Irwin Counties; EGK, as EC for Walton, Gwinnett, Barrow, Oconee, Morgan, Newton, and Rockdale Counties; AAY as EC for Richmond, McDuffee, Columbia Counties; CVY as EC for Muscogee, Chattahocchee, and Marion Counties; HYN as EC for Troup, Merriweather, and Harris Counties; PFF as EC for Laurens, Johnson, Treutlin, and Montgomery Counties. WN4WGA is a new ham in Savannah. UCJ is the new call of the Thomasville Radio Club. NDX is building a bandswitching VFO-exciter for his 813 final. POI is working 144-Mc. 'phone. KSZ is rebuilding his 3.85-Mc. rig. EYQ now has his Extra Class license. We are all saddened to learn of the death of FVY. LRR is new NCS for the Atlanta Two-Meter Net. Traffic: W4USA 2107, K4WAR 1254, W4ZD 412, EJC 349, ACH 88, OCG 63, HYW 56, POI 54, NDX 31, MA 20, EYQ 19, OSE 19, NS 16, MTS 11, BQU 4.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: ES. The following information on the 10-meter gang was received from RK: PD and OO, perhaps the youngest and oldest active KP4s, are studying together for their Advanced Class tickets. WP4QM is putting an FB signal into San Juan from Mayaguez on 3735 kc. DU, now W1NJA, is heard often on 10 meters. Ex-Novices QA and QV are doing OK on 10-meter 'phone. RK is feeding 18 watts into new three-element beam. WV4AZ now is KV4AZ. NT, RA, and MS have new 20-meter beams. The 10-meter AREC Net meets Fri. at 8 P.M. AST on 28.8 Mc. The MARS Net meets on 3925 kc. daily at 3 P.M. AST with KP4WAB as NCS. WP4TQ, licensed September, already is an AREC member. ES resigned as SEC. KV4AA has kilowatt bandswitching final. FF is back on 75-meter 'phone. W2KDS visited KP4-Land. WP4TO is awaiting General Class license. ID, the NCS, delivered an 86-word Red Cross message to Washington during the S.E.T. GO writes from DL4. NY has Globe King working OK on all bands. BV, BY, CK, CL, EE, KD, and KV4AA renewed AREC membership. New AREC members are OS, RC, PQ, and TQ. Traffic: KP4DV 5, DJ 4, CP 2, ID 2.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Samuel A. Greenlee, W6ESR — Asst. SCM: Kenneth L. Kime, 6KSX. RMs: FYW, GJP, JQB. Mgr. LSN: FMG. Section Traffic Nets: L.A. Section Net (LSN), Mon. through Sat., 3600 kc. at 2030. El Capitan Net (ECN), Mon. through Fri., 3655 kc. at 2030. BPL this month was made by KYV, GYH, and HK. FMG chalks up another banner month for LSN. HIF has all-band, plus 2- and 10-meter rigs. LAX sure misses CK (QRL hospital). DPL is proud of his new bandswitching rig (TVI-proofed, too). BLY reports JTK went deer-hunting and

(*Continued on page 98*)



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WEST HARTFORD 7, CONN.

bagged a new battery for the club station (??); LVQ did a nice job on the S.E.T.; BRY now is Class A. Thanks, Ira. NTN says that he, OSC, IZO, and QIW now are Class A. Per FYW: WN6THA is BRY's jr. operator; OXJ (12 years old) is an FB c.w. man; and EGC is completely "Collinized." HLZ reports that the Mission Trail 2-meter traffic net, QR-NCS, is going great guns nightly on 145.080 at 1930. CBO is chasing gremlins in the new multivibrator. COZ gives with: MOG is on 10 meters with new 807 rig; CCD has a new beam for 10 meters; EPX now is using s.s.s.b. and FTH is de-TVling. According to YSK, new stations on 160 meters include QYB, CWS, RUX, VQI, TPF, OJA, and YRA. YCF reports ZRR has hand-powered portable and new Elmac mobile; ORI and ORW have a new jr. operator; QHC has a hot new beam on 20 meters. K6CJ put in a BFO for PQS, who has been hospitalized for too-o-o long. Gracias, Mel. HOV is back on 75 meters. MU is sporting a new HRO-60. HK put in 319 hours during the month handling traffic! DCB is "regusted" with his non-buffing buffer. LKF reports rebuilding ZOJ (club rig). It's nice to hear HOV on 75 again. That gal, WRT, really handles traffic on 75. Thanks, m' friends, for the slug of reports, but how about more NEWS? When the blank space in the report card isn't filled in (as were over two-thirds of the reports this month) the rest of us have no way of knowing what you are doing. AREC Notes: Glen Area (VCU, EC) coördinated drills with all city services and is building control center. Mid-Cities (DCB, EC): This big net has five active control centers in as many cities. Daylight (ONI, EC): Check-ins are invited, noon Thurs. on 146.8 Mc. — a hard-hitting net. Centinella Valley (OI, EC): New all-band control station is being built at Inglewood City Hall. Whittier (BLY, EC): Took auxiliary policemen in mobiles to patrol on Halloween; officials were so impressed they are starting a code class to get in the ham game! A new member is KTJ, ex-EC for Honolulu. San Luis Obispo (LKF, EC): Because of terrain all operation is on 75 and 10 meters. Long Beach (NSX, EC): The accent is on mobile. The big net is operated in a very business-like fashion on 10 and 2 meters. San Bernardino (HKD, EC): Both 10- and 2-meter segments are very active with good tie-ins with long-haul traffic nets. LARC station HGV (CSS,EC): These boys are always on deck when needed and operate on 80, 10, and 2 meters. Crescent Bay (ZFA, EC): There are heavy weekly drill turnouts on 10 and 2 meters. They are setting up for 75 meters and participate in all local hospital, etc., demonstrations, and what publicity! Ventura (DYU, EC): Mostly mobile, control stations are auxiliary powered on 2; outlets on 75 meters. Owens Valley (WWT, EC): Very active on 75 they are experimenting with u.h.f.; 50 per cent mobiles. Among those reporting were BUK, CFL, CIX, EPL, GEB, KQS, KSX, NCO, WOO, and WN6PJY. Traffic: W6KYV 3123, GYH 1019, HK 701, VHN 234, FMG 223, ESR 189, JQB 171, BHG 129, QIW 129, WRT 118, GJP 112, DPL 75, HGY 68, YBF 62, PMS 61, FYW 48, HOV 34, NTN 26, CMN 25, NCA 25, HLZ 22, COZ 18, HIF 16, CBO 13, COF 9, LDR 9, LKF 5, LVQ 4, DCB 3, ONI 1.

ARIZONA — SCM, Albert Steinbrecher, W7LVR — Asst. SCMs: Kenneth P. Cole, 7QZH; Dr. John A. Stewart, 7SX. SEC: OIF. RM: JGZ. Arizona 'Phone Net: Tues., Thurs., 7 P.M., 3865 kc. Arizona C.W. Net: Mon., Wed., Fri., 8 P.M., 3515 kc. Phoenix Net: Tues., Thurs., 7 P.M., 29 Mc. Tucson Net: Thurs., 8 P.M., 29 Mc. Arizona YL Net: Wed., 7:30 P.M., 3865 kc. Arizona 6&2 Net: Nightly, 7 P.M. Arizona MARS: Tues., Thurs., 9 P.M., 4025 kc. Announcing new Arizona Restricted Speed Net: Mon., Wed., Fri., 8 P.M., 3700 kc., 8–12 w.p.m. The outstanding event of the month was the "Bombing of Glendale" in the Red Cross emergency. The following participated: AIA, DRQ, HUV, LAD, LLO, LQB, OIF, PLM, PMD, QHD, QHT, QNO, QZH, QZP, and RYO. The Red Cross was very much pleased with the haste in which the messages were dispatched and sends congratulations to all participants. The Arizona C.W. Party saw 20 active stations, including 12 Novices. WN7SIY got the highest score. KOY checks into the Early Bird Net. GYK got a free trip to Europe. NZS is building a rhombic. QZH worked KH6 on 75-meter 'phone. PFB is building Johnson Viking. Miracle of the Month: LZL worked 80-meter c.w. and received television on same antenna simultaneously. NPW is in the Army. NBZ now is on 80-, 20-, and 11-meter c.w. New papas: NAP, LFX, MAH. New Commercial: PMD. New Arizona Net Stations: MWD, MII, SHR, OQB. New MARS stations: PLM, IEY, NMJ, QFQ, KQV. Traffic: W7FAG 254, W7KOY 110, LAD 41, PZ 24, LVR 22, QFQ 22, PLM 21, MLL 8.

SAN DIEGO — Acting SCM, Thomas H. Wells, W6EWU — Asst. SCMs: Shelley E. Trotter, 6BAM; Richard E. Huddleston, 6DLN. RM: IZG. SEC: SK. ECs: DEY, FOP. Within the month a new OBS appointment was made to FJH, who very promptly rewarded us with a fine report from the Escondido gang, the Union High School Club, and the Palomar Club. FJH is an instructor at the school and as organizer of student hams obtained IAC for them back in 1950. He found rough going until the Novice tickets swelled the rolls to an even dozen. The station runs 50 watts on 80 meters and holds daily skeds. They have joint meetings with the Palomar Club the 4th Wed. of each month. IAC also is headquarters for a new c.d. net serving

(*Continued on page 100*)

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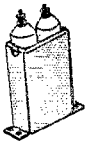

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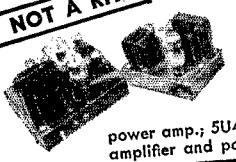

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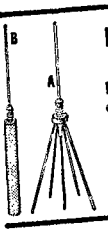

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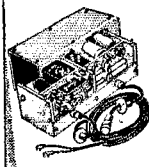

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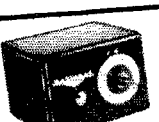

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the grape valley on 3702 kc. The net has rocks for all members and KKC has supplied them with QN signal sheets. FJH has 150 watts on all bands through 10 meters and reports hearing 1AW very FB on 40 and 20 meters for his OBS material. AKY now is Class A and is making with signals on 75 meters. LRB is drooling over a new 75A-2 receiver. ICF is trying his hand on 420 Mc. and will get lots of help from the old masters, BOS and ICF. GDG is back from Michigan with a new car. Legion Net, please note. One of the popular signals on 75 meters is a chess game with 3BNH/6. SK is on an enviable elk-hunt trip to Montana. What's this about KW pulling stakes in San Diego to make a good business connection in L.A.? IZG is in again with BPL, but says he has to give up his RM appointment. Very sorry. FCT has a total of 15. IAB made BPL in a big way with 5626 for a total. CHV had a total of 4 with activity curtailed because of the big power transformer going West. Traffic: W6IAB 5626, YDK 781, IZG 504, FCT 15, CHV 4.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, William J. Gentry, W5GF — SEC: JQD. RM: QHL. PAM: IQW. Bill Green has done a nice job as SCM and I am sure the members would like me to extend him a vote of thanks. A job well done, Bill. BPL cards have been issued to TGV and TFB. Congratulations! QDF now is on Guam and will be there for several months. On Oct. 18th and 19th the South Plains Amateur Radio Club held its Annual Hamfest. More than 100 hams attended from Oklahoma, New Mexico, and Texas. Mr. Carlos Dodd, NUX, staff member of Federal Civil Defense Administration, Regional Office at Dallas, Tex., gave a most enjoyable talk and pictures on civil defense work. Mr. Dodd outlined the plan of RACES. Wayland Groves, NW, Vice-President of ARRL, also gave a nice talk covering the League work. R. C. Griffin, PXI, president of the local club, gave the welcoming address. JQD was chairman and did a fine job. VYY is only 11 years old and a good operator. I will need your traffic and activity reports on time. Your coöperation will be appreciated. Traffic: W5BKH 239, TFB 230, TGV 167, PAK 152, QHI 110, SRQ 95, VRX 53, ASA 43, RUM 27, UFP 26, GZU 10, TLW 6.

OKLAHOMA — SCM, Jesse M. Langford, W5GVV — SEC: AGM. RM: OQD. PAMs: GZK and ATJ. October provided the Oklahoma hams with another excellent hamfest, this time at Lake Murray Lodge, and put on by the Ardmore Radio Club. A total of 130 were present; 77 were amateurs, the rest were XYLs, harmonics, and potential hams. Civil defense certificates were presented to the Ardmore EC members by Lew Chattam, director of civil defense for Oklahoma. Several prizes were given and the Ardmore Club was asked to do a repeat performance next year. The Zelinger family, in addition to being 100 per cent licensed amateurs, is 100 per cent Advanced Class. UEG and UEW are now General Class. IVT has a new harmonic, 6 lbs. RIT and his XYL, UGD, have been transferred to Hawaii. TPB now is Advanced Class. VIA and UIW are operating on 160 meters. TKC passed Advanced Class exam. SLC and EHC are now Extra Class. VRV and TMY now are Advanced Class. SWM is operating mobile on 3.9 Mc. ØDIL/5 is active on 3.9 and 14 Mc. TKI now is at Custer City. NVD has a new Collins and is working much DX. VEO soon will be on with 40 watts on 80 meters. MFX is rebuilding the rig. Traffic: W5GZK 145, ROZ 137, MRK 105, SWJ 92, MFX 52, PA 38, SVR 33, EMP 29, MQI 29, GVV 25, QAC 25, OQD 23, KY 22, PML 19, ESB 14, EHC 8, ADC 6, LWG 5, BAR 4, RST 4.

SOUTHERN TEXAS — SCM, Dr. Charles Fermaglich, W5FJF — EYV has returned from a vacation in Virginia. NIY reports that he has started five prospective hams on regular study for a ticket. As 8th Regiment Communications Officer for TSGRC, your SCM has started a Novice radio school of 30 students, with Capt. Pattello and Lt. Fry as chief instructors. RFG still is in airline school and has been flying into Houston. ULN, in Texas City, is vice-president and program director of the new Galveston County ARC, with PTV, pres.; PZG, secy.; and VUS, treas. ULN is on 40 and 80 meters and is TVI-proofing the rig. Hams in Texas City now include WN5s VXQ, WVI, WVJ, WVK, and YBL. ULN now is OO and OBS. UUK can copy 25 words and has made 600 contacts with 11 watts. OQG recently passed away. FXN worked VP8AU for 151 countries worked and 142 confirmed. OQ5LL visited him for a week. MN is busy with H&B every A.M. on 7150 kc. UBN is working to get AREC activities going around El Paso. SAH reports UMT has his General Class ticket. WN5WIC now has his Tech. class license. K5WAC, the main post station of the anti-aircraft and guided missile school, works all MARS, PXTN, every day, 0930 MST 14,255 kc.; N. Tex-Okla., 3960 kc. at 1630 MST. QFA reports the South Texas Traffic Net is going good. The Brazoria County Amateur Radio Club is coming along FB. UMY, secy. of BCARC, reports Novices are WFO, WTX, VFS, VFR, and Jimmy Sebesta. URP is operating from the Shriners Clinic in Houston with about 10 watts on 80 meters. WN5WFD worked Jimmy recently. WJB is operating portable in Houston from Rice. VDE is on 40-meter c.w. and 10-meter

(Continued on page 102)

LOOK STEINBERGS LOOK

IMMEDIATE DELIVERY

Single Sideband Exciter SS-75

"Sideband" is sweeping the country . . . progressive amateurs are going SSSC by the hundreds . . . and one night spent in listening to a "sideband" QSO will impress you with the terrific "punch" carried by this method of operation—voice control, fast break-in, no heterodynes, the sharpness of tuning . . . it really "gets the signal through".

Here's single sideband with all the headaches removed. The SS-75 has been field-tested for over a year and is a complete self-contained, factory aligned single sideband transmitter-exciter, designed for operational ease, reliability of performance, freedom from maintenance problems, ready to transmit a high quality SSSC phone signal alone, or to drive a Class B linear final to 1 KW input.

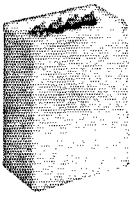
Check these specifications and you'll see why the SS-75 is now the one piece of equipment that places all the advantages of single sideband at your finger tips:

- ★ **Built-in stable VFO, with voltage regulation.**
- ★ **Carrier injection to receiver antenna terminals . . . tune in SSSC signals the same as AM, no other gadgets necessary.**
- ★ **Illuminated VFO tuning dial provides 31 inches of band-spread 3800–4000 KC in 4 bands, with 5 to 1 gear reduction.**
- ★ **Built-in voice control and receiver disabling circuit. Also provides for break-in CW operation.**
- ★ **Specially designed crystal filter network for maximum stability and reliability.**
- ★ **Carrier injection to transmitter available for working single sideband WITH CARRIER, for tune-up adjustments, or CW.**
- ★ **10 watts output, with additional 807 socket for higher power operation.**
- ★ **Handsome grey crackle cabinet, chrome trimmed, 20" x 12" x 12". Complete with 12 tubes, including one 807, operating manual.....$245.00**

Frequency conversion mixer for 20 meters, rack mtg. 3½" x 19"..... 45.00

Frequency conversion mixer for 40–20 meters, rack mtg. 3½" x 19"..... 75.00

A partial list of enthusiastic SS-75 users includes W1BBA, 1BGA, 1NSP, 4AYF, 4CIM, 4PAV, 8AV, 8FWT, 8GYJ, 8JYU, 8VLV, 8WHE, 9ARK, 9ELK, 9GSE. (Refer to By Goodman's article on page 42 Dec. 1952 QST)



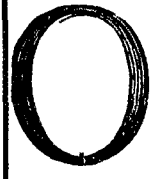
8/8/8 MFD. 500 V. D.C.

Triple 8 mfd. 500 working volt D.C. oil-filled condenser, common negative, solder terminals, hermetically sealed, 5" x 3⅜" x 2¼"..... **$1.95**

MAYNARD PREAMPLIFIER

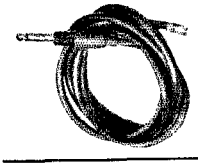
Self-powered; 4-position equalizer plus mike or tuner input; 20 db bass or treble increase or decrease; 3-12AX7, 6X4. Regularly $62.50.

Limited quantity. **$49.50**



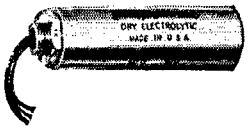
PHOSPHOR BRONZE AERIAL

125 ft. of the finest aerial wire obtainable. 42-strand phosphor-bronze with linen center. Will not stretch, very high tensile strength, diameter approximately same as No. 14 copper, very flexible. Excellent for transmitting or receiving antenna, control cable, guy wire. Regular list $4.95..... **90¢**

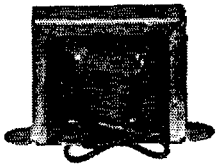


PL-55 PLUG AND CORD

Standard plug with 6 ft. rubber, 2-wire cord with spade lugs..... **85¢**



Triple 8 mfd. 450 V. electrolytic upright can condenser, separate negatives, all leads insulated from can. Nationally known mfr. Reg. dealer net $2.58.....ONLY **59¢**
10 for **$5.00**



8 HENRY 100 MA

200 ohms D.C. resistance choke. 2¼" wide, 2" high, 2⅞" mounting centers..... **95¢**
15 H. 50 Ma..... **59¢**

MINIMUM ORDER $2.00. Send 20% deposit with COD orders. Please include sufficient postage or instruct us to ship by Express Collect. Overpayment will be refunded by check.

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Your order will receive my personal attention and will be shipped the same day order is received. We distribute all top-flight amateur lines . . . let us know what you need.
73, Jule Burnett, W8WHE

'phone and is finishing a kw. final. EKO works 10-meter 'phone when neighbors and conditions permit. B. B. Atkinson recently passed his Novice Class exam. ARRL National Convention — Shamrock Hotel — Houston, July 10–11–12, 1953. Registration fee $13.50. Watch for details in *QST*. W5FJF, General Chairman. FHE is mobile on 75 meters with 35 watts to a 2E25, also a twelve-element rotary on 2 meters. PEH is the club station at Tex. Southern U. with 250 watts on 75 meters and 300 watts on 10 meters with four-element beam. HGO is on 20 meters with 300 watts to an 813. FEF also is on 75-meter mobile. GWS is operating both mobile and fixed on 75 meters. HJS has a 50-watt peanut whistle on 40-meter c.w. MXU is operating 10-meter 'phone mobile. QEU is mobile on 20 and 75 meters with new Elmac; he is on 20 and 75 meters with a Viking. QLE is on 75 meters with an HT-9. OYP has TVI licked with 300 watts on 80 meters to p.p. 211. Traffic: K5FKF 1088, K5WAC 1100, W5MN 387, QFA 68, FJF 35, NIY 14, OYP 14, FXN 8, ULN 2.

CANADA
MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — SEC: FQ. RM: OM. EC: EK. Several of the local boys handled emergency traffic with Sable Island in October. AAW has moved to Hammonds Plains and has the rig back on 3.8-Mc. 'phone. DB still is chasing the DX on 7 and 14 Mc. DQ acquired a Panadapter. EK has a new 813 final ready for action. FQ is keeping busy with VE8 skeds and the new car. HC is on 3.7- and 14-Mc. c.w. mostly because of B.C.I. 1H has been active on 3.8 Mc. with skeds with his brother. LY, BC, IC, and LZ have been active in the local net. NN is the new local R.C.N. Club station active on 14-Mc. 'phone. OM reports some activity on the M.T.N. TA is doing some converting to newly-acquired TA-12. QM has a new Collins 75A-1. Late report from VO via VO1D: At the Torbay Airshow the mobiles taking part were VO1I, 1T, 1AB, and 2BV, who assisted in spectator and traffic-control work. 1L and 1D handled the control station in the tower. 2N, of Grand Falls, has moved to VE3. 1AM is up and around again after a bad motorcycle accident. "W" boys operating in VO are ØCRO, ØCZK, 1QDM, 2OJ, 2IOL, 2DAJ, 4YCM, and 6RLW. New VO calls now active are 2B, 2H, 2M, 3H, 4J, 1F, and 1D. Traffic: VE1FQ 119, HC 66, OM 56, DB 3.

ONTARIO DIVISION

ONTARIO — SCM, G. Eric Farquhar, VE3IA — Welcome to the newly-organized ham club in Kapuskasing, with the following officers: DIM, pres.; BLE, vice-pres.; AVS, secy.-treas. VE8PI, on a visit to Kapuskasing, spoke on his two-year stretch in the North and showed very fine color slides. AVS enjoyed the CD Party. Sympathy is extended to OJ on the loss of his father and to AYM on the passing of his mother. ADN and CP are members of Detroit Civil Defense. VJ was visited by W8SYJ. WY sure has been knocking off DX on 3.5 Mc. The Toronto S.E.T. was a dandy with 14 mobiles in operation. GI's new QTH is Westboro. BHK has a regular sked with W2-Land on 2 meters. The Quinte Radio Club held its annual banquet in October with lots of OMs and XYLs in attendance. BSQ is quite active in nets. VD says his operating is confined to week ends. While on a hunting trip, CJ kept in touch with home via ham radio through DGZ. JU and his XYL sojourned to Buffalo. Hamilton Club's new officers are DGZ, pres.; XZ, vice-pres.; WE, secy.; BV, treas. During the meeting Brig. P. S. Todd, Director of Civil Defense, delivered a very instructive talk on what civil defense means, and outlined the great amount of work involved in making the operation a success. Congrats to the Hamilton Club on its achievement during this year's Field Day. By the time this item is in print the lovely Field Day trophy of the Canadian Marconi Company will have been presented to HARC, which is the initial winner of this "Annual Competition" cup. On behalf of Canadian hams may we also say thanks for the spirit shown by the donor. Traffic: VE3ATR 230, BUR 172, WY 145, IA 68, EAM 58, BJV 55, GI 24, EAU 20, CP 19, BSF 6, AUU 1.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — BK reports his activity is confined to mobile work. EM has gone mobile also with a Gonset transmitter and Sonar receiver on 75 meters. KG has renewed winter skeds for OBS, and now has a complete 10-meter portable rig with transmitter-receiver, dynamotor battery, and gas engine. AIO still is completing his new receiver but occasionally finds time to be on the air. NI now is ORS. DR finds traffic very slow and hard to come by. EC, AEM, AGU, AGP, VE, and APE keep daily skeds on 75 and 2 meters. ASK is a newcomer in LaTuque, with 300 watts on 75-meter c.w., and reports into the St. Maurice Valley Net. WW reported his 540-ft. long wire antenna is up again. ZZ has changed QTH and is erecting skywire at new location. BV also has changed QTH and gradually is getting the gear assembled

(*Continued on page 104*)

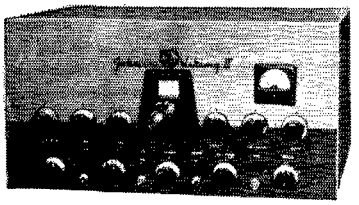
Lafayette

Elmac 50 Watt Transmitter

NOW IN STOCK!

10, 11, 20 & 75 meter with crystal or with direct-reading VFO on all bands. 50 Watts input, hi-level plate modulation, built-in Pi antenna. Network, compact measuring only 7½" x 7½" x 12" complete with tubes.

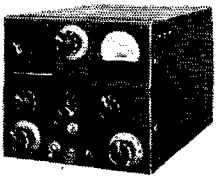
A-54 for carbon mike input.....**$139.00**
A-54H for dynamic or crystal mike.. **149.00**
110 VAC power supply..... **39.50**



NEW! JOHNSON VIKING II

The Johnson Viking II transmitter kit incorporates all the desirable features of its predecessor plus those required for effective TVI suppression. 100 watts output on phone and 130 watts on CW on all bands 160 thru 10 meters. New final amplifier uses parallel 6146 tubes. All parts supplied, including copper plated steel cabinet, chassis, wiring harness, all hardware and tubes. Complete construction test and operation manual also supplied. Viking II Transmitter Kit.....**279.50**

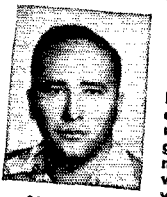
JOHNSON MOBILE TRANSMITTER KIT



New Johnson mobile transmitter kit, a band-switching 4 band rig, 60 watts input, 100% modulated (30 watts on 300 volt supply) 807 final, microphone input—dynamic, crystal or carbon. Crystal or VFO control. Viking Mobile Transmitter Kit (less tubes) **99.50**

WE CARRY A COMPLETE STOCK OF MASTER MOBILE ANTENNAS

TYPE AB/W75—Meter Whip—**NET 8.75**
MODEL M-20—20 Meter load coil for using 75 meter antenna on 20 meters—**NET 3.23**
MODEL M-40—40 meter loading coil for using 75 meter antenna on 40 meters .....**NET 3.23**
MODEL 100—96S—96" Stainless Steel—**NET 5.14**
MODEL 92—18" Whip Extension—**NET 3.18**
MODEL 9—96T—96" Economy Whip—**NET 3.67**



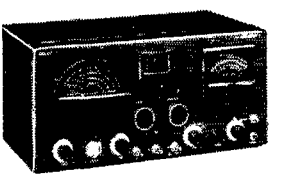
WN2NIJ

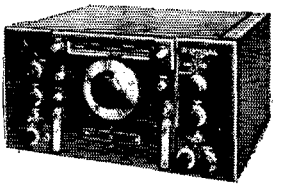
Paul Says

Now that Christmas is over we can concentrate on our shacks again, and that new equipment we've been meaning to get. We've just stocked up on all kinds of mobile equipment at Lafayette, more than we've ever had before. When you stop in you'll see what I mean. Drop me a line if you can't make it in person.

Paul Vasquez WN2NIJ

LAFAYETTE — HEADQUARTERS FOR COMMUNICATIONS RECEIVERS

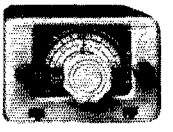


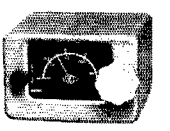


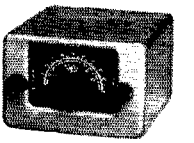
Lafayette has been the Headquarters for fine communications receivers for 32 years. All the latest models are available as soon as released by the manufacturers. Be sure to check Lafayette before you buy your new receiver.

HALLICRAFTERS		NATIONAL	
S-38C	49.50	SW 54	49.95
S-40B	99.95	NC 125	149.50
S-53A	79.95	NC183D	369.50
SX-62	289.50	HRO 60	483.50
SX-71	199.50	HFS	142.00
SX-73	975.00	**HAMMERLUND**	
S-76	169.50	HQ-129X	199.50

HEADQUARTERS FOR GONSET AMATEUR EQUIPMENT







GONSET 2-METER AMATEUR AND C.A.P. CONVERTER For fixed or mobile use on 144–182.2 mc. High stability permits use with auto or home broadcast set. Super-imposition tuning and 1 mc (output) IF doubles band-spread, speeds tuning and avoids images from TV, police and other stations outside 2 meter band. 50 ohm coaxial input, easily adapted for use with open wire line or 300 ohm ribbon. High frequency and extended to cover C.A.P. frequency. Requires 135–250 V. DC, 20 MA; 6 V. DC. Draws power from receiver. Tubes: 6CB6, 12AT7, OB2. Gray case measures 5¼ x 3⅛ x 5¼". Supplied with tubes, cables and instructions. Shpg. wt. 4 lbs.

Gonset No. 3008 2 Meter Converter.....NET 44.50

GONSET 3-30 MC SHORT WAVE CONVERTER Continuous coverage from 3–30 mc on three bands. For use in all-band mobile station installations. 1500 kc output. High sensitivity on short whip. 4 tubes. Uses power supply of receiver to which attached. Size: 5¼ x 3⅛ x 5¼". Shpg. wt. 4 lbs.

Gonset No. 3002 Converter.....NET 44.75

STEERING POST MOUNTING BRACKET—For installing any Gonset Converter on auto steering post.

Gonset Steering Post Mount 3006.....NET 3.90
Gonset 3005 Tri-Band Converter.....NET 47.60

GONSET MODEL 3017 SINGLE BAND CONVERTERS

Available in 10, 15, 20 and 75 meter models (specify band) ..... **NET EACH 39.95**

The NEW GONSET 2 Meter XMTR-RECEIVER

Complete 2-meter fixed-portable unit..... **NET 189.00**

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BOSTON 10, MASS., 110 Federal St., HUbbard 2-7850
NEWARK 2, N. J., 24 Central Ave., MArket 2-1661
PLAINFIELD, N. J., 139 W. 2nd St., PLainfield 6-4718
BRONX 58, N. Y., 542 E. Fordham Rd., FOrdham 7-8813

for action. At the regular meeting of MARC in October, AGF gave a very interesting and informative talk on transistors, complete with demonstrations of some of the things they will do. JJ, finding 10 years poor, is haunting 20 meters these days. CA still is being operated almost exclusively by Phyl, who again is handling considerable northern traffic. PQN again is functioning with AMB as manager, and LO, OJ, PM, and ZU the most active stations. Traffic: VE2AMB 76, CA 58, EC 11, LO 9, AIO 4, DR 2.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — HM has had three contacts with W5AGB/FM, the floating ice island station near the Pole, and also had very good results in the latest Frequency Measuring Test. GJ has the Alberta c.w. net well organized. This net meets Mon. through Fri. on 3620 kc. at 2000 MST and welcomes any amateurs interested in c.w. net operation. OD reports Calgary hams assisted the local police department in locating a stolen car. G3BXN has arrived in Edmonton. PE plans erection of a "ZL" special beam to snag some choice DX. LQ is active again on 14 Mc. keeping daily skeds with VE2AOJ. EH still is working on his new shack and, among other features, will have a receiver to monitor the mobile frequency for any possible emergency. WS has home station on the air from his new QTH. BO is operating from the University campus in Edmonton. JY now is a member of the Alberta 'Phone Net. SC is working on a new rig for 50- and 144-Mc. operation. EA has moved to a new QTH at St. Albert. GA has the speech amplifier about ready and will be on 'phone any day. DZ has built a super rig for frequency measuring and also is working on new high-power final. Traffic: VE6HM 129, OD 46, GJ 14, MJ 12.

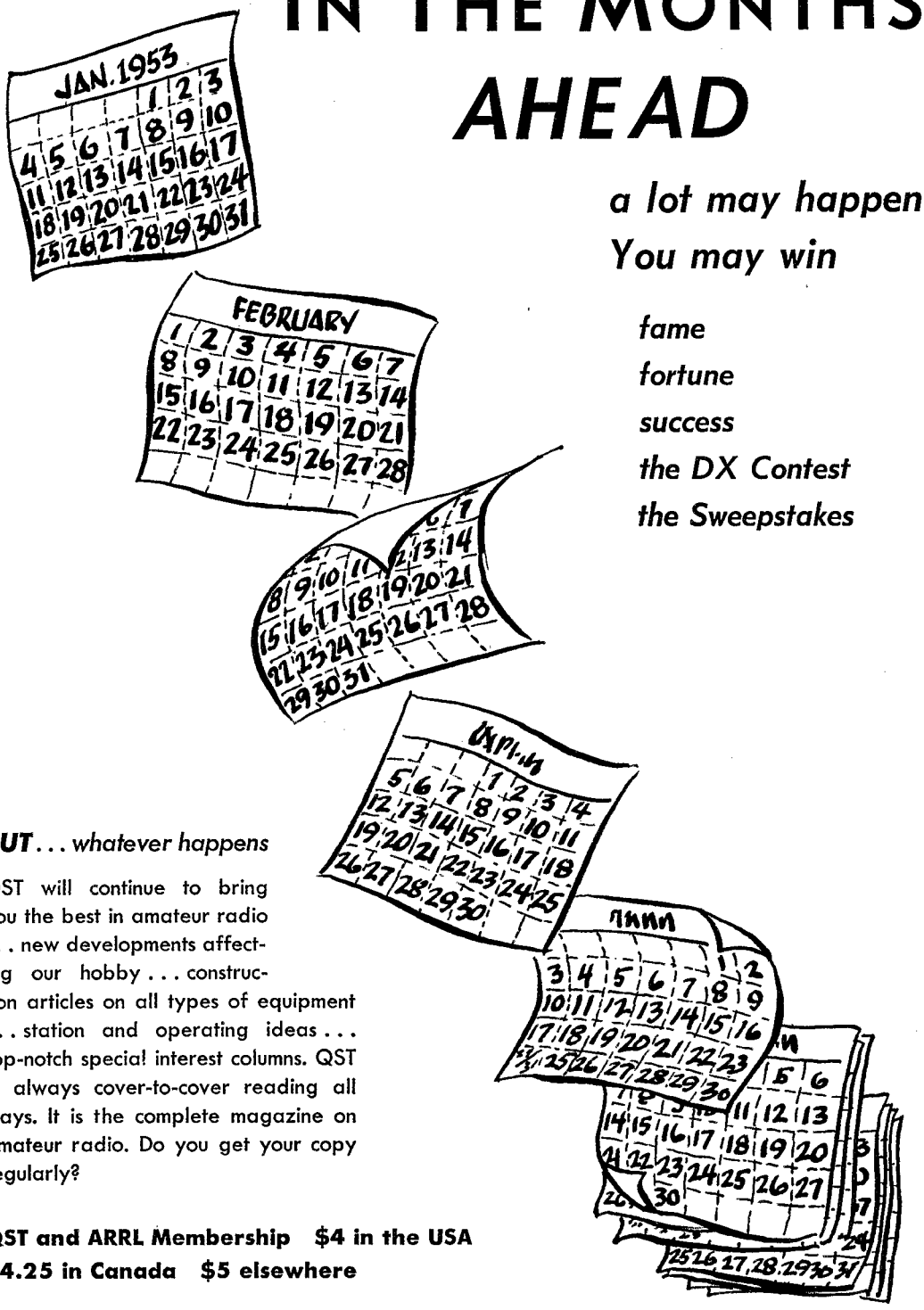
BRITISH COLUMBIA — SCM, Wilf Moorhouse, VE7US — The present SCM has tendered his resignation and nominations for this office are now solicited. The AREC net still is operating, with QV acting as Net Manager in the absence of QC. 5PX Net now is at 6PX. The present SEC is US. New lists have been prepared of the AREC full membership and new Net Rosters. These are mailed to members. Civil defense authorities have been asked to get AREC assistance through our ECs. The Northern Net is doing a very good job under LK. It certainly would help them if we could keep 3780 kc. clear at 7:30 P.M. daily. Many of these stations are c.w. and low power. AC handles MLN traffic, on 7290 kc. "Silent Keys" should have included Jim Read, XV, of Nanaimo. US is using p.p. 813s and 805s mods. LO, ACA, and KI get together to compare what? ABH now is an ORS. Not much news was received from Vancouver Island. The Nanaimo gang still is active. AQB and ACC have things on the fire. District 1 reports additional AREC members. APN and AOU are on 20 meters. QC is back in Merritt after a trip to Coalmont. QV did a good job as NCS of the AREC net while QC was absent. Please send in news, fellows. Traffic: VE7QC 18, AC 15, DH 13, AOB 12.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — The 'phone net is operating nightly at 7 on 3760 kc. and now has over 30 stations on the roll. HL is our connection to TEN in the NTS. GG is heard on 75-meter 'phone after a year's absence. LC is getting the 21-Mc. beam up with his 10-20 job. DN has left for DL-Land. Ex-8MJ now is signing CK at Inglis. JQ is EC for Minnedosa. ML demonstrated 2-meter rig to ER. New officers of the BARC are NB, pres.; AU, vice-pres.; and S. Fitak, secy.-treas. KN is editor of *Sparks*. DQ has left for sunny Spain. CI took a well-earned rest. 5TE visited AX at Rivers. QD has been visiting relatives in VE5-Land. IF and GE are back on the air — c.w. only so far. AK and DT are on 160 meters. IR has new 40-foot vertical working on 75 meters. DU was in Winnipeg and expressed interest in OES appointment. DJ is now at Fort Churchill and GP has been moved to Gimli. JK has 813 going at Carman. RA is in his new house but has no antenna as yet. Sorry for all the missing reports in the past year but I hope things stay right this time. The very best to all in '53. Traffic: VE4HL 46, ER 13, QD 13.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — Having been appointed to serve you for another two-year term I wish to thank you for the help coöperation received in the past and look forward to the next term with continued pleasure. Nov. 1st and 2nd saw the following hams in Saskatoon working at the formation of a constitution and by-laws for the SARL: LU, TE, GI, FG, WH, BV, and HR. A monthly bulletin is planned and your ideas, other matters of interest, and suggestions will be welcomed. TE is trying s.s.b. when not on the 'phone or c.w. nets. BV built a new beam using two folded dipoles 135 degrees out of phase and reports FB success. CA is QSY 20-meter 'phone from 75. LU is happy after getting ZL QSL for 75-meter 'phone. BT is leaving for Iowa. EQ has his all-band ticket and also joined the 'phone net. DR is after DXCC. HR raised a new mast and strung a center-fed half-wave for 3.5 Mc. LU is new OBS for the Regina district. PJ visited DD for a week. Ex-5BJ now is VE7WU. The c.w. net welcomes members on 3650 kc. at 1830 MST. Contact TE for particulars. Traffic: (Oct.) VE5HR 21, TE 12, PJ 11, QL 4, GO 2. (Sept.) VE5PJ 6.

IN THE MONTHS *AHEAD*



a lot may happen
You may win

fame
fortune
success
the DX Contest
the Sweepstakes

***BUT**... whatever happens*

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Got Your RCC?

WNs as well as Old-timers can and do belong to the *Rag Chewers' Club*. Many in the following list are now General Class of course. When the Chief Rag Chewer, known as The Old Sock, has an RCC member's nomination *and* your own request for certification in the Club, a membership certificate is forwarded by ARRL gratis. It is required to get in, that one chew the rag *with a member of the RCC* for at least a solid half-hour — date, call and duration of that contact should be reported with both nominations and requests for RCC membership. For full RCC rules see ARRL booklet *Operating an Amateur Radio Station* (25¢ to non-members). We list the newest WNs in RCC to help newcomers qualify.

WN1UGA, UGE, UGG, UID, UIE, UIQ, UKS, ULH, ULY, UPC, UPE, UPG, UPT, UPZ, URM, URR, USK, USL, UTE, UTU, UVH, UVV, UXB, UXG, UXK, UXL, UXS, UXZ, UZE, UZJ, UZL, UZP, UZV, UZZ, VAH, VGV, VGY, VIV, VIX, VLE, VNX, VOE, VOS, VOV, VRK, VTK, VVH, VYH, WAC, WAG, WAI, WEX, WFH, WGV, KN2AAO, ABU, ABV, ACH, AEU, AFP, AFV, AFY, AGO, AIN, AJW, AKJ, AKQ, AKV, ALC, ALD, AMG, AML, AMP, WN2ANZ, KN2AOR, APG/K2AQQ, APO, ARK, ARQ, ARU, AST, AUK, AXY, AZA, BBR, BEX, BFN, BHO, BYJ, CRJ, EBH, FBE, FMU, IAM, IEJ, IBQ, IPC, IPX, ISE, ISL, ITJ, IVU, IYP, JGV, JMF, JMH, JQC, JSL, JUN, JUW, KCS, KDI, KEI, KER, KQC, KQQ, KQU, KRP, KYS, LGQ, LHH, LKZ, LOD, MAI, MCH, MFN, MNN, MOK, MXY, MYN, NAH, NIC, NIZ, NLQ, NMJ, NZA, OGS, OHS, OHZ, OIB, OIK/9, OJV, OKU, WN3RYT, SEV, SIY, SME, SNV, SRG, SSC, SVL, SVY, SXF, SZW, TBS, TDI, TDX, TDY, TDZ, TEJ, TGK, TGN, THP, TIC, TKL, TMZ, TNZ, TSY, TWE, TYH, TYU, TYW, UAM, UAU, UAX, UBZ, UCN, UDH, UEM, UEN, UIF, UMR, UNZ, WN4TEF, TEG, THH, THX, TID, TJB, TKS, TMQ, TNE, TPO, TRZ, TVI, TVM, TWW, TWZ, TXA, TXO, TXS/4, TXY, TYC, TYE, TYR, TYT, TZD, TZE, UET, UGS, UJT, UMI, UMM, UNA, UNO, UNZ, UQZ, USF, USM, USQ, USW, UUF, UUM, UUN, UVU, UVY, UWA, UWC, UZP, UZQ, UZZ, VAE, VAH, VBO, VBR, VDL, VFH, VFL, VFR, VGB, VGU, VHH, VIV, VJM, VKA, VKC, VPA, VPN, VPR, VQE, VRK, VRS, VTT, VTZ, VUA, VUO, VUR, VUV, WBC, WBJ, WDC, WDI, WDJ, WDL/4, WEG, WEU, WGB, WGJ, WGY, WJH, WJO, WKH, WKI, WMP, WMQ, WNF, WNJ, WNV, WOF, WPG, WXZ, WN5TOL, TOM, TWG, TWL, TXB, TYU, UFK, UFO, UJN, UMC, UMP, UMV, UND, UNF, UNR, UQT, URJ, URO, URW/5, UTE, UTM, UTR, UUA, UUN, UXG, UXJ, UXN, VAI, VAX, VBG, VBH, VDA, VEI, VEX, VHO, VOE, VOM, VOU, VPD, VUS, VYY, WBU, WFK, WFP, WHE, WJB, WKR, WKX, WRT, WUL, WN6CBT, CMU, DKX, DPD, HYI, JQR, LLK, LTT, MWF, MYP, NNC, OJE, ONV, OPL, OQY, ORV, ORW, OXB, OXJ, OZW, PCA, PFX, PHS, PHT, PKB, POO, PPY, PSO, PSR, PZG, QHS, QJH, QKD, QMO, QNB, RGG, RHA, RQT, RTE, SBZ, WN7PRF, PSS, PTY, QDJ, QFY, QHR, QII, QJY, QKE, QMA, QMS, QMW, QPJ, QQE, QVH, QWH, QXA, QYN, QZV, RAX, RCM, RDX, REQ, RHM, RLW, RMD/7, RME, RQN, RVD, RWM, RZJ, SFS, TAZ, WN8HIT, HMI, HOI, HOP, HPP, HRQ, HRU, HSE, HSM, HUM, HVQ, HWI/8, IAA, IAY, IBF, IDC, IEA, IEQ, IFU, IIV, IJW, INQ, IKS, ILE, INA, IOU, IQB, IUA, IXG, JAE, JAV, JCA, JCS, JDB, JDZ, JEF, JGX, JIA, JIF, JIJ, JKS, JNE, JNI, JSF, JWP, JWR, JXU, JZX, KAB, KAO, KAU, KBC, KBR, KCK, KCW, KIG, KJC, KJT, KLZ, KMG, KPR, KVP, KWP, KYD, KYE, KYF, KZI, LBT, LDP, LES, LFO, LGK, WN9OLL, OTR, PCY, PLM, PPA, PQN, PRJ, PSU, PUP, PUW, PZT, QAK, QAO, QAQ, QBC, QKA, QKC, QKI, QLK, QMG, QMU, QNO, QQN, QQO, QVX, QVY, QWZ, QYG, RBU, RGJ, RGK, RNQ, RTQ, RUJ, RVM, RVN, RWN/9, RXY, RYU, SMS, SOC, SPI, SQF, SZR/9, TGX, TKO, TNH, TOF, TOY, TRE, UAM, UCR, UDX, UTK, WNØECT, EDS, EEG, EHV, EPS, ESB, EZW, FTQ, FUZ, FVM, GVX, HAW, HBO, HFY, HGT, HIN, HIS, HJD, HMA, HOP, HPE, HQE, HQH, HQL, HTJ, HUV, HWY, HYX, IDU, IEZ, IFM, IGU, IGV, IPQ, IPW/Ø, IRJ, IRL, IVS, IYP, JEG, JGV, JHY, KBD, KEW, KFS, KGH, KHA, KLG, LLU.

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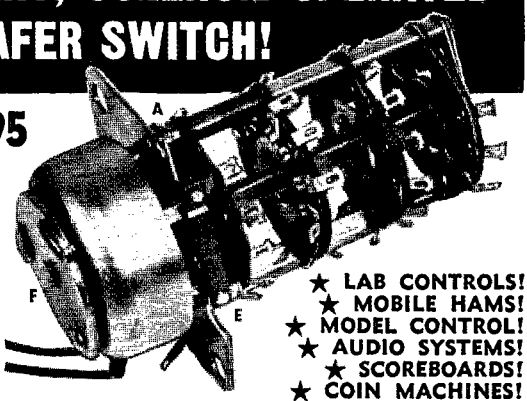

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New solenoid literally obsoletes manual switching! Innumerable remote control applications: remote crystal selection, band switching, antenna selection, audio circuits; uses limited only by your own ingenuity! *How it works*: solenoid (F) produces rotary motion from 6V DC impulse. Action is transmitted to rotor shaft of 4-gang wafer switch by ratchet mechanism. Cam-operated interrupter switch (E), attached to wafer (A), opens when solenoid nears end of stroke, de-energizing solenoid. By combining interrupter switch (E) with wafer contacts on (A), either stepping or rotary selective action is achieved. Size: 4½ x 2½ x 2½". *Resistance ½ ohm DC. 25 deg. rotary stroke.* 8 lb. in. torque. Ship. wt. 1 lb. Pictorial-Schematic circuits included. *Exclusive at Radio Shack!* Order No. RQ-4519 ..... $3.95

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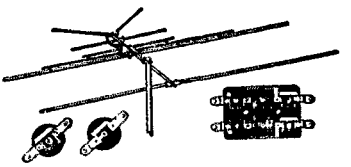

NEW VHF–UHF ANTENNA FOR TV COVERS ALL CHANNELS 2–83

VEE-D-X MODEL "ULTRA Q-TEE"—the world's first all-channel TV antenna covering existing channels 2-13 and all projected channels on UHF. Be ready for UHF TV when it comes to your area! Eliminates need for separate UHF antenna and antenna-switching! Preassembled; requires only a single lead-in line. Includes two (round) filters for VHF channel separation, large (rectangular) 6-section printed circuit filter for UHF channel separation — all filters mount on antenna. Complete, less mast. List price $14.25.
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NEW MALLORY UHF CONVERTER

Model TV-101—New Mallory converter for reception of UHF TV stations. Connects to antenna input of VHF TV sets. Entirely self-contained—complete and ready to operate. Designed to harmonize with fine furniture and TV cabinets. Uses special Mallory Inductuner in RF and oscillator stages for smooth, continuous tuning of all UHF channels. Slide-rule dial for easy station selection. Front panel control turns TV set on and off. Has antenna selector switch for returning to standard VHF *operation. Broadband output permits use of* channels 5 or 6 of TV sets as IF. Maroon plastic cabinet, 9 x 7 x 6¾". With tubes. For 110-120 volts, 50-60 cycles. Wt., 6½ lbs. List $42.50.
36-480Q TV-101 ..... **Net $31.24**

RADIO SHACK
CORPORATION
167 Washington St., Boston 8, Mass.

Harmonic Radiation

(*Continued from page 18*)

to come up with data on a super signal squirter with a high "front-to-bottom" ratio.

There are probably other tricks that expediency will bring forth. Building a new house with all components designed to obviate metallic contacts might be the ultimate, but that would be the last resort! The number of amateurs that would go to such an extreme is limited. As a matter of fact, the number that will experience nonlinear system difficulties may be very small.

It is difficult to predict, from the meager statistics available, what the trend will be. A few stations have had one or more proven cases. A favorable number have apparently had no difficulties. A group of unknown size having partially TVI-proofed transmitters may or may not know that they are having nonlinear system difficulties. And a happy-go-lucky gang, the boys who start activities after the last local television station lowers its flag for the night and plays the "Star-Spangled Banner," may never know!

4-Tube Superhet

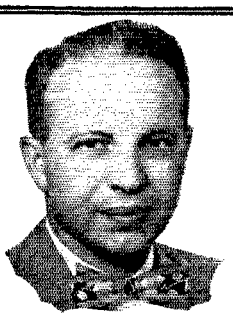
(*Continued from page 24*)

nal you used was at 3650 kc., you know that the first 100-kc. harmonic you hear on the high-frequency side will be 3700 kc., and the first one on the low side will be 3600 kc. The second harmonic of the 3650-kc. signal will furnish a check point at 7300 kc. (2×3650), so swinging C_2 to about ⅓ meshed (where it will peak the 7-Mc. signals) will allow you to locate the 7-Mc. points. Thus you will have 100-kc. intervals on the dial from 3.5 to 4.0 Mc. and from 6.9 to 7.4 Mc., but not necessarily coinciding. To make them coincide, some slight retuning of the 100-kc. transformers is required. If, for example, the 7.0-Mc. point occurs to the right of the 3.6-Mc. point, the 100-kc. amplifier is tuned low, and the slugs should be turned out slightly. A few trials will bring the circuits to where you want them.

Now is a good time to check the regeneration of the detector, so connect the lead from Pin 5 of the detector to D on T_3. You may hear a steady beat, indicating that the detector is oscillating, so tune both circuits of T_2 and see if they will kill the oscillation. Their action is to load the regenerative detector to where it won't oscillate — if the action persists, try a 4700-ohm resistor at R_{13} as a last resort. These circuits should be peaked on a modulated signal, with the b.f.o. turned off.

If this all sounds tricky, it really isn't, and you will find that the regenerative detector can be made to behave quite nicely. After the detector has been made regenerative, the calibration can again be checked as in the preceding paragraph, and any minor changes in tuning made as are found necessary. Once the 100-kc. circuits have

(*Continued on page 110*)



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That's right fellows. The U.S. Air Force and Signal Corps are buying WRL Globe King and Globe Champion transmitters because they know they can depend upon their accurate, split-second perfomance.

Also, more and more amateurs prefer the outstanding performance of WRL transmitters —both Phone and CW. Our prices are low, we give personalized service, tailor-made terms, liberal trade-ins, and have complete stocks. We finance our own paper—NO RED TAPE—NO DELAYS. Special attention given to foreign orders. Deal with WRL—"Largest Distributors of Amateur Radio Transmitting Equipment."

NO TVI WITH GLOBE KING!

Says Jerry Armstrong, 2738 N. 49th St., Omaha, Nebr. Here are some excerpts from Jerry's letter:

"I have had my Globe King Transmitter for 2½ years. I get out with it every night despite heavy QRM, and have QSL cards from all over the world showing excellent contacts.

Jerry Armstrong with his Globe King

There are 8 TV sets within a quarter block but no one has trouble with TVI even though I use a ground plane vertical antenna.

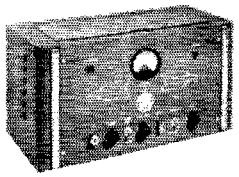
Dollar for dollar, I feel that the Globe King is the ham's best buy."

—Signed/ Jerry Armstrong

NEW WRL 400-WATTS Phone-CW
GLOBE KING XMTR
Send for complete data sheet

KIT FORM $475.00 WIRED-TESTED $495.00

NEW ENGINEERING TRIUMPH!



THE WRL GLOBE SCOUT

(50 WATTS PHONE — CW)

The WRL GLOBE SCOUT is the latest triumph of the WRL engineering staff. It is a beautiful, compact XMTR, completely self-contained, including power supply — 8H X 14½W X 8¼D. Contains new 6146 tube in final; covers 160M thru 10M. Metering provided for final grid and final plate circuits. Complete kit includes all parts, chassis, panel, power supply, cabinet, tubes, meter and one set of coils. Can be used for mobile work with suitable power supply. (Auxiliary socket provided.) An ideal XMTR for the novice or the experienced ham.

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Coil sets available for 160, 80, 40, 20, 15 and 11-10, per each set.....$3.00
Crystals 160, 80, or 40M (40M used on 10-20) each...$2.75
Quality crystal microphone and stand.....$10.17
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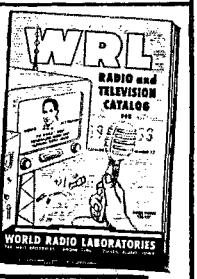
WRL 165 WATT GLOBE CHAMPION XMTR (less accessories) KIT-FORM $329.50 WIRED $349.50

SEND NOW! FREE 1953 WRL CATALOG



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1819-1825 K. C.
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$1.50 Ea.
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80 METER
3615-3619 K. C.
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99¢ each while they last

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All crystals mounted in FT-243 holders and checked for activity before shipment. Crystals will only be furnished within the range of frequencies shown above. Will furnish as close to desired frequency as possible. When these are gone, no more available.

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25¢ HANDY WALL SIZE

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Name_____

Address_____

City_____ State_____

been aligned they can be left alone, and if the 3.5- and 4.0-Mc. points don't come where you want them on the tuning dial, a slight adjustment of C_7 will correct it. You can steal a little more bandspread by using only 22 turns at L_3, but we suggest doing this only after you are completely familiar with the receiver.

Antenna Coupling

You are now on the 1-yard line ready for a touchdown, and all that is left is to familiarize yourself with the handling of the receiver. Since no antenna input circuit has ever been devised that will handle all types of antennas equally well, it is wise to see what yours is doing to the receiver. To this end, we suggest connecting a 140-$\mu\mu$fd. variable in series with the antenna post, to provide for variation in coupling. On 80 meters, peak C_2 on noise or a signal and rock the adjustment slug of L_1. If it tunes fairly sharp, your antenna coupling is not too tight and you are OK on that band. Swing C_2 out until you are listening on 40 (to noise or a signal) and again rock the slug on L_1. If it tunes broad, reduce the capacity of the 140-$\mu\mu$fd. antenna condenser until the tuning slug of L_1 shows a definite peak. While this 140-$\mu\mu$fd. variable antenna coupling condenser may not be necessary in some cases, it is wise to try its effect if you want to get the most from the receiver. By noting the settings of the condenser for the two bands, it is no trick to swing it to one or the other of these settings as you swing C_2.

The input condenser, C_2, will tune sharply on either band, and it should always be peaked when listening to a weak signal. Detuning it slightly will attenuate abnormally loud signals, but you should always be able to handle these with R_{10} and R_{16}, unless the signal is from a ham next door

General

The single-signal effect on c.w. will depend upon the degree of regeneration you have in the detector and the setting of the b.f.o. Setting the b.f.o. to give a low beat note will not permit as much single-signal effect as will setting it higher, of course. If your headphones have a peak at some frequency (and most of them do), you may want to set the beat note to coincide with this peak.

With no antenna connected to the receiver and with the b.f.o. on, you will run across a few weak signals across the dial. These tune faster than a normal signal and do not peak with the setting of C_2. They are caused by the second harmonic of the 5-Mc. oscillator beating with the 7th harmonic of the 1600-kc. crystal, and fall at 3950 and 4000 kc. on the tuning dial (if your 1600-kc. crystal is *exactly* 1600 kc.). They won't bother you in practical operation, but they are mentioned so that you will recognize them. More selectivity at 1700 kc. would probably reduce them, but it would also result in a more complicated receiver.

The single-signal effect reverses between the two bands, of course. In other words, if the b.f.o. is set up so that tuning toward a higher frequency

(Continued on page 112)

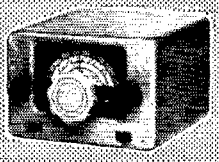
Happy New Year

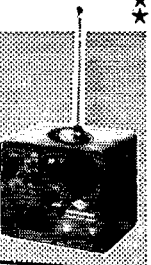
Megathanks!

. . . for the FB Ham and Industrial business you have been sending me —
It certainly is appreciated!

I hope you had a real Merry Christmas, and that your New Year will be the best ever!

73, *Bil Harrison* W2AVA





Start the New Year Right with Top Gear from HARRISON'S HAM HEADQUARTERS

(Top Left) LATEST GONSET "SUPER 6" AMATEUR CONVERTER
Covers 10, 11, 15, 20, 40 and 75 meter phone bands with plenty of bandspread. Also 49 and 19 meter SW broadcast bands. With tubes **$52.50**

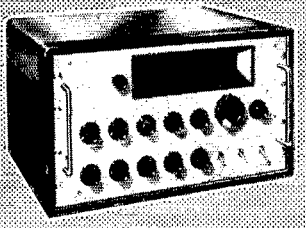
(Center Top) NEW SONAR BANDSWITCHING TRANSMITTER (SRT-120)
Completely TVI suppressed. 100 watts phone, 120 watts CW. Bandswitching: 80, 75, 40, 20, 15, 10 or 11 meters. Provision for VFO or crystals. Requires: 6.3V @ 6.4A; 600 V. DC @ 350 MA. With tubes **$198.50**

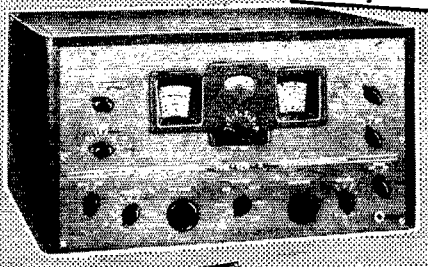
(Top Right) NEW GONSET 2-METER "COMMUNICATOR"
Complete 2-way station for mobile or fixed use. Superhet receiver and built-in noise clipper. 15 watts input. Crystal or carbon mike. Built-in speaker and 19" whip. 10¼ x 9¼ x 7". For 110V. AC or 6V. DC. With tubes, less crystal and mike . . **$189.50**

(Left) LATEST HALLICRAFTERS HT-20 TRANSMITTER
TVI-suppressed! 115 watts CW or 100 watts AM phone. 1.7 to 30 mc continous band-switching coverage. Completely shielded and filtered. For 117V., 60 cycles AC. With tubes **$449.50**

(Lower Left) FAMOUS HAMMARLUND HQ-129-X RECEIVER
Continuous coverage from 540 to 31 mc in 6 bands. Bandspread on 80, 40, 20 and 10 meter bands. With tubes **$239.50**

(Lower Right) NEW NATIONAL HRO-60 RECEIVER
Dual conversion above 7 mc . . . second IF of three 456 kc stages with 12 permeability tuned circuits . . . current regulated heaters in HFO and mixer . . . PLUS other exclusive features. Less Speaker **$483.50**





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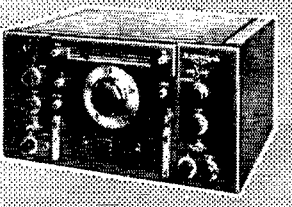

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on 80 meters brings you through the signal and out weakly on the other side of zero beat, tuning toward a higher frequency on 40 will bring you weakly down to zero beat and out loud on the other side.

The power-supply requirements for the receiver are slight: about 15 ma. at 250 volts and 25 ma. at 105. A power supply with 60-ma. rating will take care of this and the additional 10 or 12 ma. for a VR-105. Fig. 4 shows a suggested circuit.

V.H.F. Receiver Design

(Continued from page 41)

Many of the newer crop of double-conversion receivers have selectivity that was impossible heretofore. With them, and a good v.h.f. converter, we can dig down into the noise level in a way that we never could before — if we will take advantage of the possibilities that c.w. operation affords.

You Can't Work 'Em If You Can't Hold 'Em

High selectivity is great stuff — but you don't get that boost in signal-to-noise ratio for nothing. When you start thinking of bandwidth in *cycles*, you come up against stability problems. A wandering oscillator doesn't cause much trouble when the i.f. bandwidth is 50 kc. or so, but to use selectivity effectively the converter oscillator has got to stay put!

This rules out tunable oscillators for the average v.h.f. man, so we turn to crystal-controlled injection sources. A crystal-controlled converter is nice to have, even on 28 Mc. It is more of a pleasure on 50 Mc. At 144, 220 or 420 Mc. it becomes a necessity for narrow-band work. Fortunately, crystal control in the converter is not difficult. Even for 420 Mc., two dual triodes and a low-cost crystal will provide enough energy in the vicinity of 380 Mc. to replace a one-tube oscillator covering the same frequency.

And what a difference! — 420-Mc. signals received on a crystal-controlled converter tune in as easily as a signal on 7 Mc., and c.w. is just as practical. No more holding one's breath, or tuning signals in and out by waving the hands a foot or two away from the receiver. It is no exaggeration to say that the general move to crystal-controlled reception at 144 Mc. and higher in late years has been one of the most potent factors in demonstrating the utility of these bands for amateur communication.

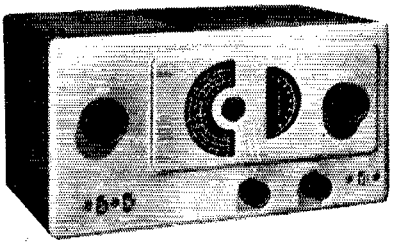
FEED-BACK

In the coil table for the Coffee-Can Receiver on page 40 of the November issue, the form diameter was inadvertently omitted. This should be 7/8 inch.

The "Push-Pull 6146s at 144 Mc." amplifier chassis specified on page 13, November *QST*, should measure 5 by 10 by 3 inches rather than 5 by 7 by 3.

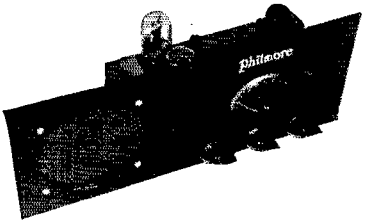
Start The New Year RIGHT

..AND START RIGHT IN HAM RADIO THIS EASY WAY!

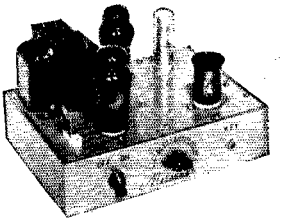


HALLICRAFTERS Model S-38C Receiver. Shpg. wt. 14 lbs. Only $49.50

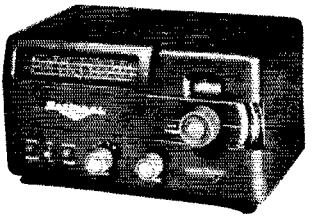
Half the fun of being a Novice or Amateur is the sense of satisfaction and pride that comes from owning and operating good equipment. Bargain-wise operators everywhere have learned to depend on Walter Ashe for the best of everything in radio and electronics at sensational savings, made possible by "Surprise" trade-in allowances on used (factory-built) equipment. Better get *your* trade-in deal working today. Wire, write, phone or use the handy coupon below.



PHILMORE Model 7001-C Broadcast and Shortwave Receiver Kit. 2 tubes plus rect. Complete less tubes. Only $11.76



MEISSNER Model 2-CW Novice Transmitter Kit. Only $24.45



NATIONAL Model SW-54 Receiver. Shpg. wt. 10 lbs. Only $49.95

PHILMORE Model 7001-B Broadcast Receiver Kit. One tube plus rect. Complete less tubes. Only $7.35

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Coffee-Can Rig

(Continued from page 43)

are lined up, one behind the other, to the left of the coffee can. To the left of the 6V6 at the rear — the buffer-doubler — is the socket for L_3 and then the 6L6. The socket for the output coil, L_2, is in front of the 6L6. These sockets are flush-mounted with clearance holes in the base for the prongs. The two tuning condensers, C_{13} and C_{18}, are mounted from the Presdwood base on brackets in front of the two coil sockets. Their shafts, which extend through large clearance holes in the panel, are fitted with well-insulated knobs having recessed set screws, since the shafts are at plate voltage above ground. The two meters are mounted on the panel, above these controls.

With C_2 set near maximum capacitance, C_3 should be adjusted until the oscillator frequency is set at 3500 kc. Then C_2 should cover the band. When the coil is plugged in at L_3, C_{13} should be tuned to resonance as indicated by the usual dip in plate current. This should occur with the condenser at somewhat less than half maximum capacitance.

With the power supply shown, the minimum unloaded plate current to the final amplifier should run about 15 ma. except when doubling. In the latter case, it will run about 30 milliamperes. Using a conventional antenna tuner, the output stage may be loaded until the plate current at resonance is about 100 milliamperes. So long as T_2 has a current rating of at least 75 ma., I have not found the use of voltage-regulator tubes necessary.

When the amplifier alone is keyed, a toggle switch connected across a 'phone plug inserted in J_1 may be used to switch the oscillator off while receiving.

Radioteletype Converter

(Continued from page 45)

present on the grid will result in the flow of grid current and will bias this grid to plate-current cut-off. The plate voltage rises from 15 volts to 50 volts and the series-connected neon lamp fires. This results in the application of about 25 volts of positive bias to one half of the 6SN7 polar-relay-keyer tube. This half of the tube draws 20 ma. of plate current and develops 20 volts of bias across the common 1000-ohm cathode resistor, R_{19}. This voltage results in plate-current cut-off in the second half of the 6SN7 tube. A spacing frequency will cause the second half of the 6SL7 detector to function in the same manner and result in plate-current flow in the second half of the 6SN7 keyer tube.

The 6C5 tube is used in a Hartley oscillator circuit adjusted to oscillate at either the marking frequency of 2125 cycles or the spacing frequency of 2975 cycles, depending upon the action of the printer keyboard contacts. The output of this oscillator is used to drive the amplitude modu-

(Continued on page 116)

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You will gain all-around experience that will increase your value to the company as it further expands in the field of electronics. The next few years are certain to see a large-scale commercial employment of electronic systems—and your training in the most advanced electronic techniques now will qualify you for even more important positions then.

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lator of the transmitter. The power-supply requirements are very nominal and no explanation of the circuit is required.

Fig. 2 shows a plot of the polar-relay keying-tube plate currents, as indicated by the zero-center meter, as a function of the input frequency to the converter. The differential current falls to zero at the frequencies between 2400 and 2660 cycles because of the switching action of the series-connected neon lamps. The converter can be constructed without using neon lamps as switches; however an increase in the transition time between marking and spacing impulses may result.

Circuit Adjustment

The adjustments required to put this equipment into operating condition are very few. The noise output of the radio receiver, with the antenna disconnected, is fed into the input of the converter and the potentiometer, R_{14}, is adjusted until the meter is approximately centered on zero. When a marking signal of 2125 cycles is then applied to the input, the meter should deflect to the left and L_1 should be adjusted for maximum deviation. With a spacing signal of 2975 cycles applied, the meter should deflect to the right and L_2 should be adjusted for maximum reading of the meter in this direction. The deflections should be approximately equal for either a marking or spacing signal. If the readings differ by a large amount, it indicates that the 6SN7 tube may not have equal cathode-emission capabilities and should be replaced.

The a.f. oscillator can be adjusted to the correct frequencies by first adjusting the core in L_3, with the keyboard contacts open. The core is adjusted to give 2975-cycle output from the oscillator circuit. The contacts are closed and C_{11} is adjusted until the frequency output from the oscillator is 2125 cycles. A recheck can be made of the spacing, and then the marking frequencies, and the adjustments retouched to eliminate the small errors caused by the slight interlocking of the adjustments. C_{11} should be varied in steps of approximately 500 to 1000 $\mu\mu$fd. The frequencies of 2975 and 2125 cycles are nominal and may vary within $\pm$ 50 cycles without affecting operation. The a.f.s.k.-oscillator output can now be fed into the converter input, and the printer should be capable of a local operational test by printing correctly. If the machine runs open, the indication is that at some point in the circuit a crossover has occurred. A simple cure for this difficulty is a reversal of the connections to the windings of the polar relay.

Single-Selector Printers

This converter is designed for use with a Teletype Corporation Model 12 printer, with which an external power supply is required for the printer selector magnets. Anyone fortunate enough to have a Model 15, or any other printer which has a single selector magnet, can modify the converter described above so as to enable it to be used with these printers directly, thus

(*Continued on page 118*)

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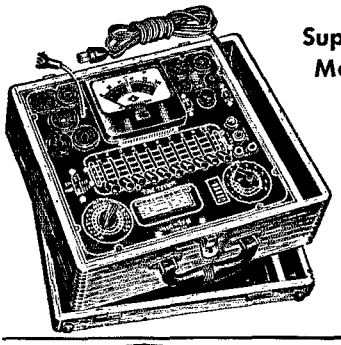
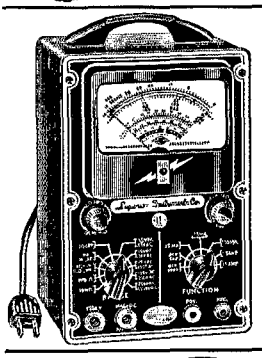


Superior's New Model TV-11 TUBE TESTER

• Uses the new self-cleaning Lever Action Switches for individual element testing. Because all elements are numbered according to pin number in the RMA base numbering system, the user can instantly identify which element is under test. Tubes having tapped filaments and tubes with filaments terminating in more than one pin are truly tested with the Model TV-11 as any of the pins may be placed in the neutral position when necessary. • Uses no combination type sockets. Instead individual sockets are used for each type of tube. Thus it is impossible to damage a tube by inserting it in the wrong socket. • Free-moving built-in roll chart provides complete data for all tubes. • Phono jack on front panel for plugging in either phones or external amplifier detects microphonic tubes or noise due to faulty elements and loose external connections.

Operates on 105-130 Volt 60 Cycles A.C. Hand-rubbed oak cabinet complete with portable cover..... **$47.50 NET**



Superior's New Model 670-A SUPER-METER

A COMBINATION VOLT-OHM MILLIAMMETER PLUS CAPACITY REACTANCE INDUCTANCE AND DECIBEL MEASUREMENTS

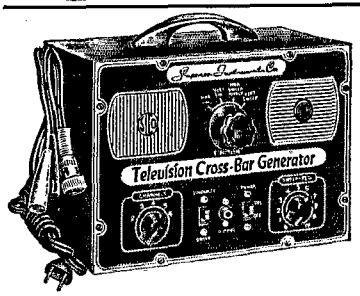
SPECIFICATIONS:

D.C. VOLTS: 0 to 7.5/15/75/150/750/1,500/7,500 Volts • **A.C. VOLTS:** 0 to 15/30/150/300/1,500/3,000 Volts • **OUTPUT VOLTS:** 0 to 15/30/150/300/1,500/3,000 Volts • **D.C. CURRENT:** 0 to 1.5/15/150 Ma. 0 to 1.5/15 Amperes • **RESISTANCE:** 0 to 1,000/100,000 Ohms 0 to 10 Megohms • **CAPACITY:** .001 to 1 Mfd. 1 to 50 Mfd. (Quality test for electrolytics) • **REACTANCE:** 50 to 2,500 Ohms, 2,500 Ohms to 2.5 Megohms • **INDUCTANCE:** .15 to 7 Henries 7 to 7,000 Henries • **DECIBELS:** − 6 to + 18 + 14 + 38 + 34 to + 58

The Model 670-A comes housed in a rugged, crackle-finished steel cabinet complete with test leads and operating instructions. Size 6¼" x 9½" x 4½".

ADDED FEATURE: The Model 670-A includes a special GOOD-BAD scale for checking the quality of electrolytic condensers at a test potential of 150 Volts.

$28.40 NET



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Two Simple Steps:

1. Connect Bar Generator to Antenna Post of any TV Receiver.
2. Plug Line Cord into A.C. Outlet and Throw Switch.

RESULT: A stable never-shifting vertical or horizontal pattern projected on the screen of the TV receiver under test.

Power Supply: 105–125 Volts 60 Cycles. Power Consumption: 20 Watts. Channels: 2–5 on panel. 7–13 by harmonics. Horizontal lines: 4 to 12 (Variable). Vertical lines: 12 (Fixed). Vertical sweep output: 60 cycles. Horizontal sweep output: 15,750 Cycles.

TV Bar Generator comes complete with shielded leads and detailed operating instructions. Only..... **$39.95 NET**

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- ☐ **MODEL 670-A**.....Total Price **$28.40** $7.40 down. Balance $3.50 monthly for 6 months.
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eliminating the polar relay and the external power supply. This change is shown in Fig. 3. The 6SN7 polar-relay-keying tube is replaced by two tubes, each capable of passing 60 ma. of cathode current. In this case the printer is connected in series with the marking-tube cathode circuit; the 60 ma. of current, adjusted by R_7, will directly operate the printer selector magnet.

ARRL Appointments:

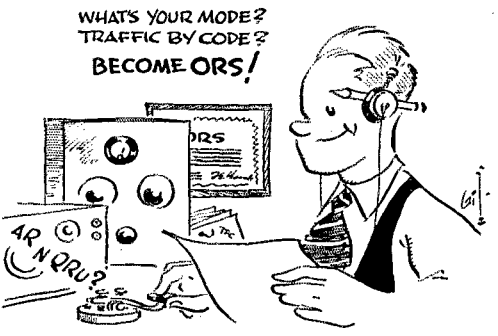
OFFICIAL RELAY STATION

Throughout the history of amateur radio, the c.w. traffic-handler has carved for himself an enviable niche. Traffic-handling has brought high credit to all stations engaged. Early ARRL recognition of the public service and dedication to properly systematized procedures created the Official Relay Station post as the first and basic ARRL appointment.

Today ORS appointment is the most popular of all *station* posts in the field organization. If you enjoy operating c.w. and consistent traffic and net operation, here is something really worth while.

What is it going to cost you? Learning and using standard ARRL operating practices (proper message form, ending signals, abbreviations) . . . keeping a transmitter and receiver in operating condition at all times . . . reporting monthly to your SCM . . . ability to handle the code at 15 w.p.m.

What are you going to get in return? The greatest single benefit is probably the development of operating ability and know-how. You'll find that there's a great deal of satisfaction to be had in being able to efficiently check in on your traffic net and handle your station properly. There's fraternalism in net operating with a group



of top performers. The opportunity to be a part of the ARRL field organization is yours. We get *more* fun and accomplishment as part of an operating team, not from going it alone in casual work. Added to enjoyment is the privilege of participation in the quarterly CD Parties. Late news and operating aids from Headquarters go along with your appointment.

Where can you apply for an Official Relay Station appointment? Your SCM is the one to contact. You'll find his name and address on page 6 of any *QST*. He'll be glad to help you.

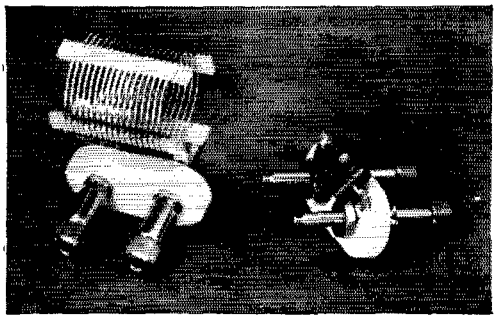
Inexpensive *L* and *C* Standards

(Continued from page 48)

Higher Accuracy

Greater accuracy can be attained by making a few corrections. Since the coil is likely to be closer to exactly 5 μh. than the condenser is to 100 $\mu\mu$fd., the coil can be used as a standard to determine the capacitance of the condenser. The inductance values given by the chart can then be corrected by the factor $100/C$, where C is the actual measured capacitance including the mounting.

In measuring very low values of L or C a correction should be made for the residual inductance and capacitance of the standards and their assemblies. The binding-post assembly alone has a capacitance of approximately 1 μfd., which should be subtracted from the measured value of capacitance if it makes a significant change in the result. The residual inductance of the condenser assembly, as determined by shorting the binding posts (at the holes for the wire connections) with a large metal plate and measuring the resonant frequency, is approximately 0.02 μh., which similarly should be subtracted from a measured value of inductance if it changes the value materially. The lowest self-resonant frequency of the coil by itself is 150 Mc., sufficiently high as not to be important when the measuring frequency is below 50 Mc. When mounted to the binding post assembly the combination resonates at a little over 50 Mc.



Low-cost standards of inductance and capacitance made from readily available parts. They will give sufficient accuracy, without special calibration, for most amateur purposes.

Probably the largest single factor in the overall accuracy is the accuracy with which the resonant frequency is measured. The cramped scale of the average grid-dip meter precludes reading the frequency very closely, and this, together with calibration errors, can cause an uncertainty in L and C values of as much as 10 per cent. This uncertainty can be greatly reduced by using the meter to get a dip — with the loosest possible coupling, of course — then leaving it set at the resonant frequency and picking up the signal in a receiver. The frequency can then be measured by any means the operator has available. For most purposes, however, it is hardly necessary to go to this trouble. — *G. G.*

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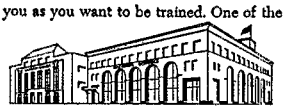

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With famous National Schools Shop-Method Home Training, you learn *by doing*—the easy, practical, interesting way. The way *you* want to learn. We send you many parts – all of modern professional quality. You do lots of practical experiments. You advance day by day, step by step. The free book tells you all about it. Answers all your questions. Use the coupon. And do it now—while you're thinking of it.

ONLY NATIONAL SCHOOLS GIVES YOU THIS PROFESSIONAL MULTI-TESTER!

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This National Schools Home Training course prepares you for many important jobs in the Service. With this training you can get into *special* service classifications—with higher pay and grade—fast!

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National Schools uses its influence and prestige to help you find your place in the field of your choice. We help you start toward the good pay you've dreamed of. Don't put it off! Get the *professional training* you've always wanted! The training *you* should have. Mail the coupon for the facts—today.

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DON'T PUT IT OFF! GET THE BIG SALARY YOU HAVE ALWAYS WANTED!

MAIL THIS COUPON TODAY—WITHOUT FAIL!

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Mail in envelope or paste on postal card

Mail me FREE the book mentioned in this ad. Also a free sample lesson. I understand no salesmen will call on me and that there is no obligation.

NAME _____ AGE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

☐ Vets! Check here if released from service less than 4 years ago.

Unpainted but . . .

(*Continued from page 50*)

made, the bookcase pushed against the wall and the signals started to roll in. From an acoustic standpoint, the 'speaker mounting is adequate for communications quality. Undoubtedly, if an attempt were made to push high fidelity through there would be painful resonances and rattles. A judicious application of Fiberglas or acoustic board on the back of the baffle and on the surrounding surfaces, plus a relief port in the vertical partition, would probably provide a fairly classy loudspeaker system for those who want to hear the highs and lows.

The vertical partition is just a nice thickness to take pilot lamps or switches. There is quite enough depth behind the partition to allow the

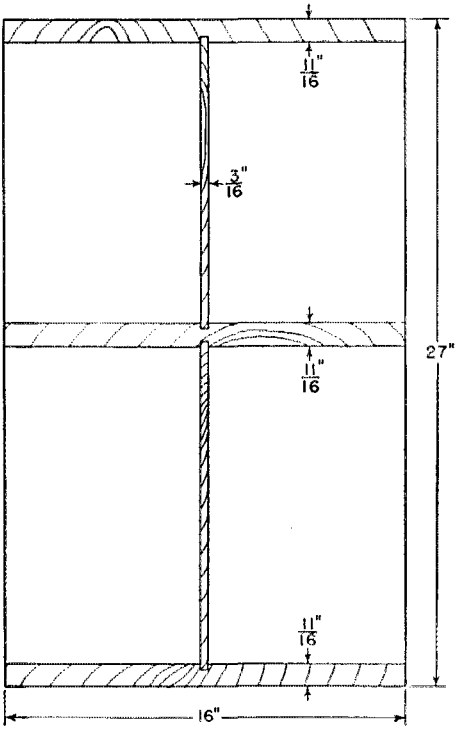


Fig. 1 — Cross-sectional view and dimensions of the double bookcase.

installation of a low-power transmitter, preamplifiers, power supplies, or what have you. The vertical space and shelf width available are just right so that the back half of the bookcase makes an excellent place to stash quite a few bottles of root beer or sarsaparilla if it is not occupied with radio equipment. The top of the bookcase is at a convenient height and places the receiver controls in a comfortable working position.

After a week's operation we got afflicted with the usual amateur disease of not leaving well enough alone. Our particular receiver has plug-in coils sets and the ones not in use cluttered up the

(*Continued on page 124*)

place. The uncompromising black circle of the loudspeaker looked businesslike but not beautiful. A most accommodating wood mill never turned a hair but ran off our minute order while we waited. The bill of material amounted to two pieces ½ by 12⅜ by 7¾ inches, plus eight pieces ½ by ¾ by 3¾ inches, all in pine. The runners are secured in place with brads. The vertical ½-inch partition is fastened with thin wire nails.

That left the 'speaker aperture to deal with. Mr. Woolworth supplied a simple 11 by 11-inch wooden picture frame. The glass was removed and a piece of tapestry substituted for it. The picture frame is set in place and secured by placing the second ½-inch partition in such a position that the picture frame is a push fit. Since the bookcase is never moved and there is no vibration there seemed no point in providing a permanent fastening to the vertical partition. The second ½-inch partition not only serves to hold the picture frame in place but also gives a better balance to the looks of the thing and, incidentally, storage space on the top shelf for a few books.

The total cost of this rigging left almost five dollars change from a twenty-dollar bill. Exclusive of the time spent shopping, the total expenditure of man-hours was a little less than two. Yes! Someday it will be painted. The ebony OM and XYL on top of the receiver are refugees collected in OQ-land and are not essential to the design.

As it is now used, the bookcase is set flush against the wall. It could also be used, as was the original intent of its design, as a piece of furniture located out in the room away from the walls. In this case, the back of the 'speaker would need to be hidden by a box or the whole back of the bookcase closed in with a piece of plywood. It is dubious that the arrangement would ever find a place in a "better home" magazine but it does provide an acceptable, inoffensive, and — above all — inexpensive solution of the problem of providing an effective roosting place for the communications receiver.

Hints & Kinks

(Continued from page 66)

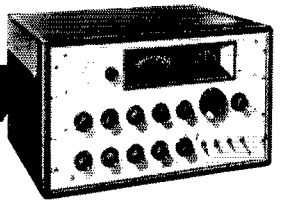
If the auto radio uses variable capacitors for tuning purposes it is possible to modify the tuning range merely by inserting a capacitance of approximately 100 $\mu\mu$fd. in series with the leads to the variables. This system does not permit complete coverage of the b.c. band and the sets we have worked with tuned 1100 to 2000 kc. after the revamping and the alignment had been completed. — *Fred Nazar, W8RNA.*

Now at NEWARK

THE NEWEST IN HAM EQUIPMENT

THE LATEST FROM hallicrafters

THE *New* HT-20

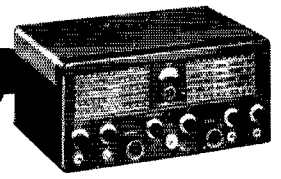


HT-20 TVI SUPPRESSED MULTI-BAND TRANSMITTER

A complete new transmitter that incorporates all the Hallicrafters ingenuity and craftsmanship and practically eliminates "TVI" interference. Covers 160-10 meters. Delivers clean signals on both phone and CW. Power output for AM is 100 watts; for CW—115 watts. Uses bandswitching exciter and continuous-tuning final amplifier. All spurious outputs are at least 90 db below rated output. All control leads are filtered thoroughly. Pi-network tank circuit is followed by 4-section low-pass filter. dial and meter scales are covered with metal screening. 10-position crystal selector switch has additional positions for external VFO. Single meter with 8-position switch checks all stages and provides output tuning indication. Tube lineup. 6AH6 osc.-buffer, 6L6 buffer-doubler, 4D32 final amp., 6SL7GT speech, 6K6GT driver, 2-807 modulators, 5U4G L-V rectifier, 2-5R4GY H-V rectifiers, 6BL7 bias rectifier, 6AL5 RF carrier rectifier. Sizes: 20½x11¾x16¾". With tubes, cabinet and instructions. For 105-120 volts. 50-60 cycles AC. Wt., 130 lbs.

98F022. NET..... 449.50

MODEL SX-71



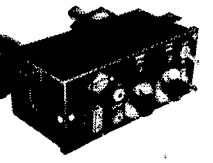
DUAL-IF RECEIVER

A top-notch receiver. Has double superheterodyne circuit above 4.6 mc to provide extra selectivity and image rejection. Includes Narrow Band FM reception, as well as AM and CW. Provides continuous AM reception from 538 kc to 35 mc, and 46 to 56 mc. Five-range selector covers: 538-1650 kc, 1600-4800 kc, 4.6-13.5 mc, 12.5-35 mc and 46-56 mc. Built-in limiter and balanced detector stages for hiss-free Narrow Band FM reception. Double conversion (2075 and 455 kc IF channels) gives image rejection of better than 300 to 1 at 28 mc. One RF, two conversion, and 3 IF stages yield high gain for sensitivity in the order of .7 microvolt. 2½ kc selectivity with 11 tuned circuits. Audio peaked for communications frequencies, with 3 watt output. Has extra-wide dials for Main and Bandspread tuning. Controls: 3-step Crystal Filter with Phasing; RF; AF; Tone; BFO On-Off/Pitch; Limiter; Send/Receive Switch; AM/Narrow Band FM Switch. Has universal antenna input, "S" meter, 500-ohm speaker output, phone jack, external power socket and remote send/receive terminals. Circuit uses: 6BA6 RF, 6C4 oscillator. 6AU6 mixer. 6BE6 2nd conv., 3-6SK7 IF, 6H6 ANL—delayed AVC; 6SC7 BFO/1st audio, 6AL5 detector and 6K6GT audio output. Also has VR150 regulator and 5Y3GT rectifier. Satin black cabinet with chrome trim, hinged top. Size, 18½x8⅞x12". For 105-125 volts, 60 cycles. With tubes, less speaker,

98F008. Shpg. wt., 33 lbs. **NET..... 224.50**

Write to Department T-13

MARMAX

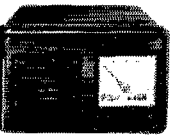


MODEL MT-52 TRANSMITTER

Compact multi-band mobile or fixed phone-CW transmitter. Tube complement: 1-6AG7, 1-6Q6GT, 1-12AU7, 1-6J6. Power requirements: 2.9 amperes @ 6 volts DC. Peak power rating of final stage: 50 watts. Size: 3½" high, 8¼" wide, 9" deep. With tubes and 10 meter coils. Wt., 2 lbs.

97F190. NET..... 79.50

POLICALARM

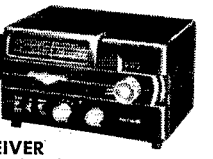


MODEL PR-31

Covers 30-50 mc. For police, fire and emergency calls. Superhet circuit uses ratio detector for quiet operation under "no signal" conditions. Sensitivity better than 10 microvolts. Drift compensated. With 5" speaker. Requires 6 to 8 ft. vertical wire antenna. Walnut plastic cabinet, 11x6x6". 110-120 v., AC-DC. Shpg. wt., 8 lbs.

98F101. NET..... 44.95

NATIONAL

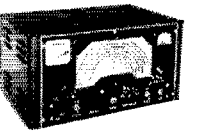


MODEL SW-54 RECEIVER

Outperforms receivers twice the size and twice the price. Covers entire frequency range from 540 kc to 30 in 4 bands. Police, Foreign, Amateur and Ship bands clearly marked. Unique plastic bandspread dial is adjustable to assure logging accuracy over entire range. Built-in speaker. Size, 11x7x7". Wt., 15 lbs.

98F318. NET..... 49.95

LYSCO



MODEL 600S TRANSMITTER

Latest from Lysco—a newly designed all-band TVI-suppressed transmitter. Operates on 160, 80, 40, 20, 15 and 10 meter bands. Temperature compensated. Uses 6AG7 oscillator, 6AG7 buffer, 807 amplifier, 5U4G rectifier. Power input, 35 watts. Black wrinkle-finish steel case, 17x9x11". Wt., 50 lbs.

97F040. NET..... 189.95

NEWARK ELECTRIC COMPANY

223 W. MADISON ST. CHICAGO 6, ILL.

Just Out!

NEWARKS NEW CATALOG NO. 55

FREE!

YL News

(Continued from page 49)

tubes and coils." . . . The Long Island YLRL announced membership in the Federation of L. I. Radio Clubs. Pres. W2JZX, Vi, expects a membership increase as a result of her on-the-air code practice. . . . W3LSX, Kay, has her transmitter checked out and will be on forty again as soon as she finishes work on a new antenna tuner. . . . W6HTS, Mildred, reports that the W6 YLRL 75-meter net which meets Wednesdays at 0900 attracts a number of girls, plus an occasional OM.

The first VE2 YL to work the U. S. on Six! Stella Belanger, VE2AOB, sparked interest in the 50-Mc. band among Quebec hams and a growing group is converting transmitters and receivers, proving they can get out with low power. Stella uses a 6F6 VFO, 6V6 buffer, an 807 in the final, and an SX-42 receiver. (We could use more W YLs on Six, too!)

KZ5DG, Sec. of the C.Z. QRMarys reports that eleven KZ5 YL contacts are still necessary for a certificate. KZ5LJ, Jeanne, the twelfth YL in the area, is not yet back on the air. Thus far only OMs have received certificates issued Stateside, so gals who work ten are urged to get busy. . . . N's have been dropped from the calls of W9s QYG SEZ SJR and SYX. . . . To keep pace with her OM's numerous hobbies, W9FZO, Helen, has taken up flying. . . . Thirteen-year-old W1TTE, Carolyn Bradley, of Marblehead, Mass., is on ten regularly. . . . New officers of the LARKS of Chicago are W9LOY, Chris, Pres.; W9MYC, Gladys, V.P.; and W9SJR, Bernice, Sec.-Treas.

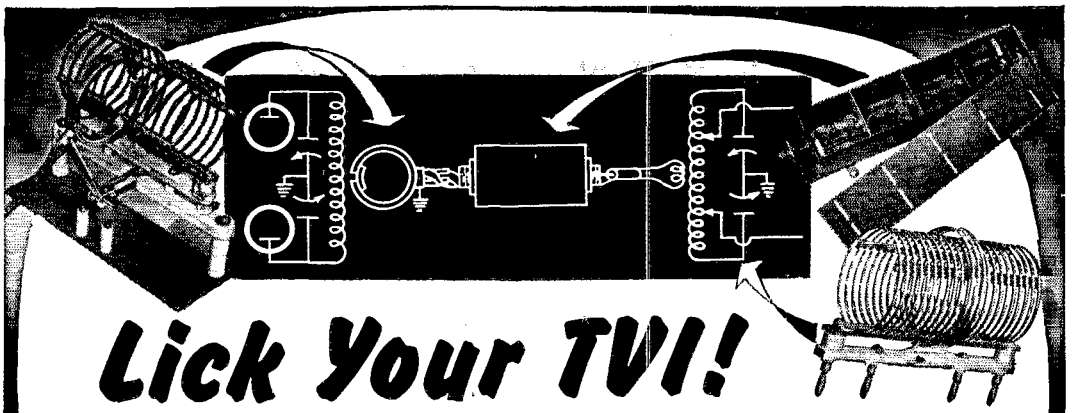
—•••—

Miscellany

We point with pride to the new Assistant Communications Manager, 'Phone, of ARRL — a YL — Ellen White, W6YYM/1. Ellen's OM, W6YYN/1, is Assistant Communications Manager, C. W., and the two are now living in Bolton, Conn., where they hope soon to "grow an antenna farm" and work all bands. Ellen, who is also handling the ARRL Training Aids program, reports that she is enjoying her new work very much.

—•••—

She's Harriett Sanders, she's from Texas, and she's the YLRL Fifth District Chairman, W5NES. Almost enough said — but we should tell you that she operates ten and seventy-five regularly, and that she's a faithful member of the South Texas Emergency Net. The OM (alas, fellows, there is one) is W5NET. Harriett echoes the appeal of other District Chairman for more news for *Harmonics.*



Lick Your TVI!

Most cases of TVI caused by harmonics and spurious radiations can be reduced to a negligible minimum.

In planning a new rig, the best bet, of course, is to use precision-made B&W components—from oscillator to final including antenna coupler. Filtering and shielding recommendations in our "*Filter Facts*" booklet show what to do, how to do it.

Should your present rig be of fairly good design, a few minor changes as outlined in "*Filter Facts*" plus installation of B&W low-pass filters and Faraday shielded links will effectively throttle TVI. Many hams have proved it!

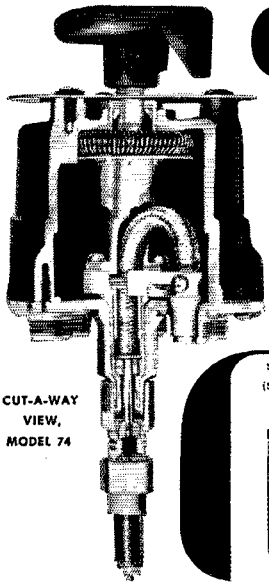
Send 15c today for a copy of "*Filter Facts*" giving details on how to lick your TVI and get silent rigs back on the air!

B&W Low-pass Filters, Models 52 and 75 Amateur net $27.00.

B&W

BARKER & WILLIAMSON, Inc.

237 Fairfield Ave. Upper Darby, Pa.



CUT-A-WAY VIEW, MODEL 74

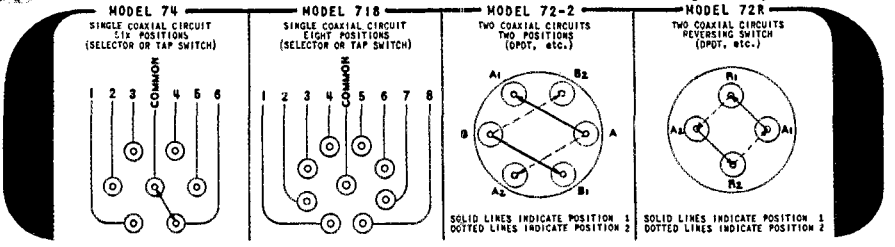
COAXWITCH COAXIAL SELECTOR SWITCH

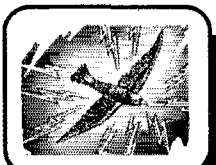
50 Ohms – Type N Connectors – Manually Controlled

Low VSWR – 4 Models

The COAXWITCH is an RF switch for use in coaxial circuits where it is important that the 50 OHM impedance of the cables be maintained. In a circuit sense, this switch consists of two pairs of "N" connectors spaced 4½" apart using RG-8/U as the connecting link. The COAXWITCH itself introduces no VSWR other than that of connectors. Characteristic impedance is maintained thru all switch details. Cut-away view shows that shield as well as center conductor is switched. Beryllium copper contacts, on the gooseneck, mate directly with male "N" (Type UG-21B/U) connectors, which connect directly to back plate of switch. Since all connectors come out in line with axis of switch, right angle connectors are usually unnecessary.

Literature Gladly Sent





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U. S. N. R.

ARRL Roanoke Convention

The Naval Reserve was well represented during the ARRL Roanoke Division Convention on October 11, 1952, at Richmond, Va. Capt. R. R. Hay, USNR, W4LW, represented the Director, Naval Communications. Cmdr. E. J. Beall, USNR, W6BVY/4, and Cmdr. G. W. Bartlett, USNR, WN4YEV, Reserve Electronics Program officers, represented the Commandant, Fifth Naval District. The Fifth Naval District Reserve Electronics Program office furnished an exhibit consisting of an SCR-299 mobile communications van. This equipment was set up near the convention headquarters and operated on amateur frequencies using the call W4USN/4. Other Reservists attending the convention included: Cmdr. R. E. Coleman, USNR, W1NK; Cmdr. Karl R. Medrow, USNR, W3MCG; Ethel Mae Smith, RMN3, USNR, W3MSU; and C. E. Van Pelt, RMN1, USNR, W4LRI

ARRL San Diego Convention

The Naval Reserve took an active part in the ARRL Southwestern Division Convention held at Balboa Park, San Diego, Calif., October 11–12, 1952. Cmdr. James C. Picken, Jr., USNR, K6DY, District Reserve Electronics Program officer, represented the Commandant, Eleventh Naval District and the Chief of Naval Operations. Cmdr. Picken was a member of the convention committee as well as a member of the Amateur Radio Emergency Corps of San Diego, which sponsored the convention. Two communications vans were set up and operated on amateur frequencies using the calls K6NCB and K6NRT. A communications jeep furnished mobile directory service on the 75-meter 'phone band for out-of-town amateurs. A Naval Reserve radioteletype circuit between San Diego and Long Beach was demonstrated during the convention.

Reading, Pennsylvania, Fair

During the month of September 1952, the Naval Reserve Training Center, Reading, Penna., set up an exhibit at the local fair consisting of an SCR-399 mobile communications van. Messages were accepted for transmission to service personnel throughout the world. K3NRR/3, operating from the Fair, was assisted in handling traffic by W3STJ/3, operating from the training center. Cmdr. S. J. Hopkins, USNR, W3STJ, Inspector Instructor of the training center, was in charge of the exhibit.

Pennsylvania Week

During Pennsylvania Week, October 13–18, 1952, the Naval Reserve Electronics Program office of the Fourth Naval District set up an exhibit on Reyburn Plaza, near the city hall in Philadelphia, Penna. This consisted of an SCR-299 communications van operated by J. B. McGettigan, RMN, USNR, W2VZM. Messages were sent to service personnel in the U. S. and overseas via amateur radio.

The most noteworthy message was one sent by the Mayor of Philadelphia to the Supreme Allied Commander in the Far East, General Mark Clark.

Here and There

—•••—

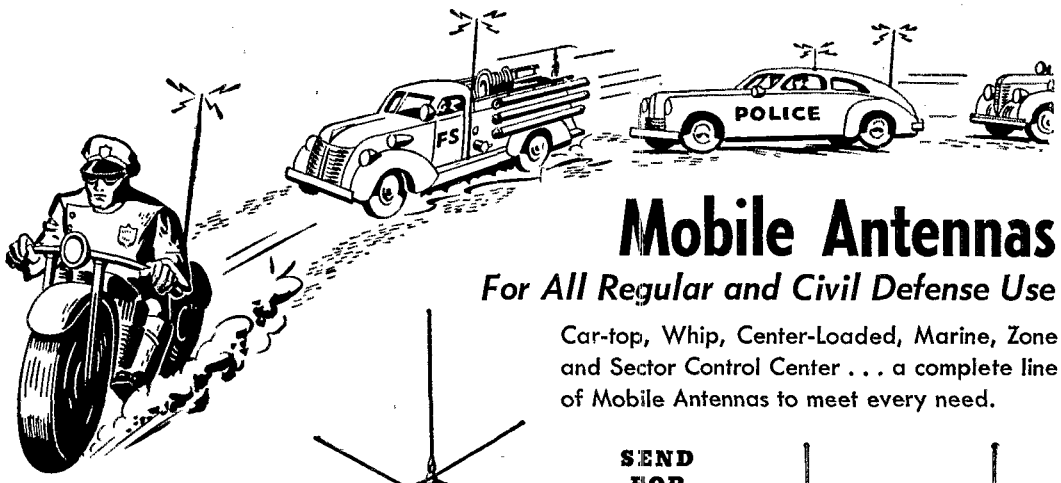
Arthur W. Louis, W5MMO, a member of Organized Electronics Company 8–22, Bellville, Texas, is one of the operators at K5NBF of the same unit.

—•••—

Lt. Cmdr. John A. Frey, USNR, W1EFQ, recently returned to inactive duty after serving for the past two years as Communication Officer of the *USS Block Island*.

—•••—

Lt. Cmdr. Norton C. DeWolfe, USNR, W6CBX, is Commanding Officer of Volunteer Electronics Company 12–8, Redwood City, Calif. The call K6NRN is assigned this unit.



Mobile Antennas

For All Regular and Civil Defense Use

Car-top, Whip, Center-Loaded, Marine, Zone and Sector Control Center . . . a complete line of Mobile Antennas to meet every need.

Special 75, 40, 20, 11, 10, 6 and 2-meter Mobiles for Civil Defense and Amateur installations.

Ground Plane Antenna used in Civil Defense Zone and Sector Installations.

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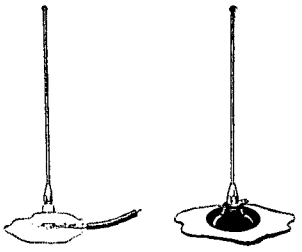
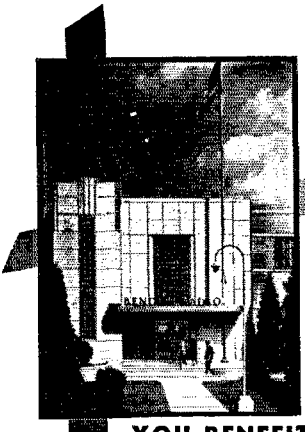


At the left, one-hole-mounting car-top, and at the right emergency suction-clamp car-top antenna for 100 to 250 mc.

PREMAX PRODUCTS
DIVISION CHISHOLM-RYDER CO., INC.
5302 HIGHLAND AVE., NIAGARA FALLS, N. Y.



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YOU BENEFIT AT BENDIX RADIO: from high wages, a modern, air-conditioned plant, paid vacations and holidays, group insurance and a good chance for advancement.

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BALTIMORE-4, MD. Phone: TOWSON 2200

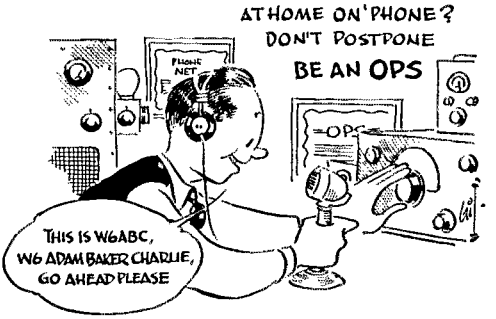
ARRL Appointments:

OFFICIAL 'PHONE STATION

This is for you if you *really* take pride in that 'phone signal you put out on the air! This is for you if you use your mike more than your key. What's for you? . . . appointment as OPS!

That certificate makes a fine-looking addition to the wall of your shack, doesn't it? It represents your desire to learn and to *use* message and procedure standards recommended by the League. It means you follow circuit precautions to ensure the stability of your signals and the cleanness of your modulation. It marks you as an amateur interested in the support of your Section Net.

The 'phone man so appointed has added responsibilities to the general public. Impressions of amateur radio are to a great extent the result



of reception of amateur 'phone conversations. Correct practices create favorable public impressions, and the OPS appointment is in recognition of such intent and practice!

An OPS is entitled to wear the distinctive blue ARRL pin, he receives bulletins directly from Headquarters with late news and operating tips. Along with all station appointments comes the opportunity to take part in the quarterly CD Parties. The obligation to report to the SCM monthly assures that the group organization stays one of *actives*, one that you can be proud to belong to.

Sound like an appointment you'd like to hold? If so, turn to page 6 now and write the SCM of your section. He'll be happy to send you the necessary application forms, and arrange to get you started on the way to being an OPS.

Answer to **QUIST QUIZ** *on page 10*

He should report it to ARRL headquarters, but not before he has checked to make sure that it isn't an "image" in his receiver. If a receiver has poor image rejection, and the oscillator is on the high-frequency side, images from the 15-Mc. b.c. band can be heard in the 20-meter band.

To check for an image, one can wait until an amateur signal comes on and heterodynes the suspected image. If it is an image, tuning the receiver slightly will change the pitch of the heterodyne. This doesn't happen, of course, if both signals are actually in the band. Another test can be made by using the crystal filter and the b.f.o., setting up the receiver for single-signal c.w. reception. Amateur signals in the band will give a beat note on one side of zero beat (depending upon how the b.f.o. is set) but images will give a beat on the other side.

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.

MOTOROLA used communication equipment bought and sold, W5BCO, 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 WØKXL, 1507 Central Avenue, Kansas City, Kans.

QSLS, SWLS. America's Finest! Samples, 10¢. C. Fritz, 1213 Briargate, Joliet, Ill.

QSL'S, SWL'S. Super-gloss. 10 colors. Four card stocks. Seven styles Samples, 10¢. Almar Printing Service, Farragut, Iowa.

QSLS: Fluorescent QSLs radiant and glowing with quality-control. QSLS Kromekote three colors and up. Rainbow maps. DX QSLS. Samples rushed. 10¢. Uncle Fred, Box 86, Lynn, Pa.

QSL Samples 10 cents, Minner, W1SQF Press, Candia, N. H.

WANTED: Cash or trade, fixed frequency receivers 28-42 Mc. W9VTV, Troy, Ill.

QSLS, SWLS. High quality. Reasonable prices. Samples. Write to Bob Teachout, W1FSV, 40 Elm Street, Rutland, Vermont.

WANTED: Marconi multiple tuner, coherer, spark coil, magnetic detector, etc.; DeForest responder, coherer and other early equipment; Marconigraphs. Modern Electrics; Electrical Experimenter and early Call Books and text books of wireless. Franklin Wingard, Rock Island, Illinois.

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.

NEED: QST for December 1915 and May 1916. Will pay any price. Have hundreds of old call books, radio catalogs, text books, ARRL Handbooks and 2000 issues of QST and CQ to sell or trade for what? Holst, W9MD, 2553 Winnemac Ave., Chicago 25, Ill.

WANTED: All types of aircraft radios, receivers and transmitters. Absolutely top prices. W2KUW, 308 Hickory St., Arlington, N. J.

WANTED: Top prices paid: Navy selsyns 1 DG, 1F, 1CT, 5CT, 5D, 5DG, 5G, 6G, 7G, etc. and BC-348, BC1221, AN/ART-13, AN/-ARC-1, AN/ARC-3, RTA-1B, AN/APR-4. Lectronic Research, 719 Arch St., Philadelphia 6, Penna.

WANTED: BC610 or BC610 parts or components. State price and condition by letter. C. Porter, 8545 11th Ave., Silver Spring, Maryland.

FOR SALE: Collins 32V2 with extra 4D32, Collins television filter, Collins 75A1, 90 day Parts guarantee, bonded by local bank. All perfect, $700. F.O.B. Jacksonville. Dr. Nelson A. Murray, W4MBM, P. O. Box 6286, Jacksonville 5, Florida.

WANTED: Summer Camp Counselor to teach radio in Jackson Hole, Wyoming ranch camp, (Boys and girls), maintain radio equipment, keep contact with pack trips. Also able to do other things such as trail cooking, or music, or campfire programs, etc. Single man or married (no children) if wife is nurse or can assist with ranch program. Contact W. S. Wilson, 2619 Oak Knoll Avenue, San Marino, California.

RADIO amateur and commercial license preparation. International Morse code transcribed on magnetic tapes, recording wire and long playing microgroove discs. Disc-A-Method Recording Company, 317 East 48th St., New York, N. Y.

CONVERTERS, crystal controlled, specifications now available. Transmitters, two meter phone, pre-assembled kits, $34.50. LW Electronic Laboratory Route 2 Jackson Michigan.

10, 15 and 20 meter beams, aluminum tubing, etc. Perforated aluminum sheet for shielding. Radcliff's, 1720 No. Countyline, Fostoria, Ohio.

ELECTRONIC blanket controls, useful for remote control purposes or component parts. Contains: plate relay, 6.3 filament transformer, switch, 3 tubes, sockets, resistors, condensors. Complete with cabinet and diagram. $5.00 postpaid. John Randolph, W4QA, 100 Westwood Place, West Asheville, N. C.

WANT: ARC-3, ARC-1, ART-13, APR, APN, ARR, TCS, RAO, DV-12, DV-17, DV-21, SCR694, BC-1306, PE-237, GN-58, GN-45, TRC, FRC, GRC, BC-639, RA-42, RA-34, RA-62, BC-639, BC-342, BC-312, BC-348, BC-221, BC-610-E, BC-614, BC-729, BC-939, Panadaptors, Teletype equipment, parts, relays, 215, 255; Technical manuals. Arrow Appliance Co., Box 19, Boston 1, Mass. Tel. Lynn 8-3100.

FOR Sale: Reasonably priced transmitting and receiving equipment. BC-221 complete; BC-458, new; I-222A signal generator. Miscellaneous parts, tubes, power and filament transformers, microphone new, etc. Write for complete list. W2CUZ, D. B. Whittemore, 36 Masterton Rd., Bronxville 8, N. Y.

NEW YORK City and vicinity, for sale: BC348Q, $75.00; 2 Mtr. T-23 ARC5 xmittr, $30.00; Master Mobile 2 Mtr. coaxial dipole, $8.00; Tecraft 2 Mtr. Cascode converter, $33.00; Eldico Griddipper, $20.00; BC-453, $20.00; or complete: $175.00. W2ZVT, Palinkas, 335 E. 69th St., NYC, N. Y. Phone: TR 9-2120.

OSTS, June 1938 to June 1940 complete. Excellent condition. Best offer. Thomas M. Cassidy, Box 727, Latham, N. Y.

QSLS. Lee's. 617½ 6th Ave., Council Bluffs, Iowa.

HY-LITE 3-element 10-meter beam, 3-element 20-meter beam; T-match, 75 meter doublet with B&W connector. Antennas all fed with RG-8-U coax relay. Proppitch rotator with power supply. P.P. 813 final as per Handbook. KW oil-filled modulation transformer. S-76 Hallicrafters Lysco 600 V.F.O., TBS 50 C. W1ERX, 494 Atlantic St., Stamford, Conn.

BG610-D with Bud KW coils in final and BC614E speech amplifier $500.00. Collins 32V2 with spare 4D-32, $500; NC-183 and speaker, $200.00. W5RGC, 419 S. College, Springfield, Ill.

FOR Sale: Johnson Viking I, with all tubes, $200. Hallicrafters SX-71 receiver, with R-46 speaker, $150. All in excellent condition. D. N. Hingtgen, WØWIG, 2846 Jackson Street, Dubuque, Iowa.

WANTED: Schematic for BC224F receiver. For sale: Hallicrafters S-51, $90.00 or will trade on HRO50 with rack. G. Nelson Funkhouser, 1'. O. Box 303, Waverly, Va.

FOR Sale: 118 foot 13 inch triangular steel tower, base insulated, three sets of three guys broken up in 10 ft. insulators. Perfect condition. Two men can take down in two days. In place as is, $500. Photos on request. W1CPI.

BARGAINS: Workshop 3-el. 20-meter beam, original crate, $90 F.o.b.; famed XEC West Coast "DXman's" VFO, matching power supply, both for $35; 36-ft. 3-legged all-aluminum tower, brand new, weight 50 pounds, ideal v.h.f. antennas, $60 F.o.b.; BC-342 receiver, A-1, unmodified, $95; matched set 25 high-grade crystals, 3500-3575 Kc., ideal for xtal "VFO," $40. W1CEG, 183 Daly Ave., New Britain, Conn.

SALE: 522 2-meter transmitter, $40.00, complete with power supply and crystals. Worked Virginia to Conn. Converter parts given along. John Gotwals, 238 W. Broad, Souderton, Penna.

WANTED: 32V2 in A1 condition; state price. Bert Goldsmith, 26 Blake Terrace SE, Cedar Rapids, Iowa.

WANTED: All types of receiving and transmitting tubes. Surplus receivers and transmitters. Williams Electronics Co., 168 Washington St., New York City.

WANTED: Navy Selsyns, types 1DG, 1F, 1G, 1CT 5F, 5G, 6G, 7G, etc. Autosyns: AV1, AV101D, AV201, etc. Tubes, test equipment, Signal Corps Equipment. Send Lists. Top prices. Electro, 110 Pearl St., Boston, Mass.

QSLS: Samples free. Big 118 page catalogue, 25¢. "Brownie," W3CJI, 3110 Lehigh, Allentown, Penna.

SELL complete mobile installation, Elmac transmitter, converter, dynamotor, etc. Tape recorder, NC125, BC221, BC459, 813's, 829B's. W9BHV, 857 Burlington Ave., Frankfort, Indiana.

SALE: Millen exciter, tubes and coils for 20 and 80. Like new, $25. Dynamotors, as sold by B&A, 6v in, 425v at .375A out, 2 new 1 used, $10 each, or all for $25. BC-453 Q-5er, good $10. W9RQX, Box 147, Macomb, Ill.

ERCO mobile mitter 76 8 mc xtal osc, 6V6 multiplier, 6L6 output, 6C5 speech, 6A6 modulator, 30 Mc band, 400 volt 175 mil Pioneer dynamotor, good used condx $45. Hallicrafters HT-12 marine radiotelephone, 10-channel 50-watt AM xmitter and xtal controlled recvr Ideal complete station for 160 or 75 meter net. With tubes and book, less crystals, good used condx, $150. 2-channel 6-volt 5-watt marine radiophone, has BC recvr band. Workable as complete emergency rig 160 or 75, good used condx, $35. Robberson, W2FRQ, 44 Sintsink Drive East, Port Washington, N. Y.

SELL K.W. final in 66 in. deluxe rack. Parts for K.W. Power supply. Best offer. SX24, $49.50. M. M. Bernstein, W2KNT, 38 Dorchester Dr., Manhasset, L. I., N. Y.

SELL: Hallicrafters S38R. Perfect condition, $33.00. A. H. Hardwick, W2YQ, Orange, N. J.

FOR Sale: Carter Dynamotor, new and unused, in original carton, 6 volts input, 400 volts 375 mills output. $35.00. W. M. Jackson, W4ILZ, Box 51, Savannah Tenn.

FOR Sale: Lysco 600, new condition, $125.00. Reason for selling: have another transmitter. Also GO-9 surplus transmitter, complete with schematic, $40. One hf side of GO-9 transmitter, $20.00. Various surplus tubes, filter chokes, transformers, meters. Lowell Powell WN4VSJ, P.O. Box 128, Ahoskie, N. C.

DON'T Fail! Check yourself with a time-tested "Surecheck Test," similar to the F.C.C. tests. Novice, $1.50, General, $1.75. Amateur Extra available soon. Amateur Radio Supply, 1013 Seventh Ave., Worthington, Minn.

WANTED: Selsyns and syncros. Top dollar paid. Write full descriptions to: Box 84, Babson Park 57, Massachusetts.

QSLS? State-map? Rainbow-map? Modernistic? Cartoons? Variety QSL samples, 25¢. "Rus" Sakkers, W8DED, Holland, Michigan. Subscriptions, renewals appreciated to all radio magazines.

WANTED: Detroit, Grosse Pointe ham to coach stupid middle-aged man at reasonable fee for general class ticket. Knows code but bogged down on theory, etc. John Messler, 8905 East Jefferson, Detroit 14, Mich. Tel. VA 1-0628.

SELL: Teletype midget printer, model 21A, Model 12 page printer, distributor motor, control panel relay, miscellaneous parts, teletype tape transmitter. Will trade. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. (Richmond 2-0916).

10, 15 & 20 meter beams, aluminum tubing, etc. Perforated aluminum sheets for shielding. Radcliff's, 1720 North Countyline St., Fostoria, Ohio.

SELL: Plate, filament, driver, modulation transformers; chokes, filter condensers; complete power supplies; disc recording, playback equipment, tube checker, 19 in. racks, cabinets, panels, chassis; microphones, pickup, speakers; variable, vacuum condensers; 6 volt Wincharger; MB-150, Lester 6-10-11 converter; Stancor 110-C transmitter, 100 watts fone, cw, all bands; BC221, Signal Shifter; field strength, modulation, panel, multimeters; Heathkit 'scope condenser checker; BC348-R; transmitter, receiving tubes; National 1-10 receiver; many other items. Everything guaranteed okay, request listing, valuations. Howard O. Severeid, W9DPL, 2431 East Riverside Drive, Indianapolis 23, Ind. Tel: Winthrop 2184.

SELL: 70 watt, 75 meter transmitter, ARC5, VFO, 40 watt modulator, also 15 tube Patterson communication receiver. Must sacrifice. John Gable, 45 Chestnut St., Binghamton, N. Y.

COLLINS 75A2 and speaker, new in carton, $360; Meissner EX Shifter, new, $50.00; 813 new, $5.00; modulation xfrmer, 200 watt Multimatch, new, $20, Kw power supply components. W4SOR.

WANTED: AVT-112A aircraft transmitter. State condition and price. Jay M. Suter, Park View, Box 49, Harrisonburg, Va.

QSLs by Petty, W2HAZ, 17 Southard, Trenton, N. J.

W3TEC is interested in a 220 Mc transmitter and power supply around 100 watts. What say, fellas? 2227 Gtn Ave., Phila. 33, Penna.

MOBILE xmitter, 12 watts, bandswitching 80 thru 10, $20.00. W6RET, 550 So. "G," Oxnard, Calif.

WANTED: AN/APR-4, APR-5A, ARC-1, ARC-3, ART-13, etc. TS-12 and other "TS-," particularly microwave equipment, even salvage; VHF frequency meters and signal generators; quantities of 723A/B. 3C22, etc., tubes; any laboratory equipment. Top cash or swap; rush! Engineering Associates, 434 Patterson Road, Dayton 9 Ohio.

WANTED: Baldwin mica diaphragm type headphones. W1BB.

1N34 diodes prepaid USA, 7 for $4.65; screw driver set, 6 pcs., plastic handle, hardened and tempered steel, 98¢. Sell your surplus tubes and equipment. Free Tabogram, "TAB," 111 Liberty St., New York 6, N. Y.

4D32 new, $20; Heath grid dip meter, $32.50; Heath A8-A 20W, Hi-fi amplifier, $49.50; Heath V-6 VTVM, $39.50; Meck T-60, $49.50. W5AXI.

SIMPLE conversions, surplus dynamotors, $1.00. Kujampaa, Box 72, Revere, Mass.

SALE: Transmitter BC-1072A, new, 150–200 Mcs, 115V AC operation. Tubes, One 6J5, one 807, one 2X2/879, one 9002, one 6SN7GT, two 5U4G, two 826, two 9006, same listing over $40.00. Contains Variac, milliammeter, AC blower and many other parts. Price: $29.50. W3CZE, 418 10th St., NW. Washington 4, D. C.

SELL: ARC-5 2-meter rcvr, converted for 6 volt operation with tubes, less power supply. Best offer. WØNJP, Richmond, Mo.

SEASON'S greetings from "Bake," WØFIR, ex/W9FOR. Almost anything you need for ham radio at bargain prices. List. Stamp. Indicate your needs. 5049 Murdock, St. Louis 9, Mo.

QSLS! QSLS for OMs! QSLs for YLs! Samples, 10¢. Tooker, Drawer T, Lakehurst, New Jersey.

FOR Sale: QST 1935 to date. Perfect condition. $1 per volume. W2RKR.

10-meter Motorola FMT-30-DMS with power supply, cables, control head, mike, mounting hardware, test meter and instructions. Never used. $100.00; Gonset Tri-band, $35.00; Drake 10 meter lo pass filter, $4.00; Eldico line filter, $4.00; Bliley CCO-2A with tube and xtal, $7.50; T-17-D, $1.00; mike desk stand, $1.00; Gooseneck, $1.00; Master Mount small body mount and 8 ft. whip, $6.00. Fred S. Eggert, W8FIL, 11833 Wisconsin, Detroit 4, Michigan.

WANTED: Book "200 Meters And Down" for club files. Give condition and price. W4WT, 1227 Windsor Ave., Richmond, 27. Va.

MILLEN R9er and Vibroplex bug, nearly new, $25.00. Mitchell, W6MTM, 621 Palisade, Pasadena, Calif.

NC-57 rcvr, $60.00. H. Rett, 14 W. Elm, Chicago 10, Ill.

FORT Wayne opening features stock of new popular brand parts offered at less than half regular net cost. Gene Van Sickle, W9KJF, (formerly of Indianapolis) purchased this stock from one of the largest distributors in the country who quit the amateur business. Example: "HF" variables 25¢ and up, new boxed 8005's, $2.95, speed keys, $5.95 up. See this new electronic headquarters, Van Sickle Radio Supply Co., 1320 S. Calhoun, Ft. Wayne 2, Ind.

BC-348, for sale, converted to AC, in excellent operating condition, practically new. Universal output transformer. Cheap. W5UOD, R. L. Deming, Box 1663, Los Alamos, New Mexico.

TRADE gear for 2¼ x 2¼ camera, two burner cook-stove. List. Ferguson, 258 Home Ave., Graham, N. C.

FOR Sale: Presto model V disc recorder, five months old, complete with amplifier, 25 red label audiodiscs, Shure model 55, dynamic microphone with stand and 2 cutting needles. Will take HQ-129X part trade. Price $400.00. C. G. Crider, Jr., W3HTO.

VOLTOHM Milliammeters, pocket size, AC-DC ranges 750 V 150 V and 15 V; 150 Ma. and 1 mgohm, $8.75. W2OXR. R. Gross, 11 Belmont Terrace, Staten Island 1, N. Y.

FOR Sale: 8 tube superhet built exactly as shown in later editions of ARRL Handbook. Complete with power supply, coils for 80 and 40 meters. Best offer over $45. Also Eico A200 signal generator for best offer. Write W2INY. 206 West 9th St., Elmira Heights, N. Y.

CRYSTAL lapping machine complete with carriers, plates and motor, ready to grind crystals; trade for BC-221 or LM frequency meter, or BC-348 rcvr or equivalent. Dave Williams, W5AJP, Box 915, Bartlesville, Okla.

WANTED: Collins 30K-1 or Kw-1 transmitter. S. Leon Oser, W1RMS, 198 Euclid Ave., Waterbury 10, Conn.

MEISSNER Signal Shifter with modulator, NC100, and most components of 500 watt rig (including Class B transformers). All for $250.00 or will swap for exceptionally good receiver such as HRO, Collins, etc. T. Skoglund, W1TBH, No. Porchuck Road, Greenwich, Conn.

WANTED: Technical data on McMurdo Silver Masterpiece VI receiver, schematic diagram or photostat. Edmund B. Lemon, W4UJW, 3206 Oakdale Rd., S.W., Roanoke 15, Virginia.

FOR Sale: SC10 or BC1016 code recorder with many spares, $60.00. Will take offer. W8JKQ, 620 Fourth St., N.W., New Philadelphia Ohio.

150 Watt WRL Globe Champion coils seventy-five through ten meters. In good condition. Less key and mike. Cash: $295.00. You pay freight from W7HLF, Medford, Oregon.

TRANSMITTERS: 300w fm/cw, 42" cabinet, 4 meters, coils for 10, $100; 60w fm/cw, 815, VFO, gang-tuned, bandswitched 80-10, pi output, integral power supply, size of NC-57, $100. Very neat and compact 200w, plate modulated, complete with power and control circuits in 14" grey cabinet, $150. "Signal Shifter," 40m coils, $30; 2m 832 mobile, $30; Complete 10M mobile, 10w, dynamotor, clipper, Gonset 10-11, very compact, $65; Vibroplex, $5; Eico, VTVM, $20. Schematics for all. Write for further details. W7MUI/9, c/o W9GFC.

SX-71 $150. F.o.b. A/2C. Henry C. Leahy, AF12399130, 28th A&E, Maint. Sq., RCAFB, Weaver, So. Dakota.

FOR Sale: 10M mobile station, complete with Morrow 3BR converter RCA trans. with PGE 300V-200 Ma dynamotor, control cable with lead, mike, whip, $125.00, or best offer. W9KHV, 311 N. Chicago Ave., Freeport, Ill.

WANTED: DeForest, Electro Importing, Adams Morgan, Wm. Duck, Murdock, Mesco, Wireless Specialty apparatus, QST, Wireless Age, Electrical Experimenter, Marconigraphs, Modern Electrics, Collins Wireless Bulletins, early catalogs, Year Book of Wireless Telegraph and Telephony for 1916, 1917, 1918 and 1919. Please describe items in detail and price wanted. Louis Rizoli, W1AAT, 100 Bay View Avenue, Salem, Mass.

BARGAINS: New and reconditioned Collins, Hallicrafters, National, Hammarlund, Johnson, Elmac, Harvey-Wells, Babcock, Gonset, Morrow, RME, Millen, Meissner, Workshop, Hy-Lite, Lysco, others. Reconditioned S38 $29.00; S53A, $59.00; S40A, $69.00; S40B, $79.00; SX43, $119.00; 75S, $129.00; SX71, $149.00; SX42, $199.00; SW54, $35.00; NC57, $69.00; NC183, $199.00; HRO5OT, $249.00; NC173, HRO7, HRO5OT1, NC183D, HFS, HQ129X, SP4OOX, RME84, RME45, VHF152A, Lysco 600, Collins 75A1, 75A2, HT9S, Viking transmitters, etc. Shipped on approval. Terms. List free. Henry Radio, Butler, Missouri.

WANTED: 32V Viking Clobe King outboard or inboard boat. Have to trade: $500 equity on new house trailer, any make you choose. Harvey-Wells TBS-50-D, Gonset Tri-band, two Abbott TR2 transceivers, Superior powerstat O-135V, 1 antenna tuner. Ken, W8GYV 239 East Main Road, Conneaut, Ohio.

COLLINS equipment, brand new or in new condition: 30-J transmitter, coils and crystals for 160, 80, 20 and 10. Walnut brown cabinet, chrome trim, 310-B1 exciter in 75A-1 cabinet, 75A-1 receiver with Navy RB-2 3" Panadaptor, some spare tubes. 30-J only $550, with 310-B1, $750.00. 310-B1 not available without transmitter. Receiver and Panadapter, $400.00. Inspection invited. WØNLE, 2209 Blake Boulevard, Cedar Rapids, Iowa.

COLLINS, Harvey-Wells, Johnson, Gon-set, Hallicrafters, National, RME, Sylvan, Hammarlund, Millen, Eldico, Sonar, Morrow, Meissner, Lysco, Web, Elmac, Babcock? You name it, we handle it. We trade and offer terms. Send for latest used equipment list, no obligation whatever. We also assemble Johnson Viking transmitters and VFO's. Write for prices. Carl, W1BFT, Evans Radio, P.O. Box 312, Concord, N. H.

WANTED: 6V or 12V Dynamotor, 300 to 400 vdc at 200 Ma. Tom Dorf, KN2BPS, Mercer Rd., Princeton, N. J.

BARGAINS: Extra special: Motorola P-69-13 mobile receivers, $29.50; Globe King, $315.00; HT-9, $199.00; HRO-50, $275.00; Lysco 600, $199.00; HRO-7, $199.00; Collins 75A1, $275.00; HRO-5T, $175.00; SX-71, $159.00; SX-42, $189.00; SX-43, $129.00; HRO Senior, $119.50; RME 2-11, $99.50; RME-45, $99.00; Meissner EX Shifter, $59.00; S-40A or SX-16, $69.50; VHF-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 chanalyst, $69.50; XE-10, $14.95; Gonset 10-11 converter, $19.95 and many others. Large stock trade-ins. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deal to World Radio Laboratories, Council Bluffs, Iowa.

JOHNSON VIKING, Factory-wired, TVI-suppressed, excellent condx., $225. Rcvr. Hallic. SX-71, like new, $135. Mahland, WN2JMH, 23 Locust Ave., Eatontown, N. J.

FOR Sale: Meissner signal shifter, Model EX9-1090, complete with 115 VAC power supply, $120.00; phase modulator (NBFM) Model FMX, installed in above $18.00; Speech clipper Electro-Voice Mod. 1000 for above, $19.00; Final amplifier with power supply, $30.00; Receiver NC173 FM adapter, $200.00; Receiver NC183, $250.00; Converter RME HF1020, $75.00; Receiver 1155 mounted on new Hammond panel and cabinet, $60.00. R. E. Hadfield, VE3GL, 14 Sunny Lea Ave., E., Toronto, Canada.

FOR Sale: R44/ARR5 10 to 2 meter receiver, $70.00. GE S1201D speaker and enclosure, $20.00; assortment of high current 48–72 volt full wave rectifiers. Childs phono preamp, $30.00. G. H. Ashley, 715 E. Buffalo St., Ithaca, N. Y.

NEW crystals for all services at economical prices; also regrinding or replacement crystals for broadcast, Link, Motorola, G.E. and other commercial types. Over 17 years of satisfaction and fast service. Eidson Electronic Company, 1802 North Third St., Temple, Texas.

SU1AD back in USA. All needing QSL's, write W3BHD.

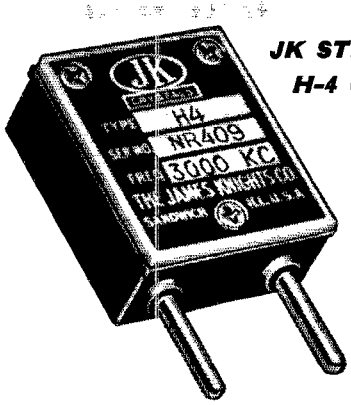
Index of Advertisers

keeping communications ON THE BEAM

JK PRODUCTS

Her Ship-to-Shore is Ship Shape

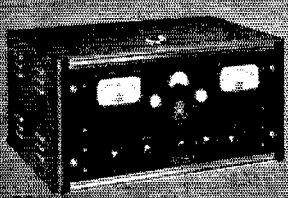
Her decks may be awash but there's fair weather in the radio shack. Despite wind and waves the Captain's message will reach the home port. In fair weather or foul, you'll find JK Crystals rate a Navy "E" for their part in keeping marine communications "ship shape."



JK STABILIZED H-4 CRYSTAL

CRYSTALS FOR THE CRITICAL

A versatile crystal the JK H-4 is widely used as a replacement crystal in marine and other communications systems. Pressure mounted, dust and water proof, stainless steel electrodes. Frequency range 1800 kc to 15 mc. Military type holder. Another of the many JK Crystals available to serve every need.



the JK FB-12

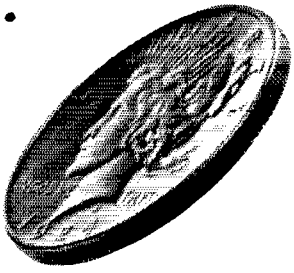
FREQUENCY & MODULATION MONITOR

Absorption type for frequencies anywhere between 45 mc and 175 mc, checking both frequency deviation and amount of modulation. Keeps the "beam" on allocation; guarantees more solid coverage, too!

THE JAMES KNIGHTS COMPANY

SANDWICH ILLINOIS

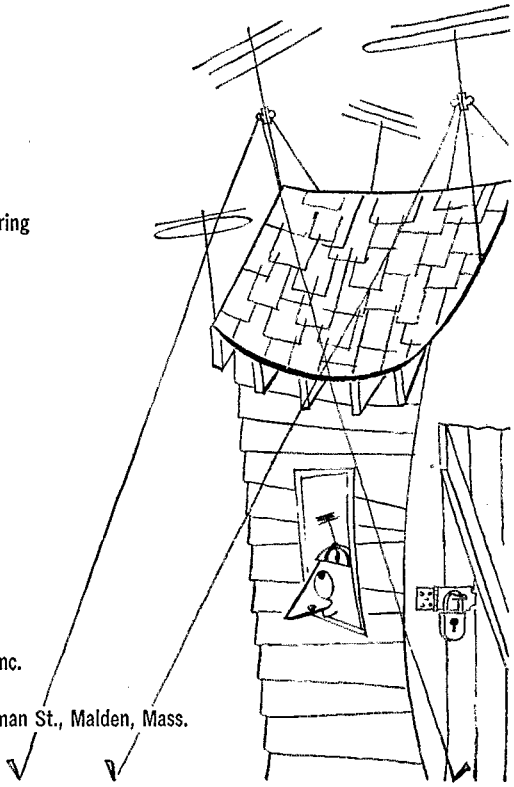
HAVE the Time of YOUR Life ....



AND GET PAID FOR IT!

Think of the hundreds of hours you spend in your shack, having the time of your life!
How would you like to get paid for it? You may **IF** . . .
IF you're a top-flight electronic engineer with an excellent communications background. **IF** you have an electrical engineering degree from an accredited college or university.
IF you have an inventive spark — a real urge to create something new and better.
IF you meet all of these qualifications, National can offer you an exceptionally good salary, unusual social benefits and a really great gang to work with. Best of all, you'll get paid for doing what you like to do most!
IF you can meet the "IF's", write us a letter and tell us about yourself — your education, positions you've held, successes you've had — marital status, present salary, etc.
We promise a prompt decision.

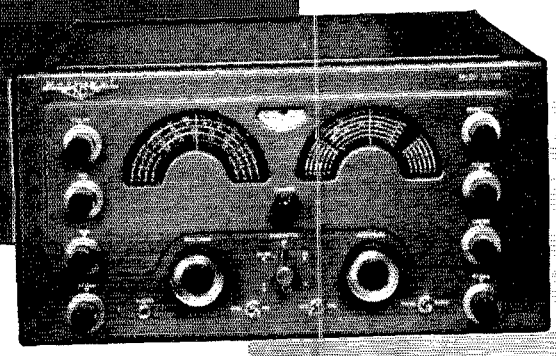
President, National Company, Inc.



Write to Industrial Relations Dept., **NATIONAL CO., Inc.**, 61 Sherman St., Malden, Mass.

all new and TERRIFIC

183 D



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National proudly announces a brand-new receiver — the NC-183D — *every* feature you want in a truly modern receiver! Dual conversion on the three highest ranges (including 6, 10, 15, 20 and 40 meter ham bands) no "birdies"! Steep-sided skirt selectivity with 3 I.F. stages (*16* tuned circuits on the 3 high bands — *12* on all other bands, compared to 6 normally used) plus a new crystal filter. Approximately 1 microvolt sensitivity on 6 meters for a 10db signal-to-noise ratio! New, indirectly-lighted lucite dial scales! New miniature tubes for improved sensitivity! Bandspread on all bands, including new 15-meter band! New bi-metallic, temperature-compensated tuning condenser for drift-free operation! *Plus* all the time-tested features of the famous NC-183!

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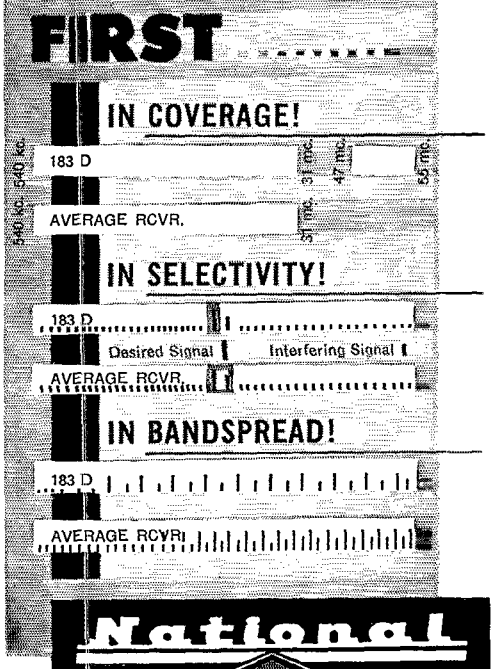

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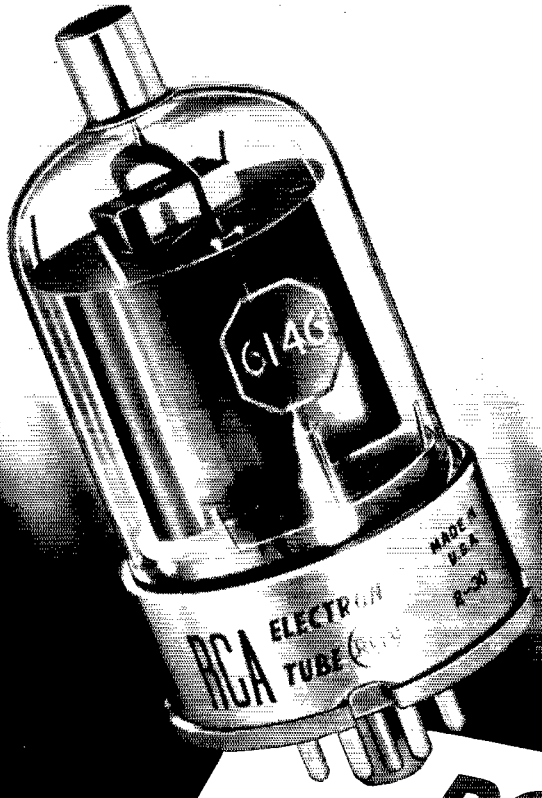
1 year old ... and everybody's baby



DC to 175 Mc!

Specifically designed by RCA for radio amateurs, the **RCA-6146** has set a record for circuit versatility matched by few other types. From dc amplifier to VHF services, this remarkable tube has high power sensitivity, regardless of plate voltage or frequency. You have already seen it used in ham gear, described in *QST* and *CQ*, and in new commercial transmitters.

Before you freeze the design of that new rig, investigate the **RCA-6146.** For a free copy of the technical bulletin on this popular tube, see your local **RCA Tube Distributor** or write RCA, Commercial Engineering, Section 48AM, Harrison, N. J.

POWERFUL FOR ITS SIZE—

In CW service (ICAS) it can take
90 watts, up to 60 Mc.
64 watts, at 150 Mc.

In AF service (ICAS) two can give
120 watts—class AB1
130 watts—class AB2

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