

March 1956

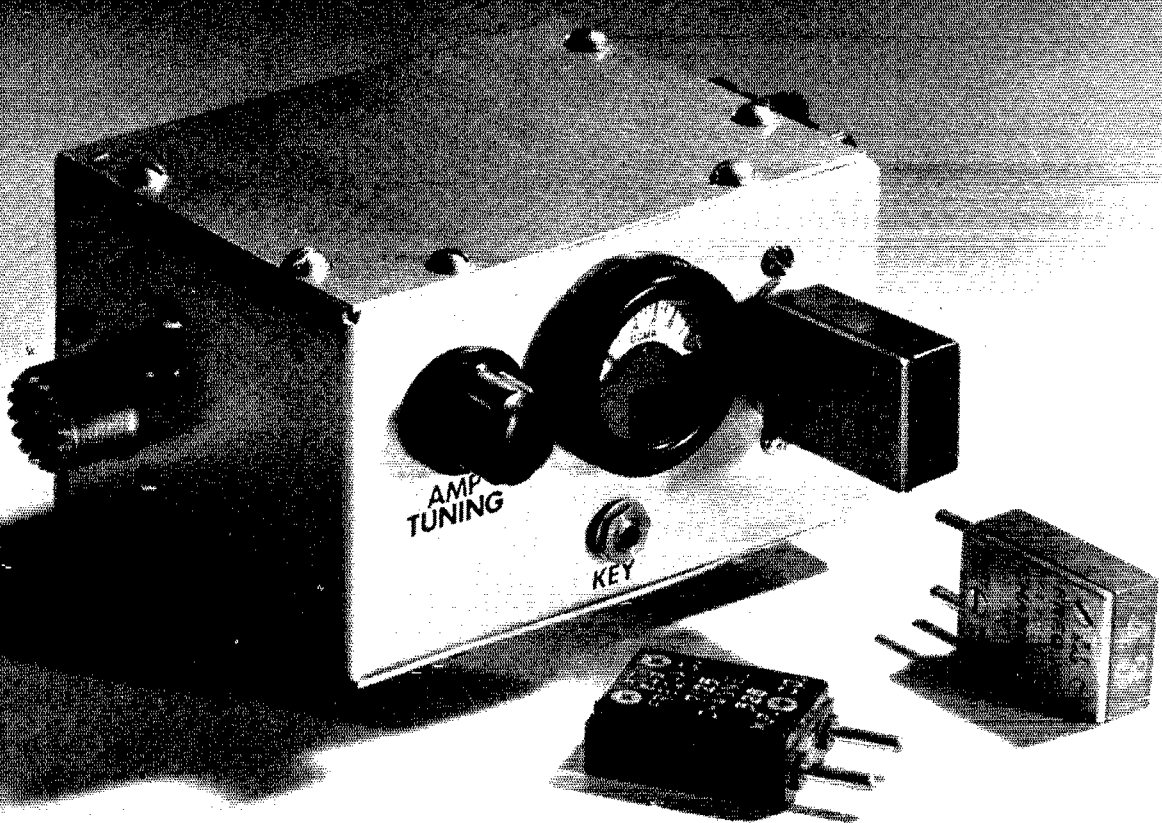
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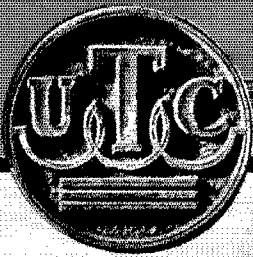
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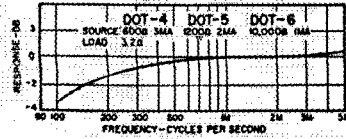
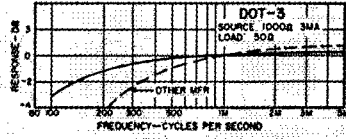
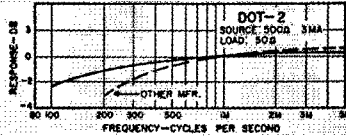
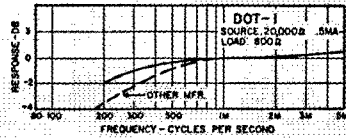
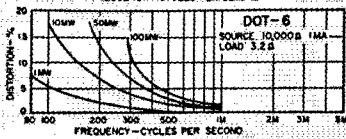
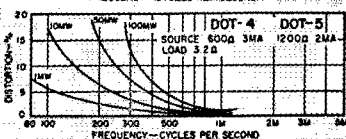
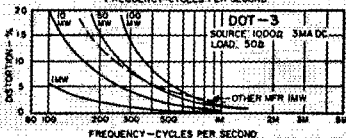
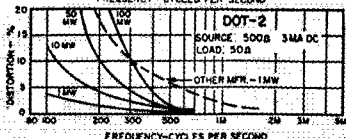
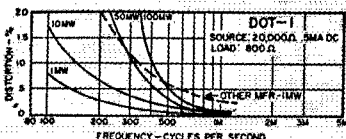
Dec-Ouncer Transformers



DOTS for short REVOLUTIONARY TRANSISTOR TRANSFORMERS

UTC has been the leader in miniaturization for over twenty years. In view of this, it was surprising to many people that UTC did not quickly bring out a series of transformers designed for use and comparable in size to transistors. Unfortunately, extremely miniature transistor transformers of standard construction had poor general characteristics, poor reliability characteristics, and were woefully inadequate for a large number of applications. Instead, UTC started a development program to evolve a new transistor transformer structure designed to provide full performance in extremely miniature size. The culmination of this development is found in the new DOT series**. Listed below are the standard types of DOTS now being made and curves showing their general characteristics in typical transistor application. To fully appreciate the unprecedented performance of these revolutionary transistor transformers, the curves also show characteristics of similar size units now on the market.

Special DOT units (some even smaller in size) are available on production order.



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DOT units are hermetic sealed compared to other mfr. open structures.

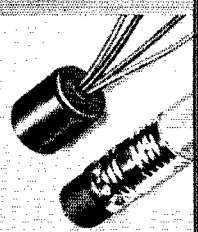
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DOT CASE

Diameter 1/16"
Length 13/32"
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Type No.	Application	Level Mw.	Pri. Imp.	D.C. Ma. in Pri.	Sec. Imp.	Pri. Res.	Sec. Res.
DOT-1	Interstage	50	30,000 20,000	.5 .5	1200 800	850	125
DOT-2	Output	100	600 500	3 3	60 50	60	8
DOT-3	Output	100	1200 1000	3 3	60 50	115	8
DOT-4	Output	100	600	3	3.2	60	.5
DOT-5	Output	100	1200	2	3.2	115	.5
DOT-6	Output	100	10,000	1	3.2	1000	.7
DOT-7	Input	25	200,000	0	1000	3700	100
DOT-8	Reactor	3.5 Hys. at 2 Ma. DC,	630 ohms. DC res.				

*DOT units have been designed for transistor applications only . . . not for vacuum tube service **Pats. Pending

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CAUTION: READ

W2GYV CHECKS PERFORMANCE OF G-E 12-KW KLYSTRON

Transmitting power tubes like this carry u-b-f television to viewers in all parts of the country. Rigid General Electric tests precede shipment and installation. The special equipment for klystron tests shown in the picture, was designed and built under the direction of W2GYV (L. F. Jeffrey). Features are the three large beam focusing coils, surrounding the upper half of the tube . . . the rectangular wave guide on top, into which output of the klystron is fed by a coaxial line ending in a $\frac{1}{4}$ -wavelength antenna . . . the elaborate power-supply control and metering cabinet at right.



Radio Amateur Lawrence F. Jeffrey Holds Important G-E Power-tube Responsibility

WITH 8 states still to contact on six meters—he has 40 already in his log-book—amateur Jeffrey (W2GYV) can be pardoned for wishing his rig had a final as high-power as G.E.'s big 12-kw television klystron!

A licensed ham since 1934, Jeffrey finds that his after-hours work with mike and key is a hobby tuned to the same frequency as his daytime job as supervisor, tube circuitry engineering for General Electric power tubes.

Moreover, 25 percent of the electronic specialists who work for and with Jeffrey, are active amateurs. Experience gained, lessons learned in the ham shack, contribute to efficiency in testing and designing circuits for G-E tubes whose frequencies go from d-c to microwaves—whose power ranges from milliwatts to megawatts.

Radio amateurs like W2GYV share importantly in the design, manufacture, and

testing of tubes—power, receiving, C-R—built in all 7 General Electric tube plants. Ham vision and know-how are quality ingredients of G-E tubes of every type supplied by your local distributor! *Tube Department, General Electric Company, Schenectady 5, New York.*

Congratulations from General Electric to the 1955 Edison Award winner, Robert W. Gunderson, W2JIO, Bronx, N. Y.! Mr. Gunderson was named for noteworthy achievement by the committee of judges because, a blind operator himself, he continued to aid others similarly handicapped by editing the only electronics magazine in Braille and completing 30 types of special test equipment for the blind. By presenting the Edison Award trophy and gift to W2JIO and by citing other amateurs for meritorious 1955 service, national recognition again was given the efforts of all radio amateurs in the public interest.

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MARCH 1956

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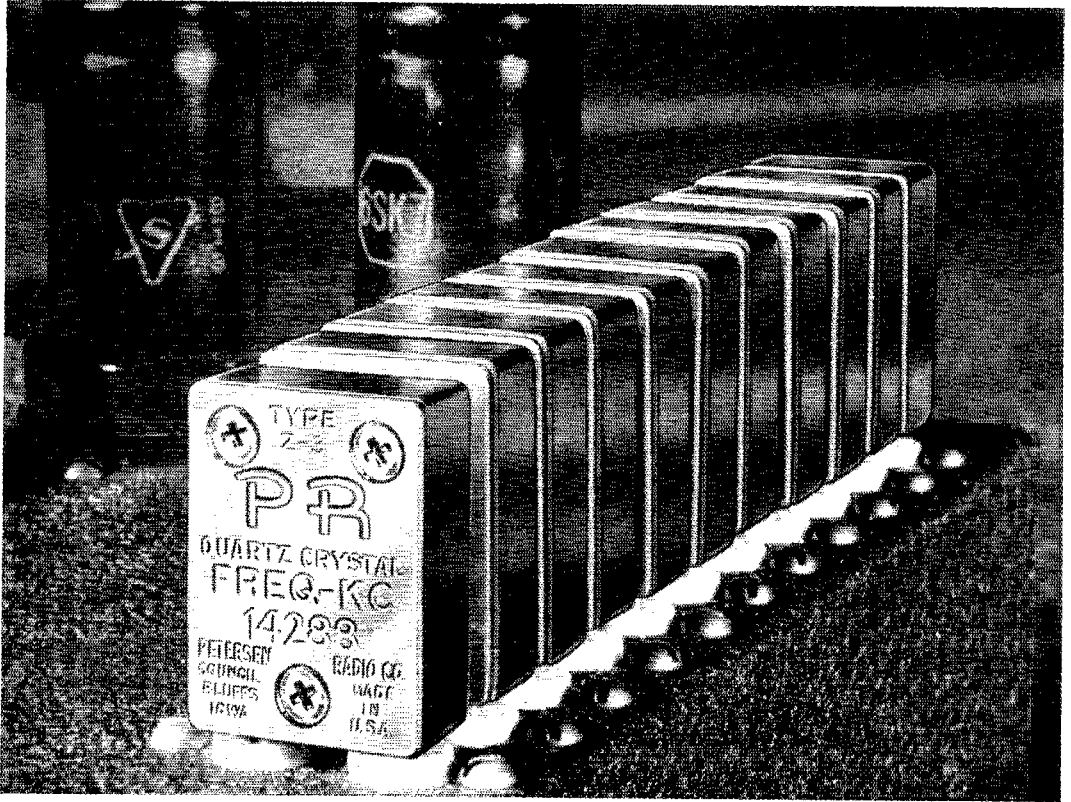
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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. *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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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 prerequisites, although full voting membership is granted only to licensed amateurs.

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Vice-Director: Forrest Bryant W0FDS
6840 Harriet Ave., Minneapolis, Minn.

Delta Division

VICTOR CANFIELD W5BSR
Box 965, Lake Charles, La.
Vice-Director: Alilton W. Kirkpatrick W5KYC
113 Patton Ave., Hattiesburg, Miss.

Great Lakes Division

JOHN H. BRABB W8SPP
708 Ford Bldg., Detroit 26, Mich.
Vice-Director: Robert L. Davis W8EYE
247 Highland Ave., Salem, Ohio

Hudson Division

GEORGE V. COOKE, JR. W2OBU
88-31 239 St., Bellerose 26, N. Y.
Vice-Director: Thomas J. Ryan, Jr. W2NKD
2339 Redwood Rd., Scotch Plains, N. J.

Midwest Division

ROBERT W. DENNISTON W0NWX
Box 631, Newton, Iowa
Vice-Director: Sumner H. Foster W0GQ
2315 Linden Dr., SE., Cedar Rapids, Iowa

New England Division

PHILIP S. RAND W1DBM
Route 58, Redding Ridge, Conn.
Vice-Director: Clayton C. Gordon W1HRC
65 Emerson Ave., Pittsfield, Mass.

Northwestern Division

R. REX ROBERTS W7CPS
837 Park Hill Drive, Billings, Mont.
Vice-Director:

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose 26, Calif.
Vice-Director: Harold L. Lucero W6JDN
1113 Ellmore Ave., Dunsmuir, Calif.

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.
Vice-Director: Theodore P. Mathewson W4FJ
110 N. Colonial Ave., Richmond, Va.

Rocky Mountain Division

CLAUDE M. MAER, JR. W0IC
740 Lafayette St., Denver, Colo.
Vice-Director: Walter M. Reed W0WRO
1355 E. Amherst Circle, Denver, Colo.

Southeastern Division

JAMES P. BORN, JR. W4ZD
26 First Ave., N.E., Atlanta, Ga.
Vice-Director: Thomas M. Moss W4HYW
P.O. Box 644, Municipal Airport Branch,
Atlanta, Ga.

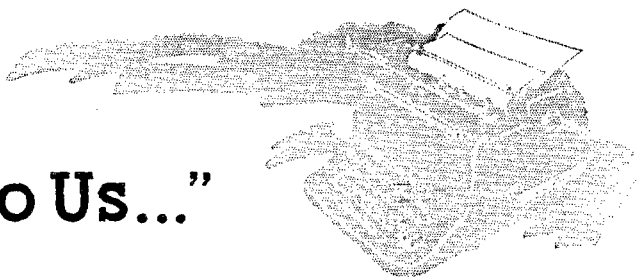
Southwestern Division

WALTER R. JOOS W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.
Vice-Director: Robert E. Hopper W6YXU
4327 Santa Cruz, San Diego 7, Calif.

West Gulf Division

ROBERT E. COWAN W5CF
3040 Encanto Drive, Fort Worth 9, Texas
Vice-Director: John F. Skelton W5MA
1916 Briarwood Lane, Irving, Texas

"It Seems to Us..."



GROWTH

It's getting to be almost routine to announce, as we have done each of these last few years, a substantial growth in the Full Membership of the American Radio Relay League. Yet, we don't propose to relegate the news to small type in the back of the mag; we're as proud of this record as we know each member is, and we're climbing right up on top of this editor's mill to shout it out loud.

In 1955, the U. S. Full Membership of the League increased by 14% — to reach an all-time high of 52,651. Add to this 1,864 VEs and you get 54,515, the total voting membership of the League as of last year-end. Every ARRL division registered an increase in Full Membership, none less than 10%.

FCC license figures show a continuing healthy growth in the amateur ranks, as well. As of year-end, some 139,000 hams were on the Washington books. While this includes around 16,000 Novices (about half of whom, past experience shows, will drop out at the end of their year), it still represents a substantial gain of 12% over the similarly-computed figure of 124,000 for the 1954 year-end.

Particularly pleasing to us is the fact that, in the past five years, U. S. amateur League membership has increased nearly 80%, a considerably faster growth than the amateur body itself.

STRAY QSLs

No one knows how many QSLs wind up each year in the dead-letter sections of the post offices around the country, but if reports that reach us now and then from hams connected with P. O. work are any indication, it is a sizable number. The chief reason: insufficient address. The Post Office has no way of knowing how to reach "W3XXX, Opr. 'Ed', Altoona, Penna." It has no appropriation for call books, in most cases probably doesn't even know such a directory exists. Undeliverable cards go to the dead-letter office.

This may be the reason that the card from your new state never arrived; the other ham would have been happy to have sent a QSL in reply, but if you sent yours without sufficient

address, he just didn't get it. So, if you're interested in QSLs for WAS or for any other reason, take simple precautions to get adequate addresses. While you're in QSO, check the call book to see if he's listed; if not, ask him for the dope. If, for some reason, you don't get a good address, it's better to wait for the next edition of the call book; you're wasting your postage stamps on a card addressed with only the call letters and city.

In any event, it's a good idea to have your name and address, together with the words, "Return Postage Guaranteed," in the upper lefthand corner of the address side of the card. It can be printed at the time your cards are produced, or put on with a rubber stamp or individually typed. Without this information, an undeliverable card goes to the dead-letter office. With it, the card is returned to you at a cost of only two cents. At least, you know whether your card got through to the addressee.

Another good thought is to register your call letters with the local post office. In that way, you can help insure that inadequately-addressed cards will reach you.

TAXES

It being nearly that time of year when — at least in our section of the country — tax bills are coming out of town hall covering real-estate and personal-property levies, perhaps we can save a few of the customary inquiries to Hq. as to how amateur radio is involved in certain aspects of the matter.

It is well established that a municipality cannot tax amateur radio as such. On a rare occasion or two, a city has attempted to "license" its local amateurs by means of an ordinance providing for yearly fees. Such ill-conceived ideas are quickly squelched, of course, when the authorities are acquainted with the facts of communications regulatory life — only the Federal Government has jurisdiction in such matters.

Yet this exclusivity of regulatory jurisdiction does not set the amateur apart from his fellow citizens in fields subject to local control, even though amateur radio itself may be involved. For example, a municipality may

(and usually does) require the issuance of a building permit for an amateur antenna mast, for which a fee is paid. Inspection and approval are well within the power of the community — indeed, are its responsibility in protecting the safety of its citizens — and an amateur is not exempt from paying a permit fee just because his activities are basically subject to Federal regulation, or because he engages in a non-profit hobby.

Personal-property tax is a principal case in point. True, some towns have no such tax, and instead the level of real-estate assessment is set at a point considered to cover ownership of "normal" household accessories (other than automobiles, handled separately), such as TV sets, cameras, a piano, etc. But many do require a separate listing of personal possessions — a boat, a power lawn-mower, a freezer, power tools . . . or amateur radio equipment, which is properly taxable as personal property. Your town is not usurping Federal authority in taxing your ham gear as a personal possession. The valuation must be reasonable, of course, and amateur equipment must not be singled out for taxation; in other words, the treatment must be impartial. But neither possession of a Federal license to own and operate the gear, nor the fact that it is strictly a hobby (unless there is specific exemption for hobby possessions), exempts you from payment of the town's personal-property tax.

HAMFEST CALENDAR

Florida — The Orlando Amateur Radio Club will hold its annual hamfest on Sunday, April 8, at Rock Springs, Florida. The festivities will begin with an auction of ham gear at 10:00 A.M. Here's your chance to clean out your junk box. Barbecue pork or beef dinner at 1:00 P.M. Advanced registrations will be \$2.00 for adults and \$1.00 for children; tickets at the door will be 25% higher. Additional information may be obtained from Bob, K4BAK, 1008½ Lucerne Terr., Orlando, Florida.

Ohio — Saturday, April 14, at the Dayton Biltmore. Dayton — the Dayton Amateur Radio Association will hold its annual Hamvention. Hamvention is the best treat in ham radio — ask anyone who has attended. The day-long program will feature outstanding speakers on all phases of amateur radio and a special program has been prepared for the ladies. The affair will wind up with a banquet at 7 P.M. in the hotel ballroom. Tickets are \$5.00 in advance or \$5.50 at the door. Reservations, more information, and an attractive brochure may be obtained from D.A.R.A., P.O. Box 44, Dayton 1, Ohio.

Ohio — The Indian Hills Radio Club of Cleveland presents a Break Break Pow Wow home-style dinner meeting, March 24, at 7 P.M., Alliance Club Hall, 6908 Broadway, Cleveland. Program, refreshments, and a good time. Reservations only — price \$3.00. For further information, contact W8ICS, 19451 Upper Valley, Euclid 17, Ohio.

COMING A.R.R.L. CONVENTIONS

March 3 — Michigan State, Grand Rapids

June 15-16-17 — West Gulf Division, Galveston, Texas

July 6-7-8 — ARRL National Convention, San Francisco, Calif.

A.R.R.L. MICHIGAN STATE CONVENTION

Grand Rapids, Mich. — March 3, 1956

After eight years of sponsoring successful hamfests, the Grand Rapids Amateur Radio Association is this year staging the ARRL Michigan State Convention to be held at the Rowe Manger Hotel, Grand Rapids, Mich., on Saturday, March 3.

The following frequencies will be monitored by Grand Rapids stations during Friday evening and Saturday morning, for the convenience of the mobile operators who plan to attend: 3930 kc.; 28,620 kc.; 29,610 kc.; and 6 meters (low end).

Top-notch speakers from the amateur ranks as well as industry representatives and exhibits (which will be operational wherever possible) will reflect a "New Products" theme.

Highlights of the convention will be a mobile judging contest, a "swap and shop" booth, QMN dinner, Michigan Council of Clubs dinner, phone-men's dinner, EC meeting, and other items of specialized interest too numerous to mention. Amateur-license examinations will be held by the FCC at convention headquarters at 10:30 A.M. on Saturday, March 3.

The admission fee is \$1.25 in advance, or \$1.50 at the door. Advance registrations will close February 24 and the Reservation Committee will take care of your room reservation, if notified in advance. Please make out all checks in favor of the Grand Rapids Amateur Radio Ass'n.

For further details regarding the convention, address communications to ARRL Michigan State Convention, Box 333, Grand Rapids, Michigan.

OUR COVER

"Look, Maw, no watts!" might well be the title of this month's cover. WICUT's transistor rig runs about 50 milliwatts input, and is described beginning on page 11. To those of you who are looking for new fields to conquer, the transistor offers an interesting challenge.

Say, who's going to be the first to make WAC with an all-transistor transmitter?

Strays

F. H. Black, W1LQ, sends in this clipping from a Quincy, Mass., newspaper. We quote — "DECODED: In Superior, Wis., a railroad worker told a judge he had attacked three bunkmates with an iron poker because he suspected they were plotting an attack on him by snoring in Morse Code."

There ought to be resistance here — Warren Rudolph, W4OHM, queries the technical department about assistance with installation of some new mobile gear. He says there seems to be loss in a cable and wonders whether his call may have anything to do with the difficulty.

The Airport Television and Radio Company, of 188 Airport Road, Reno, Nevada, has developed a form of circular slide-rule known as a "Quick-Way Tube Pin Locator." The unit operates with a simple turn of the dial, covering hundreds of tube types. When set to the tube number, it automatically registers all tube pin socket connections.

"CQ TR"

Transistors in a 7-Mc. M.O.P.A.

BY E. LAIRD CAMPBELL, W1CUT

• The "Stray" on page 96 of the January issue stirred up quite a bit of curiosity, so here's the dope. For the benefit of prospective experimenters who haven't yet made the plunge, there's also a bit of preliminary discussion about transistors.

IF YOU are one of those for whom satisfaction in amateur radio is measured by the number of "100 per cent" QSOs per call or a high score in a contest, this article is not for you. What we have to talk about will not win any contest, nor will it give contacts as a matter of course. Neither is it economical — very likely it achieves a new high in dollars per watt.

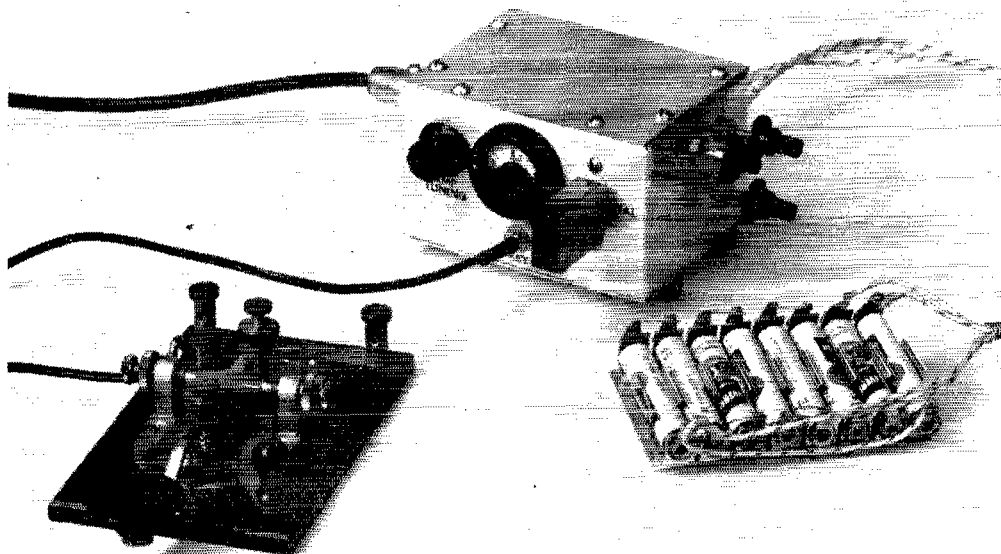
In short, the sort of gear under consideration will appeal only to the experimenter — the man who likes to try new devices and new circuits just for the kick to be got out of exploring new fields, with a little education on the side. The ranks of "transistor transmitters" are still sparse enough so that anyone who joins up can have the

feeling of being a pioneer — with ample justification, since there is still plenty to be found out about the little germanium wafers in this application.

About Transistors

When tackling the transistor for the first time the natural approach is to compare the mechanism of transistor operation to that of vacuum tubes. There are quite a few similarities in transistor and tube circuit behavior, but trying to develop exact equivalents, or to replace tubes with transistors in the same circuit, will only lead to confusion. However, basic transistor operation can be understood by learning a few principles that are easily within the grasp of the average amateur.

The electron tube operates by the flow of electrons between elements in a vacuum, but the transistor functions by the flow of electrons within a particular kind of solid. These solids are neither good conductors nor good insulators, but under certain conditions they can be made to show some of the properties of either. They are



The transistor transmitter and battery power supply. The power supply is made up of 8 small "penlight" cells and all the required voltages are tapped from them.

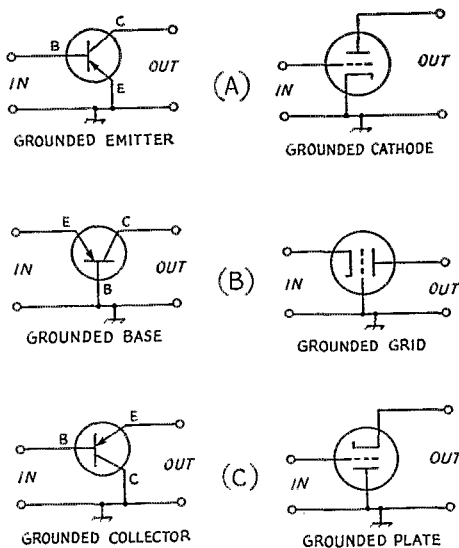


Fig. 1—Typical transistor circuits and their vacuum-tube equivalents.

known as "semiconductors," and examples are germanium, selenium, and silicon. By adding certain substances or "impurities" to a semiconductor, it can be made to have an excess of electrons. Such material is called "N-type" because of its excess negative status. The material can also be made with a deficiency of electrons, and in that case is called "P-type" because of its positive nature. An "N-P-N" type transistor consists of a germanium crystal with two N-type regions separated by a thin layer of P-type material. When an electric field is applied to a treated semiconductor, electrons will move within the material, constituting a current flow.

Fundamental Connections

As mentioned earlier, it is unwise to try to draw a parallel between transistors and vacuum tubes. But in order to become familiar with the different elements and basic circuits of transistors we can show some analogous circuits. The three elements of a transistor are the base, collector and emitter. These can be compared in a general way to the grid, plate and cathode of a vacuum tube. Fig. 1A shows the grounded-emitter amplifier circuit, which resembles a grounded-cathode vacuum-tube circuit. The signal is applied between the base and the emitter and the amplified signal is taken between the collector and emitter. Figs. 1B and 1C are grounded-base and grounded-collector circuits, respectively. The vacuum-tube equivalents are also shown.

When comparing a vacuum-tube amplifier with a transistor amplifier operated in the same frequency range, we find the input (grid to cathode) impedance of a vacuum tube is relatively high while the transistor amplifier has a low input impedance and high output impedance. The vacuum tube with its high input impedance

is voltage controlled while a transistor, with a relatively low input impedance, may be considered to be current controlled. Because of this low input impedance, the input electrodes of one stage may not be simply connected to the output electrodes of the preceding stage. The coupling of transistor stages requires a step-down in impedance, which sometimes may call for a more elaborate interstage network than in the case of vacuum-tube amplifiers.

When using transistors as oscillators the usual techniques employed for vacuum-tube oscillators should be put into practice. The component parts should be mounted for good mechanical stability, and to insure frequency stability a high- Q , high- C tank circuit should be used.

Peculiarities

A useful property of the transistor is its ability to function at low power levels. It is possible to design practical amplifiers, receivers and oscillators that operate at voltages lower than the usual filament voltage of vacuum tubes. This, combined with small size, makes the transistor a "natural" for miniaturized electronic equipment using small, cheap, dry batteries for power.

Limited frequency range, sensitivity to temperature, and lack of uniformity among specimens of the same nominal type are some of the disadvantages of transistors. The usual manner of rating transistors for useful frequency range is to specify a "cutoff" frequency, or frequency at which the current amplification factor drops 3 db. below its low-frequency value. At the present time a transistor with a cutoff frequency of 1 Mc. or higher is considered a high-frequency transistor, and since it is more difficult to manufacture its cost is considerably higher than that of the low-frequency types. Physically, the high-frequency transistors have closer spacing between the emitter and collector. Electrical characteristics include low collector-voltage breakdown, low collector capacitance and low base resistance.

As the temperature of a germanium transistor is raised, the device becomes unstable, the amplification decreases, and the noise generated internally increases. The temperature increase can be the result of heat generated in the transistor or by heat radiated from surrounding objects. Permanent damage can be caused during soldering or by mounting the transistor too close to heat-emitting components.

Nonuniformity among transistors of the same type number is quite a disadvantage to the experimenter who does not want to buy several and pick out the one that works best. In oscillators or high-frequency amplifiers it is unfortunately true that one transistor will work better or give more amplification than another of the same type. No doubt this situation will change as manufacturing techniques improve; but until they do there is no guarantee that an exact duplicate of a circuit using a transistor will function just like the original.

Since the transistors currently available are

mostly very low-power devices their use in transmitting equipment is necessarily confined to "flea-power" experiments. This, in a way, is an attraction rather than the opposite since it offers a double-barrelled kick — the novelty of trying new devices and new circuits combined with a sense of accomplishment in establishing contact with stations at a distance on fractional-watt power. Quite a few fellows have succumbed to the fascination of transistor low-power operation, as evidenced by *QST* reports of "firsts" on various ham bands during the past few years.

M.O.P.A. Transmitting Circuit

In every case reported so far, the transistor transmitter has been a keyed crystal oscillator coupled to the antenna. Like all plain oscillator transmitters the frequency has been subject to the influence of the antenna, and it was for this reason, as well as in the hope of obtaining higher efficiency and thus greater output, that the present effort was directed toward working up an oscillator-amplifier circuit. As it turned out, there were no special difficulties. We had some CK761 transistors (frequency cutoff 10 Mc.) available and since most of the early transistor transmitters had operated in the 80-meter band it was decided to explore higher-frequency operation, 40 meters, in this transmitter.

Fig. 2 shows the circuit. It uses two P-N-P transistors, one as a "base-resonant" oscillator and the other as a grounded-emitter amplifier. After trying several different oscillator circuits it was found that the one used by Ritz¹ and Atwater² gave the best overall performance. This oscillator can best be described as a base-resonant oscillator because of the tuned circuit in the base of the transistor. With crystal control the oscillator is very stable and oscillates even when the tank circuit is tuned slightly off resonance. Several different CK761 transistors were tried in the circuit and all oscillated easily and without hesitation. Potentiometer R_1 , which controls the

bias (supplied by the $1\frac{1}{2}$ -volt battery) on the emitter, is adjusted for best oscillator performance.

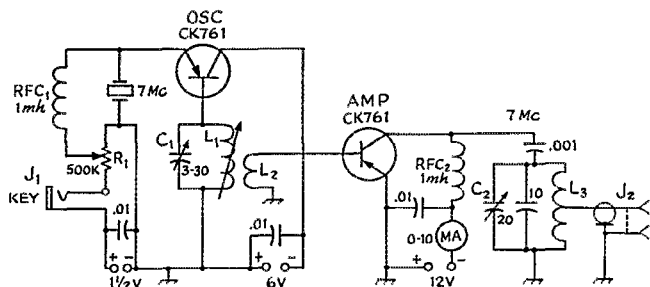
The grounded-emitter amplifier is link coupled to the oscillator by coil L_2 . This must be a low-impedance link to match the p.a. transistor input. The required number of turns was determined by the "wind and try" method until the best match was obtained, as indicated by optimum drive to the transistor base. (The optimum drive can be determined by adjusting the coupling for maximum amplifier output using the output-measuring system described below, or by adjusting for maximum amplifier collector current. If the latter method is used and the amplifier tank is tuned off resonance, the testing should be done with a collector voltage low enough to keep the power input within the transistor ratings.) The variable capacitor used in the amplifier tank circuit is of the ultramidget type and because of its construction must have the rotor grounded. This is the reason for using a shunt-fed tank circuit.

Although a grounded-emitter amplifier has been compared to a grounded-cathode triode amplifier, there is one important difference between the two. In the transistor amplifier the phase relationships between the input (base) and output (collector) currents is such that there is no tendency toward self-oscillation. Consequently, it is unnecessary to make any provision for neutralizing the amplifier, something that would be indispensable in the tube circuit.

Since this transmitter was designed to be used with a flat 75-ohm coax line, the final tank coil was tapped to work into a 75-ohm load. The correct tap points on the coil were determined by connecting one end of a 75-ohm noninductive resistor to the ground side of the tank coil. The other lead from the resistor was connected to an r.f. probe and vacuum-tube voltmeter. Then the probe was moved across the coil to find the point of maximum voltage. If a 50-ohm load is desired the correct tap can be found by using a 51-ohm resistor.

¹ "Technical Correspondence," *QST*, October, 1955.
² "Technical Correspondence," *QST*, December, 1955.

Fig. 2 — The transistor transmitter. Capacitances of .001 and above are in μf



- C_1 — 3-30- μf . trimmer.
- C_2 — 2-20- μf . miniature variable (Johnson 20M11).
- R_1 — 0.5 meg. miniature potentiometer (Lafayette Radio VC-37).
- L_1 — 5-9- μh . slug-tuned (North Hills 120-C).
- L_2 — 9 turns No. 28 enam. wire wound over L_1 .

- L_3 — 64 turns No. 24, $\frac{1}{2}$ -inch diam., 32 turns per inch, tapped at 13 turns (Miniductor 3004).
- J_1 — Miniature open circuit jack (Telex 8570).
- J_2 — Coaxial cable connector (Amphenol 83-1R).
- MA — 0-10-ma. miniature meter (International Instruments 100-C).

Construction

The transmitter was built in a small box made from flat aluminum stock. Brackets and shelves were made for supporting components, and as many miniature parts as possible were used throughout the unit. This transmitter is not actually reduced to the smallest size possible, but further miniaturization would make soldering and mounting of parts difficult.

The oscillator tank circuit, L_1C_1 , is a slug-tuned coil and a trimmer capacitor. It is of course tuned to the operating frequency. The capacitor could be fixed, but a variable was used in order to compare different LC ratios in the tank. The link coil, L_2 , is wound over one end of L_1 . Extra soldering lugs are provided on some coil forms and these make excellent tie points for the wire ends of the link.

Shafts of the oscillator tank controls along with that of the potentiometer, R_1 , are all brought out on the side of the box. The trimmer capacitor can be adjusted either by a screwdriver or by means of a shaft soldered to the adjusting screw. These three controls when once set need little adjustment, but when changing from one end of the

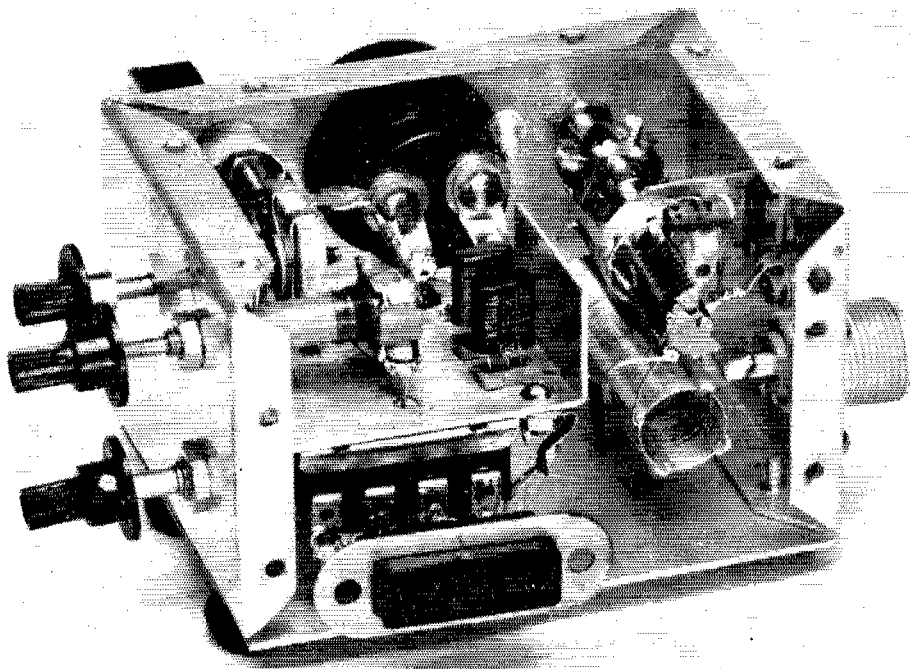
band to the other some touching up may be necessary; therefore, it is better to have the controls accessible.

The amplifier tank circuit, L_3C_2 , is made from a length of $\frac{1}{2}$ -inch diameter Miniductor coil stock and a midget variable capacitor. Because the variable did not have quite enough capacitance a small fixed padding capacitor was added to allow the tank to resonate with the variable capacitor set at half scale.

Fig. 3 shows the standard methods of identifying transistor leads. The CK761 transistor follows the method shown at A. The transistors can be mounted in subminiature-tube sockets or soldered directly. Leads should be left fairly long and held by long-nose pliers to conduct away heat if they are to be soldered. As can be seen in the photograph, the transistors were mounted side by side and since no difficulty arose from interaction, shielding was not used.

A miniature meter was used to measure amplifier collector current. It would be a good idea to be able to switch the meter and measure the oscillator collector current, although such switching was not incorporated in this unit.

Inside view of the transmitter. The two controls at the top left are L_1C_1 , with R_1 directly below them. Link L_2 is wound over the ground end of L_1 and can be seen to the left of the transistors.



Tuning Up

When the unit is finished and ready to be tested for the first time, potentiometer R_1 should be set initially with the arm at the ground end. A crystal of the desired frequency should be inserted and -6 volts applied to the collector of the oscillator transistor. Connect a 0-10 milliammeter in series with the 6 volts to measure the collector current. With the key closed, adjust the potentiometer for a collector current of 3 or 4 milliamperes. Then adjust the slug in the oscillator tank coil for a sharp rise in the collector current. This indicates that the circuit is oscillating. A receiver tuned to the crystal frequency can be used as an aid to show when the unit goes into oscillation. Adjust the various oscillator controls for good clean keying. At the same time, be careful not to exceed the power input rating of the transistor (88 milliwatts).

With the oscillator operating satisfactorily power can be applied to the amplifier. Resonance in the amplifier tank tuning will be indicated by a dip in the collector current. Again the ratings of the transistor should not be exceeded. With -12 volts on the amplifier collector about 5 or 6 milliamperes, with full loading, is average current.

When operating at ultralow power every bit of r.f. counts, so every effort should be made to get the proper coupling to the antenna. The antenna itself can be any of the regular types such as a dipole, Zepp, or vertical. If the antenna is not matched to the coaxial line an antenna coupler or other matching circuit should be used to provide the proper load for the transmitter. With this arrangement every available "drop" of r.f. energy will be most efficiently transferred to the antenna. Small things which may not seem to be important at higher power levels should be carefully considered. Feed-line losses due to faulty spreaders or poor dielectrics should not be overlooked. Even the antenna insulators should be clear of dirt or any conductive materials.

Because of the low power, most of the usual measuring devices are too insensitive to be used with this transmitter. The best method, therefore, is to use the regular station transmitter and an s.w.r. bridge for adjusting the matching circuit between the coax link and feedline, if the feed system does not already use matched coax. The usual adjustment procedure should be followed to bring the s.w.r. down to 1 to 1. After the adjustments are completed the bridge should be removed because if it is left in the line it will absorb most of the output power of the transistor transmitter. Another type of indicator that is useful in tuning up is an indicating wavemeter loosely coupled to the antenna coupler and tuned to the operating frequency.

QRP with Transistors

Except for answering a calling station, the only sporting way to make a low-power contact seems to be by calling a general CQ. Help from other

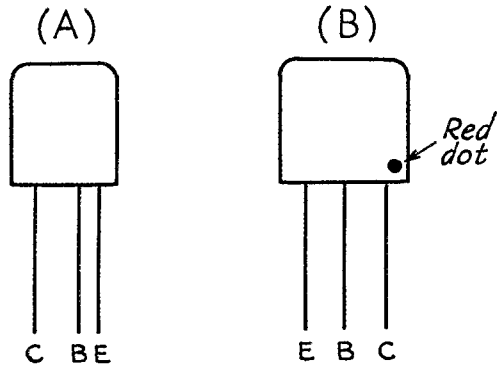


Fig. 3 — Code for identifying junction transistors. The leads are marked C-collector, B-base and E-emitter.

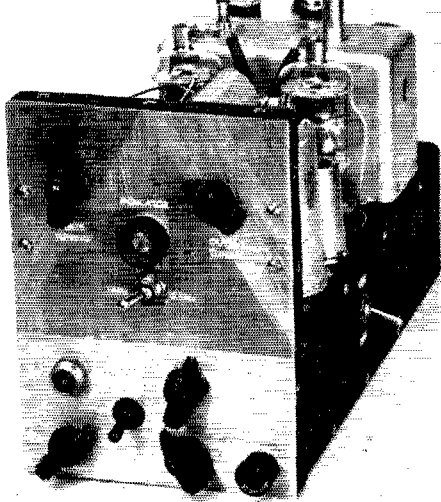
stations, prearranged schedules or pre-calling with a high-power rig just doesn't give the thrill that the low-power enthusiast is looking for.

Experience in using low-power transmitters has shown that it is more difficult than it really should be to raise other stations. Many a potential contact on hearing your weak signal assumes that atmospheric or other conditions are affecting your transmission; consequently, he passes up the idea of giving you a call because he figures his signal will be equally as weak at your station. Some sort of intelligence, therefore, has to be passed along in the general call so that it will be known your station is using low power.

Calls such as "CQ QRP" were tried unsuccessfully, probably because operators thought that the call was for another low-power station. This author suggests that a brief identifying "gimmick call" such as "CQ TR" be adopted by all stations using low power (less than one watt). Even if you are one of the "big boys" running the legal limit you can take part in the fun. The low-power man appreciates an answering call from anyone hearing his "CQ TR." Who knows — perhaps you might be bitten by the low-power bug, too!

The transmitter described in this article has been on the air for several months, resulting in lots of fun and many contacts. With an 85-foot center-fed antenna using a tuned line and antenna coupler seven states have been worked, the best DX being about 800 miles. All of the contacts have been made by ordinary calling procedure without prearrangement.

We hope that the above article has whetted your interest in the amazing little transistor. As you look over the photographs, you will be struck by the size of the transmitter. For instance, that equipment pictured on the preceding page is shown full size. It certainly isn't often that QST has been able to run a life size photo of a complete transmitter!



This two-band mobile s.s.b. transmitter is capable of up to 100 watts peak output, depending upon the power supply. Built on the chassis of a BC-458 transmitter, it uses the original VFO portion and the two output tubes. The phasing type of s.s.b. generation is used, and the audio amplifier has adequate gain for use with a crystal microphone.

On the panel, the upper knobs control output stage tuning and loading. The indicator light is used instead of a plate milliammeter, and the upper toggle switch is one of the two band switches. (The other bandswitch can be seen on the right-hand side of the chassis.) The lower left-hand knob is for the audio gain control, the toggle switch selects the sideband, and the two pointer knobs next to the switch are for carrier balance adjustments of the balanced modulator. The remaining knob tunes the VFO.



Cheap and Easy S.S.B.

Sideband Exciter Built Around the BC-458

BY ANTHONY VITALE,* W2EWL

• The following letter, quoted in its entirety, is self-explanatory.

Editor, *QST*:

Several months ago, Tony Vitale, W2EWL, was kind enough to give our radio club, the Ridgewood Amateur Radio Club, a talk on "Single Sideband."

Tony brought along a new exciter which he designed, built on a BC-458 chassis. It created a lot of interest among our members, with its compactness and very low building cost compared with the commercial exciters on the market. I was one of the many members bitten by the s.s.b. bug, and I have built this exciter. Several of our members have built them also, and they are very pleased with the results. Tony's talk was entitled "SSB Cheap and Easy," and it certainly turned out so.

My purpose in writing is to tell how pleased I am with this exciter. I have had many FB QSOs with it on very low power, and it didn't cost me over \$35, including the power supply. Most all of the fellows I talked with wanted to know more about this exciter, and I think it would be an excellent article to put in *QST*. We have named it the "W2EWL Special".

73,

Frank Hernandez, W2MOF

Glad to oblige, Frank; here is the "W2EWL Special".

MOST AMATEURS have either heard or actually experienced the advantages of single-sideband phone. The author's interests have been directed at mobile s.s.b. operation, because the boost in "talk power" for a given power supply one gets with s.s.b. really works to advantage in mobile work. W2EWL has been on 14-Mc. mobile s.s.b. for over 3 years, and during that time has participated in four-way QSOs involving ZLs and VKs, and a 7-way involving two African countries, one European country and three W call areas. The DX currently stands at WAC and 23 countries.

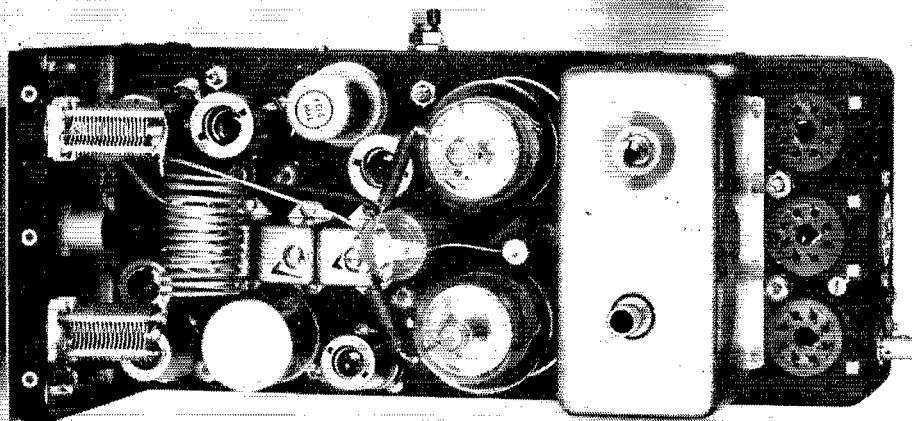
The exciter/transmitter to be described is not a one-of-a-kind deal, but represents a design that has evolved over the years. It is built around the VFO portion and on the modified chassis of a BC-458 (or T21/ARC-5), which tunes 5.3 to 7.0 Mc. in the original unit. These units sell from \$3.95 to \$7.95 in the surplus market, depending upon their condition. The design to be described uses the original output stage of the BC-458; the output will vary with the available plate voltage, and will be about 100 watts peak with a 1000-volt supply. The current W2EWL rig uses only one of the two 1625s in the original output stage, with 300 volts on the plate, to drive one 837 that in turn drives four 837s in a grounded-grid amplifier. The exciter hangs under the dash of the car, and the amplifier mounts in the trunk.

The Circuit

The photographs show two different units; one is for 14 Mc. only and the other is switchable to either 14 or 3.9 Mc. If you want only 3.9- or 14-Mc. operation, you can omit the unwanted circuits and a couple of toggle switches, but the rest of the circuit remains unchanged.

* East Glen Road, Denville, N. J.

The 14-Mc. version differs from the 2-band exciter in only a few respects. This view shows V_7 , V_{10} and V_{11} removed from their sockets; the coil adjustment screw visible between the V_{10} and V_{11} sockets is L_7 . This coil is link-coupled to a similar coil at the other L_7 location shown in another photograph.

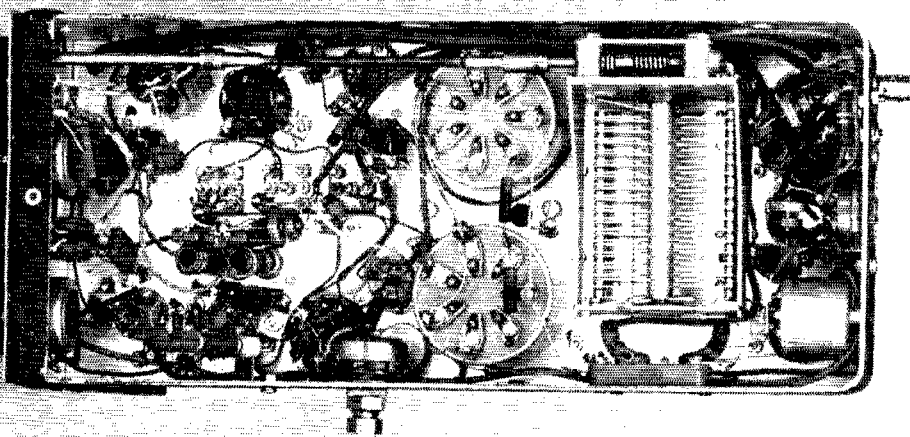


The circuit of the exciter is shown in Fig. 1. Much of the circuit is similar to "S.S.B. Jr.," the excellent design published some years ago.¹ The s.s.b. signal is generated at 9 Mc. and heterodyned to either 14 or 3.9 Mc. by beating against the VFO unit of the BC-348. To change bands, it is only necessary to flip two toggle switches and change the VFO setting.

Running through the circuit, the microphone

¹ In the November-December, 1950, issue of *G-E Ham News*.

signal is amplified through V_1 and V_{2A} . The gain is controlled by the setting of the 1-megohm gain control. The audio signal is then coupled through T_1 to an audio phase-shift network. This network isn't shown in the schematic, but J_2 is the octal tube socket it plugs into. For anyone who has fears and doubts about the complexity of an audio phase-shift network, forget them; the B&W Model 350 is inexpensive, comes sealed in a metal tube envelope, and all you do is plug it into the socket.



A view under the chassis of the 14-Mc. exciter. The only significant difference between this unit and the two-band exciter is the absence of the bandswitches, the change in size of L_8 , and the 4-turn link coupling between an L_7 in the plate circuit of V_7 and an L_7 in the grid of V_3V_9 .

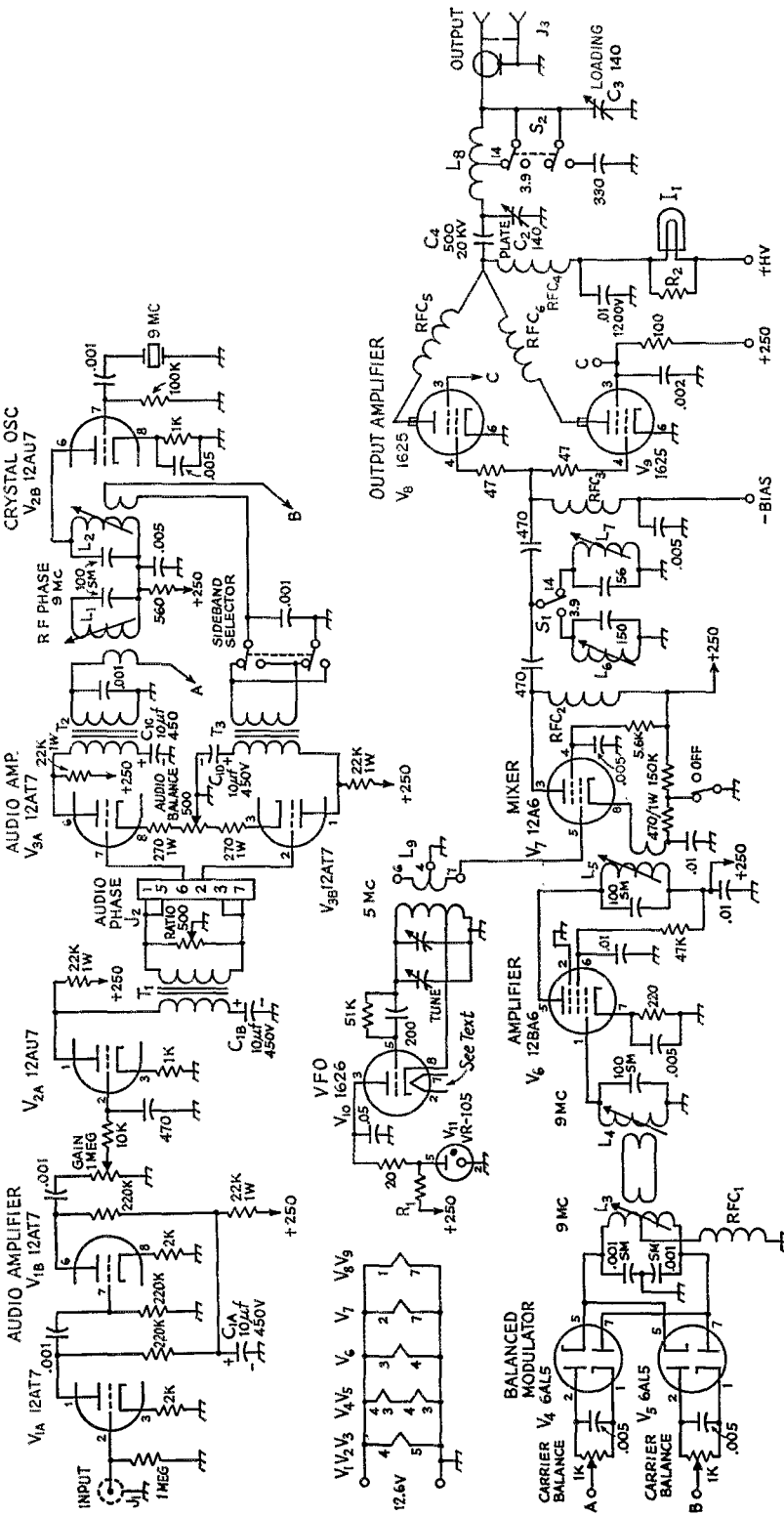


Fig. 1 — Schematic diagram of the mobile s.s.b. transmitter. Resistors are $\frac{1}{2}$ watt unless otherwise noted. Decoupling capacitor values are in μ f. 5M = silver mica.

C1 — Quadropole electrolytic, 10-10-10-10 μ f. at 450 volts.
 C2, C3 — 140- μ f. midget variable (Hammarlund HF-140).
 C4 — 500- μ f. 20-kilovolt ceramic.
 R1, R2 — See text.
 R3 — 500- μ f. 20-kilovolt ceramic.
 Coils L1 through L7 are wound on slug-tuned forms $\frac{3}{16}$ inch in diameter. See text.
 L1, L2, L3, L4, L5, L6 — 25 turns No. 22 enam. Link, 4 turns
 L3 — 8 turns No. 10 enam. 1-turn link.
 L5 — 40 turns No. 26 enam.
 L7 — 25 turns No. 22 enam.
 L8 — 46 turns No. 20 bare, wound 16 turns per inch. 1-inch diam. Tap at $8\frac{1}{2}$ turns from C2 end. (B & W 3015). For 14 Mc. only, use 12 turns No. 14 wound to occupy $1\frac{1}{8}$ inches, $1\frac{1}{8}$ diam.
 J1 — Microphone jack.
 J2 — Octal socket.
 J3 — Small coaxial cable receptacle, UG-290/U.
 RFCs, RFC2, RFC3 — 500 μ h.
 RFC4 — 1 or 2.5 mh. 300 ma.
 RFC5, RFC6 — 20 turns No. 22 enam., wound on $\frac{3}{16}$ inch form (high-value resistor) and spaced to occupy $\frac{1}{2}$ -inch winding length.
 T1 — 20,000 to 600-ohm transformer. See text.
 T2, T3 — 20,000 to 200-ohm transformer. See text.

The phase-shift network requires two audio signals of different amplitudes in the input to give equal signals in the output, and the 500-ohm potentiometer across the secondary of T_1 is included to obtain the proper ratio. The two output signals, of equal amplitude but differing in phase by 90 degrees, are applied to the grids of V_3 for further amplification. To insure equal gain through V_{3A} and V_{3B} , the 500-ohm audio-balance control is included. The two signals are coupled to the balanced modulators through T_2 and T_3 , and these transformers are shunt-fed to minimize undesirable phase-shift characteristics.

The balanced modulator circuit is similar to that in "SSB Jr." except that 6AL5 dual diodes are used instead of germanium diodes. The two 1000-ohm carrier-balance controls permit compensating for inequalities in the diodes. Selection of either upper or lower sideband is provided for by the d.p.d.t. sideband-selector toggle switch. Of the controls mentioned thus far, only the gain and sideband selector are panel controls, unless you count the casual mention of the bandswitch.

The r.f. for the balanced modulator is furnished by a 9-Mc. crystal oscillator stage, V_{2B} . The two tuned circuits are link-coupled to the balanced modulator, and L_1 is coupled inductively to L_2 . When these circuits are undercoupled and detuned from resonance, the r.f. on the coils and in the links can be adjusted to be 90 degrees apart. This is an adjustment that is made once when the transmitter is finished.

The 9-Mc. s.s.b. suppressed-carrier signal is amplified in V_6 and coupled to the grid of the mixer tube, V_7 . Output from the 5-Mc. VFO (BC-458 oscillator stage) is coupled to the grid of the mixer. The output of the mixer will be the sum (14) or difference (4) frequency, depending upon the frequency to which the plate circuit is tuned. This is selected by the position of the toggle switch, S_1 . Output of the mixer stage drives the output stage, V_8V_9 . The plate circuit of the output stage is a pi network, band-switched by toggle switch S_2 . A small panel lamp in the plate-power lead of the output stage is used to indicate the plate-current changes and is useful in tuning and in monitoring the voice level. The lamp socket should be well insulated from the chassis, of course, and the value of the shunting resistor, R_2 , will depend upon the current drain of the final which, in turn, depends upon the plate voltage and the operating conditions. The W2EWL unit uses a 2-watt W.E. pilot lamp mounted in an insulated fuse holder. A meter could be substituted, of course.

View under the chassis of the two-band "W2EWL Special." The VFO control shaft at the right is made from the original coupling control of the BC-458.

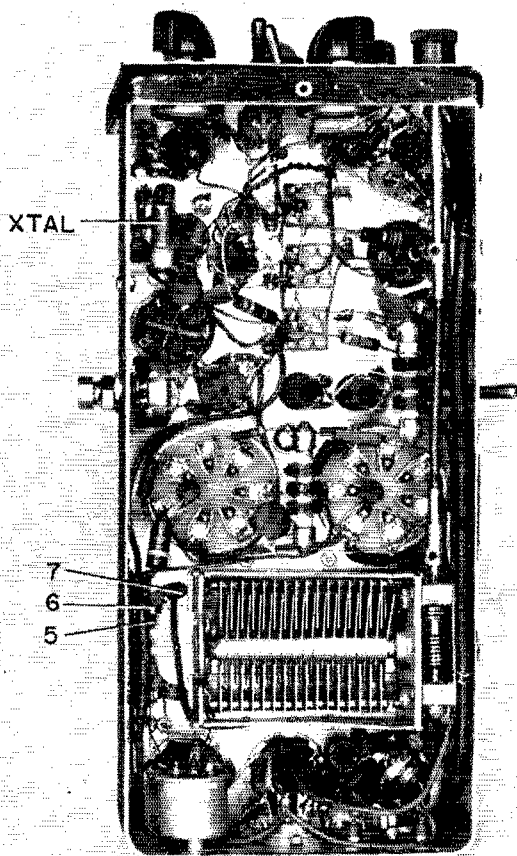
The switch in the V_7 cathode circuit is the most convenient point to turn the exciter on and off. The switch can be one pole of a relay used to key the antenna relay and to disable the receiver, and it can be controlled by the push-to-talk switch. You won't find it in the photographs because it isn't there. In a mobile installation it is usually outrigger; in a home installation it will probably be in the voice-control circuit.

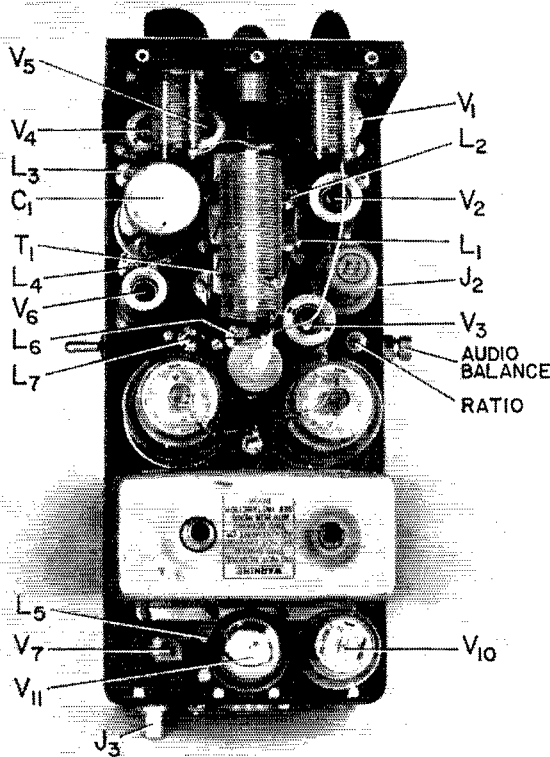
The bias for the output stage is most conveniently furnished by a small battery; the value of the bias voltage will depend upon the plate voltage that is used. The output stage can be driven into Class AB_2 operation, or it can be operated in Class AB_1 with slightly less output but better linearity.

Construction

Construction is started by the removal of all of the original wiring of the BC-458 except the 1626 oscillator circuit. The two sockets adjacent to the 1626 are retained, for V_{11} and V_7 , and the two 1625 sockets are left on the chassis. The original screen by-pass capacitor for the 1625s is retained. All of the other components are removed from the chassis but retained; they may come in handy at some future date. (The output loading coil and wheel can be used with a base-loading coil on 75.) The knob and shaft that controlled the link coupling in the original unit are used to make up to the flexible coupling to the VFO tuning capacitor (See photos).

The next step is the drilling of the new holes





Top view of the two-band exciter. The B & W Phase-Shift network is in the light-colored "tube" plugged in J_2 .

and a UG-290/U receptacle is added (J_3). The socket for the 9-Mc. crystal can be mounted on a small bracket on the side of the chassis, under the V_2 socket.

Oscillator Wiring

The numbers shown on L_9 in Fig. 1 represent the numerical order of the terminals from the VFO assembly, reading from the rear to the front. The wire from Terminal 1 will have been removed, and the wires from 2 and 3 will be left as is. The black wire from 4 should be grounded to the chassis. The white wire from Terminal 5 ("hot" heater lead) is left connected to the .006- μ f. fixed capacitor and the "hot" side of the 12.6-volt heater circuit. The black lead from 6 to the neutralizing capacitor is removed, and the lead from 7 is carried over to Pin 5 of the V_7 socket.

On the oscillator socket, V_{10} , the red lead at Pin 3 that ran to the tuning-eye socket is removed, and the red lead from Pin 4 is run to Pin 5 of the V_{11} socket (old crystal socket). This is the pin to which R_1 is connected; the value of R_1 will be 5000 ohms, 5 watts, if a 250-volt supply is used.

Other Wiring

Not much need be said about the rest of the wiring, since everyone has his own pet tricks. In the construction of the coils L_1 through L_6 , the link windings are wound over the "cold" ends (grounded end) with the same wire that is used for the twisted link lines.² The single exception is the 1-turn link winding of L_3 , and this winding should be dead center on L_3 .

Adjustment

As in any transmitter, the initial adjustment is a step-by-step process. To do a good job with this unit, you should have an audio oscillator and a simple oscilloscope, which you may be able to borrow for the occasion if you don't have them in your shack. You will also need a receiver and, if you run into any troubles, a v.t.v.m. or other test meter.

(Continued on page 110)

for sockets, transformers, coils and potentiometers. Although larger transformers can be crowded into the available space, the small transformers shown in the photographs are very convenient.² Holes are also required for the insulator that supports C_4 , for the mounting of RFC_4 , and for the four-section electrolytic capacitor, C_1 .

A new panel of sheet aluminum is used over the old panel. The tuning capacitors C_2 and C_3 , the pilot lamp I_1 and the band-change toggle S_2 are mounted on this panel above the level of the chassis deck. On the same panel, below the level of the deck, you will need holes for the two carrier balance potentiometers, the gain control, the microphone jack J_1 , the sideband selector switch (toggle) and the VFO tuning.

The ratio potentiometer is mounted on the left-hand side of the chassis (viewed from the front), and the audio-balance potentiometer is mounted on the deck near V_3 and the audio phase-shift network. A CTC "Minipot" ($\frac{3}{4}$ -inch diameter) will fit more conveniently here than the standard controls. S_1 is mounted on the right-hand side of the chassis.

At the rear of the chassis, a regular octal socket can be substituted for the original power socket.

²The three transformers are available as a set from Electronics Associated, P.O. Box 206, Montclair, N. J. The price is \$7.95.

³We used coil forms from a surplus unit marked "Z101." The unit, with 12 of the coil forms in it, was obtained for \$1.50 from Vet Salco, Paterson, N. J.

Switch to Safety

One Ham's Ordeal

ROBERT D. BASS, W3JSI,* ex-W4CQG

Now it can be told. For many months I have kept the following article on the table in my shack. I wrote it as a warning to others, but I still trembled too badly to see it in cold print. Now the scorched nerves in my palms have ceased tingling, the memory of the excruciating pressure across my chest and shoulders is fading, and I can even smile wryly at my experience in the deadly tentacles of my transmitter.

Be warned. *Switch to safety.*

. . . . It was 11 o'clock on an October morning that I had my nearest brush with death. I was almost electrocuted by my amateur radio transmitter. It was not the feared high voltage, but the despised 115 volts a.c. that wrapped around and squeezed me like a hungry python until I passed into unconsciousness.

That old devil TVI was the cause of it all.

In May, 1951, I pulled the big switch at W3JSI, lowered the four-element rotary beam for 20 meters, and carried the transmitter up to the attic. On June 1 we sailed for England, to visit our son who was a Rhodes Scholar at Oxford University. Then I matriculated as a Research Student at the University of Cambridge—and became a visiting member of the Cambridge Amateur Radio Club.

The XYL and I had a wonderful time at Cambridge. Upon our return to Annapolis, she and I set about housecleaning, for our oldest son was bringing home a Scottish bride as a souvenir of his years in Britain. Among other improvements, the breakfast room was repossessed and W3JSI banished to the cellar.

The cellar was damp, and every time I touched a switch, I got just enough tickle to remind me of the concrete floor. So I built a wooden platform, 6 by 12 feet, and set the transmitter, operating table, receiver, and associated gear upon it. Tickles ceased, and on September 12 I sent my first cheerful, post-Cambridge CQ.

Upon our return, I had noted that our nearest, friendliest neighbor now had a miniature three element beam on the top of his house. High-pass, low-pass, some jack, and I was game. After building a six-section low-pass filter, I

began changing over from 600-ohm feed lines to RG8/U coax.

Great — until I reached the 20 meter antenna. The old delta-matched four element rotary was the sweetest thing that ever inhaled DX. But how does one fit a 52-ohm coax into an 8-ohm impedance? A mobile passed the QTH, and out of the dust and QRM floated a vertical antenna. I had a solution.

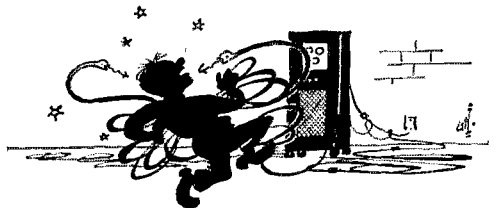
October 8 dawned clear, crisp, and beautiful. It was just the kind of day on which one would not choose to die. After breakfast I stripped the elements from the old rotary, shoved four quarter-wave sections into the damp garden soil for radials, joined them at the center, and on a pole about six inches above them fastened a quarter-wave vertical radiator. I then connected the center conductor of the RG8/U to the vertical radiator and the sheath to the center of the radials.

What a neat installation. What a perfect electric chair!

The transmitter sits in a large screen cage; the entire rig is connected into the ground side of the a.c. line¹. In my excitement over a new antenna, low angle radiation, and DX, I had forgotten to ground the cage or polarize the line². Safely insulated on its platform and rooking with a.c. voltage, the transmitter quietly bided its time.

I grasped the end fitting on the coax feedline from the transmitter firmly in my right hand and ran over to the window where I grabbed the fitting on the coax from the vertical in my left hand.

Death struck. I became a living fuse.



"Help! Help! Help me!" I screamed.

My hands were vibrating violently. My shoulders and chest felt as if they were being squeezed in the coils of some monster. My breath was short and quick.

Few men die without struggle. I struggled. I fought. I writhed. I overturned chairs and the ping-pong table. But I could not free myself. There were 20 feet of loose coax grasped firmly in each hand, and like black vipers these cables trailed me, clinging, frying, sizzling.

(Continued on page 116)

*11 Ridgely Ave., Annapolis, Md.

¹ At least two dangers exist, however. First, that "ground" wire may not actually be a good ground, and secondly, it is too easy to plug in the equipment with the wrong "polarity," so the gear is above ground by at least 115 v. Thus, never take anything for granted. Use an ohmmeter to check the quality of your "ground." Use polarized plugs. Switch to safety.

² So that when death tried to strike, it was in the form of a 115 v. a.c. potential existing between the braid of the coax connected to the rig and the braid of the coax connected to the true earth ground at the base of the antenna.

A Crystal-Controlled 432-Mc. Converter

Top U.H.F. Performance at Moderate Cost

BY ERNEST J. BERNARD,* W5NSJ

ANYONE WHO has attempted long-distance work over difficult paths on 420 Mc. will agree that a stabilized transmitter, a stable low-noise converter and a sharp tunable i.f. are necessities. The converter described here is the result of several months' work on a design that would fill the needs of most u.h.f. workers. It has been duplicated simply and economically, with a minimum of special equipment.

Two 6AN4 triodes are used as r.f. amplifiers ahead of a crystal mixer. The output of the mixer is fed to a low-noise bandpass 6BQ7 preamplifier, the output of which goes to the receiver used as a tunable i.f. at 14 to 18 Mc. The oscillator multiplier chain starts with either an 8.708-Mc. or 26.125-Mc. crystal multiplying to the injection frequency of 418 Mc. with a 6U8 and a 6J6.

With some care in adjustment the over-all noise figure can be maintained practically constant over 432 to 436 Mc. without readjustment of the r.f. tuning, after it has been set at 434 Mc. The image rejection with this adjustment is 37 db., and the noise figure about 6 db. The noise figure can be improved by reducing interstage coupling between the r.f. amplifiers but this reduces the bandwidth and makes it necessary to retune the r.f. stages to cover the band.

The power supply requirements are 200 volts at about 50 milliamperes and 6.3 volts at 1.75 amperes for the heaters. The converter is assembled on a $7 \times 9 \times \frac{1}{16}$ -inch aluminum plate which is screwed on to a $7 \times 9 \times 2$ -inch metal chassis, zinc plated (ICA Type 1569).

R.F. Circuit Features and Construction

The first r.f. stage is a 6AN4 grounded-grid amplifier, with a gain of approximately 14 db. For best noise figure it is operated at a plate voltage of 200, with a 100-ohm cathode resistor. At 150 volts the noise figure is .1 db. higher. The antenna is coupled directly to the cathode through C_1 , the cathode and heater being main-

* 3121 Madeira Drive NE, Albuquerque, N. M.

• There are two ways to receive on 420 Mc. One is to convert any of the various radar and altimeter equipments that are available on the surplus market. This will do — if you don't want to hear any farther than you can see. The other is to build your own converter, to be used ahead of a communications receiver. When the latter approach is employed properly the 420-Mc. band comes alive, and we find that work is possible over distances comparable to those covered on 114 Mc. Here is a converter that will deliver that kind of 420-Mc. reception.

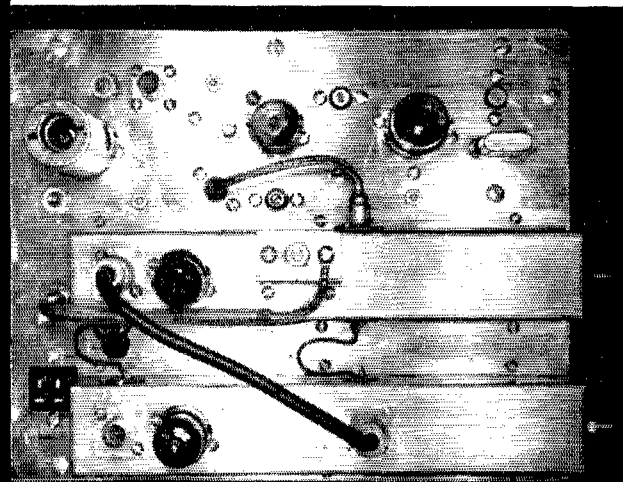
tained above ground potential for r.f. by chokes. If a balanced transmission line is used with the antenna a balun will be needed between the line and the input to the amplifier.

The plate circuit of the amplifier is a half-wave trough line tuned by means of a miniature capacitor. With the dimensions shown, 434 Mc. falls at about mid-range of C_{15} . Plate voltage for the 6AN4 is fed through a decoupling resistor, which is soldered to the plate line at the point of minimum r.f. voltage. Output is taken from the amplifier by means of a small loop, also located at the voltage minimum point. Silver-mica button capacitors are specified in the parts list for C_2 and C_3 . Lower-cost ceramic-type feed-through capacitors may be used if the necessary mechanical changes are made so that C_2 and C_3 do not interfere with C_5 and C_6 on the second r.f. stage. The value of C_1 is not critical. Anything from 250 to 5000 $\mu\text{mf.}$ can be used, but the leads should be kept short as possible.

The amplifier is constructed on a small chassis bent from sheet brass or flashing copper. The latter is recommended for the builder who does not have bending equipment available, as it can be bent to shape around small wooden blocks or short sections of angle iron. Details of the am-

Top view of the W5NSJ 432-Mc. converter. The two r.f. stages are trough lines. The crystal oscillator, multiplier and i.f. output stages are across the top of the picture.

QST for



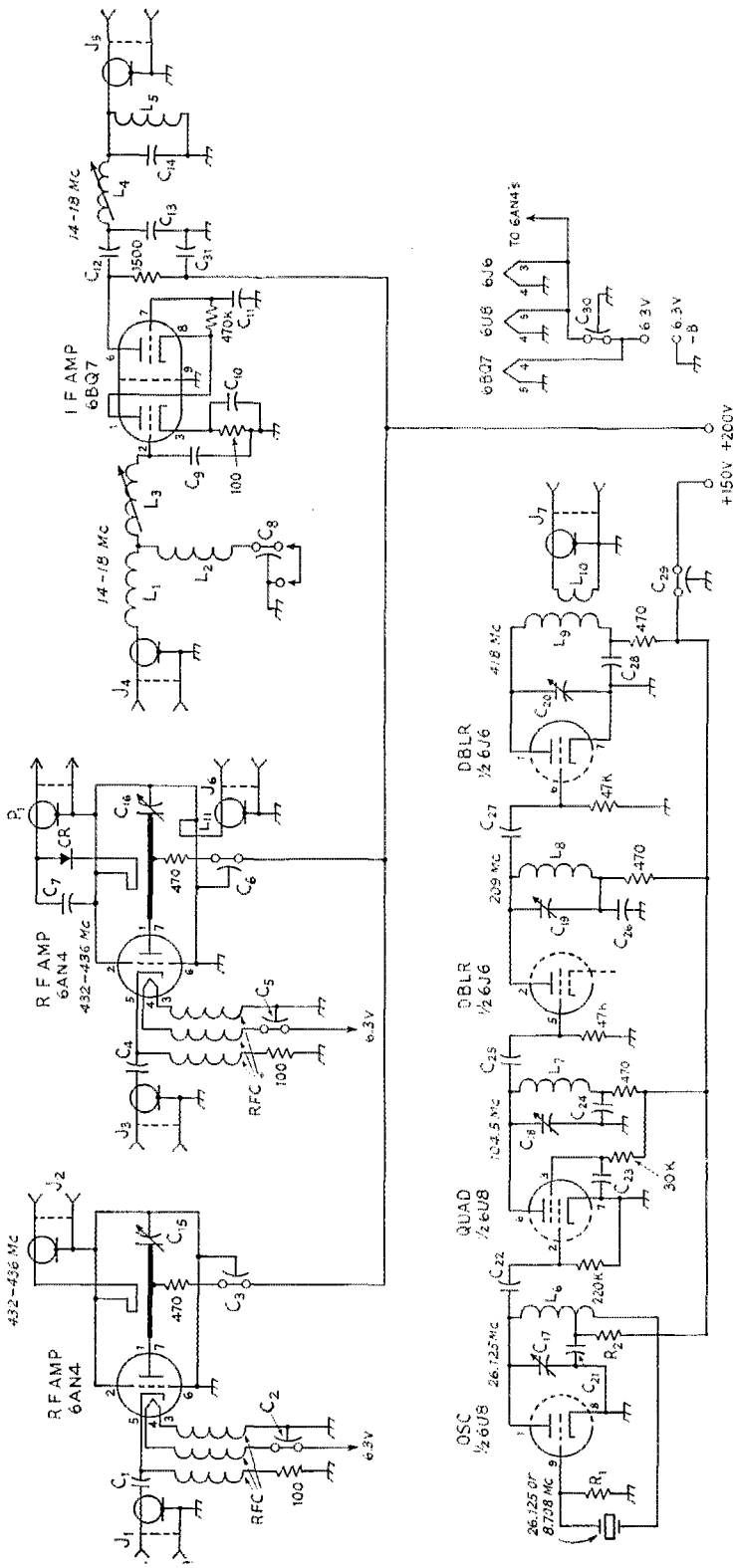
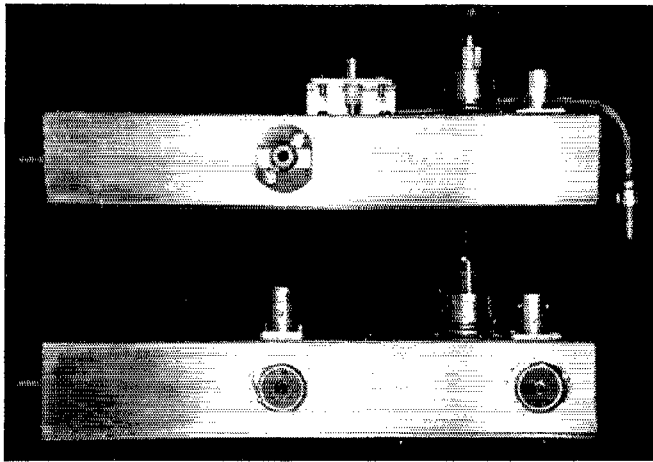


Fig. 1 — Diagram and parts information for the 432-Mc. converter. Resistors 1/2-watt unless specified.

- C₁, C₄ — 0.001- μ f. ceramic tubular.
- C₂, C₃, C₆, C₉, C₃₀ — .0005- μ f. Silver-mica feed-through, button type.
- C₇ — 55- μ f. special; see text.
- C₈ — 0.001- μ f. ceramic feed-through.
- C₁₀ — 5- μ f. ceramic (Erie NPO).
- C₁₁, C₂₁, C₂₄, C₂₆, C₃₁ — 0.005- μ f. disk ceramic.
- C₁₂ — 0.001- μ f. tubular ceramic.
- C₁₃ — 15- μ f. ceramic (Erie NPO).
- C₁₄ — 150- μ f. silver mica; see text.
- C₁₅, C₁₆, C₃₀ — Johnson 9M11 miniature variable. Remove one rotor plate from C₁₅ and C₁₆.
- C₁₇ — 50- μ f. trimmer (Hammarlund APC-50).
- C₁₈ — 25- μ f. trimmer (Hammarlund APC-25 reduced to 3 stator and 3 rotor plates).
- C₁₉ — Same as C₁₅, but reduced to 2 stator and 2 rotor plates. Leave stator bars full length.
- C₂₂ — 20- μ f. for standard crystal; 50- μ f. for plated overtone crystal.
- C₂₃ — 50- μ f. mica or ceramic.
- C₂₇ — 8- μ f. ceramic (Erie NPO).
- C₂₈ — 500- μ f. silver-mica button stand-off.
- R₁ — 47,000 ohms for standard crystal; 100,000 for plated overtone type.
- R₂ — 470 ohms 1/2 watt or 10,000 ohms 1 watt, as above.
- L₁ — 9.5 turns No. 26 enam., close-wound on 3/8-inch polystyrene rod, 0.52 μ h.
- L₂ — 17.5 turns No. 26 enam., similar to L₁, 1.13 μ h.
- L₃ — 28 turns No. 26 enam. on 3/8-inch slug-tuned form, 5.1 μ h. (CFC LS-3 form).
- L₄ — 21 turns similar to L₃, 3.5 μ h.
- L₅ — 9 turns similar to L₁, 0.5 μ h.
- L₆ — 19 turns No. 20 enam., close-wound on 3/8-inch polystyrene rod. Tap at 4 turns for 8-Mc. crystal. For overtone crystal use 15 turns, re-turning crystal to ground instead of to added portion of coil.
- L₇ — 3 turns No. 18 enam., 7/16 inch long on 3/8-inch polystyrene rod. An additional half turn is used at each end to thread through the form.
- L₈, L₉, L₁₀ — See Fig. 3 and text.
- L₁₁ — No. 20 tinned wire 1/2 inch long bent to form loop from J₆ to chassis.
- J₁, J₂, J₃, J₄, J₅ — Coaxial receptacle (Amphenol 31-003; Military UG-390/U).
- J₆, J₇ — Coaxial receptacle, phono type.
- P₁ — Coaxial plug, phono type. See cable details, Fig. 6.
- RFC — 16t No. 22 enam. 1/4 inch diam., 3/4 inch long.



R.f. stages of the 432-Mc. converter. The upper unit is the second stage, showing the built-in mixer assembly.

plifier chassis and hole locations are shown in Fig. 2. The 7-pin ceramic socket for the 6AN4 is mounted so Pins 1 and 7 face C_{15} .

The socket selected should have a center shield ring. This is broken off flush with the surface of the ceramic. Next, a shield plate is soldered across the trough, centered over the socket. The two grid lugs fit into notches in the shield, and the cross shield is soldered to the center ring. Make sure that the shield is snug against the ceramic portion of the socket and that the grid pins are soldered to the shield as close to the ceramic as possible.

Continue by installing coax fittings and output loop, wiring the input circuit, mounting C_2 , C_3 , C_{15} . Then solder the plate line in place, centering it in the trough. Complete by installing the resistor, connecting it to the plate line directly across from C_3 .

The second r.f. amplifier is similar to the first except for the mixer section, which is part of the second stage assembly. The mixer system used in this converter is simple and easily duplicated, and it works as well as a coaxial mixer tried previously. Several types of crystals have been used, but the G7A, 1N82 and CK710 are able to take more r.f. before burning out than the 1N21 and other radar types. An adapter can be made for the CK710, to permit its use in the crystal mounting of this converter.

The crystal mixer is coupled to the plate line of the second r.f. amplifier by means of a loop $\frac{5}{16}$ by $1\frac{3}{4}$ inches, spaced $\frac{1}{32}$ inch from the line (see Fig. 3). The ungrounded end of the loop is connected to a terminal lug (removed from an 8-prong socket) mounted on a small polystyrene insulator block. The small end of the crystal plugs into this lug terminal. After the insulator has

been cut to shape and drilled, the lug is installed by heating the upper end with a soldering iron and pressing the flat part through the small section of the center hole in the insulator. The upper part of the hole should be large enough to allow for expansion of the lug when the crystal is plugged in. The insulator is bolted in with two 4-40 screws as shown in the bottom view of the amplifier-mixer assembly.

On top of the trough is bolted the crystal holder ground plate which serves as one side of C_7 . The holder top plate is the other side of C_7 , the dielectric being six layers ceramic envelopes used for packaging ceramic capacitors.

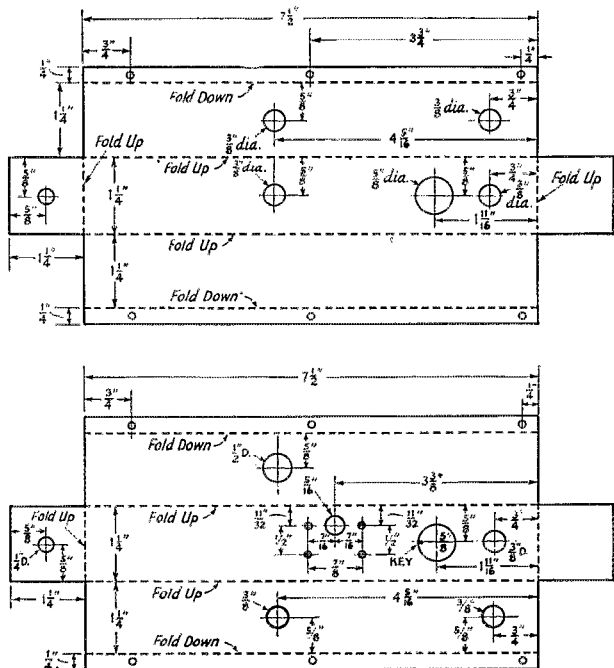


Fig. 2 — Detail drawing of the r.f. (upper) and mixer trough lines before bending.

Its capacitance should be about 55 μf . The top plate is sheet brass or copper. A short piece of thin-wall tubing with four slots is soldered to the plate. After assembly the four fingers formed by the slotted tubing are bent in slightly so they make good contact with the large end of the mixer crystal. Tubing used for the above can be obtained from hobby shops in one-foot lengths.

Details of the crystal mounting are shown in the photograph below, and Fig. 4. On one side of the trough can be seen the small injection loop L_{11} connected to a phontotype jack. The size of this loop determines the amount of crystal current. The 418-Mc. injection signal is coupled to the plate line of the amplifier and from it to the mixer loop. The amplifier line acts as an effective transmission filter, letting only the 418-Mc. signal through and attenuating other frequencies from the multiplier. Very little signal is coupled directly from L_{11} to the mixer loop, because of its position. Unwanted injection frequencies cause mixer noise and may result in spurious response to signals from outside the intended range.

Mixer performance is improved by having ample injection. This allows loose coupling and prevents signals from the amplifier from being absorbed by the injection source.¹ When using the converter near a high-power transmitter it is advisable to provide some protection for the mixer crystal, such as breaking the plate supply to the r.f. amplifiers during transmission. This holds the amount of r.f. reaching the crystal to a safe value. The noise figure measured at the input to the second r.f. amplifier at 434 Mc. runs from 7 to 8.5 db., representing the best and worst tube and crystal combinations.

I.F. Preamplifier

The output of the crystal mixer is fed into a low-noise band-pass amplifier using a 6BQ7 tube. Satisfactory operation at this frequency could be

¹ John Thompson, *Radio Communication at Ultra High Frequency*, Methuen & Co., Ltd., London. Chapter IV, Receiver Input Circuits.

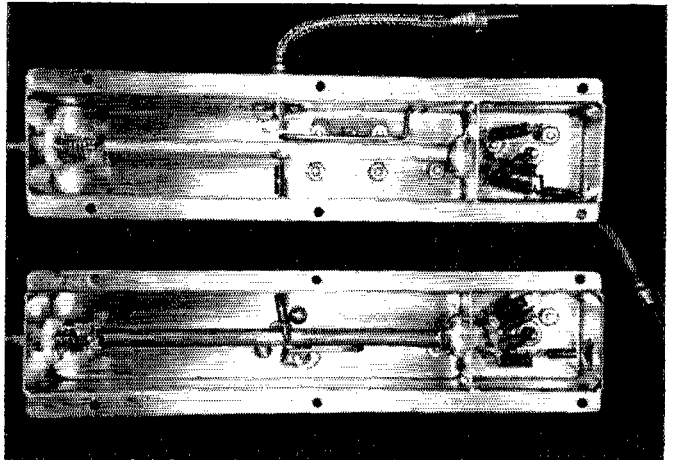
² C. F. Hadlock, "Band-pass Circuit Design for Crystal-Controlled Converters," *QST*, Feb., 1954.

obtained with a pentode, but the cascode circuit is simple and more readily stabilized. The band-pass coupling networks were designed for transitional coupling which gives a response only 1 db. down at 14 and 18 Mc. The 300- to 400-ohm output impedance of the crystal mixer is matched to the input grid by means of a network² consisting of L_1 , L_2 , L_3 . Only L_2 is tuned with a powdered-iron slug; L_1 and L_2 are fixed and do not require adjustment if wound according to data given. The output coupling was designed for the same bandpass as the input and has an output impedance of about 100 ohms. The capacitance of the output cable, plus that of C_{14} , should equal 200 μf . The coils in the input and output networks are mounted so as to have minimum coupling to each other, permitting better control of the coupling within the networks.

The fixed inductances are wound on $\frac{1}{4}$ -inch phenolic rod and the variable inductances on $\frac{3}{8}$ -inch LS-3 coil forms. The brass portions are removed from the slugs in this application. They can be used if necessary to vary the inductance over a wide range, compensating for inaccuracy in values of C_9 and C_{13} . A phono-type connector is used for the input to the preamplifier. The lower end of L_2 is soldered to a feed-through-type capacitor C_8 , to provide for measurement of crystal current. In normal operation a jumper is connected across C_8 ; crystal current is measured by connecting a meter in place of it. The installation of a feed-through capacitor for C_8 was done after the photos were taken. Though several capacitors in the present model are 0.005- μf . ceramics, it is permissible to use any value between 0.001 and 0.005 μf .

A gain of 20 db. was measured for the i.f. amplifier. As a further check, the noise figure of an HQ-129X was measured at 8.5 db. at 14 to 18 Mc. The preamplifier was then connected to the receiver and a noise figure of 3 db. measured at the input to the preamplifier. The choice of 14 to 18 Mc. as a tunable i.f. was made mainly because some receivers operate better in this range than higher. A better noise figure is ob-

◆
Looking under the r.f. amplifier assemblies, in the same position as the side-view photograph.
◆



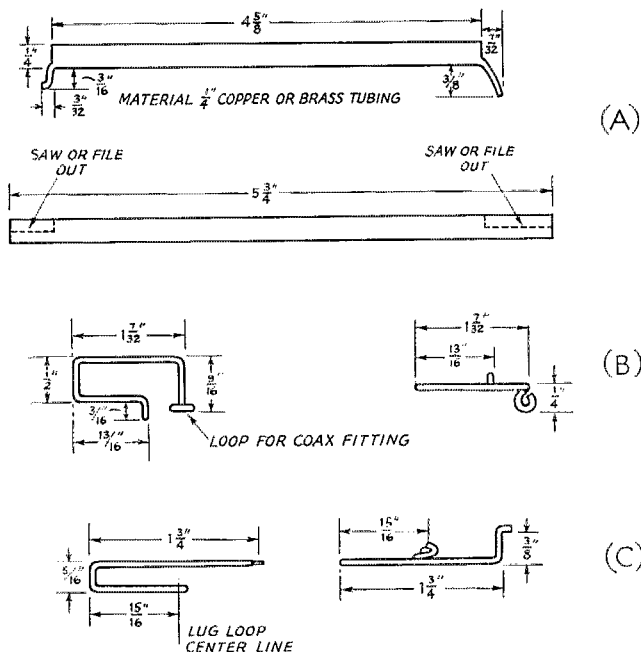


Fig. 3—Details of the plate lines and coupling loops. The inner conductor is shown in finished and rough form at A. The first r.f. amplifier output coupling loop is at B, and the mixer coupling loop at C. Side views are at the left; top views are at the right. Both loops are made of No. 14 enamelled wire.

tained from a 420-Mc. crystal mixer when it is operated into an i.f. of 30 to 60 Mc. rather than at 14 Mc.; but with two r.f. stages ahead of the mixer the over-all noise figure is affected very little by the mixer noise figure, so the deterioration resulting from the lower i.f. can be neglected.

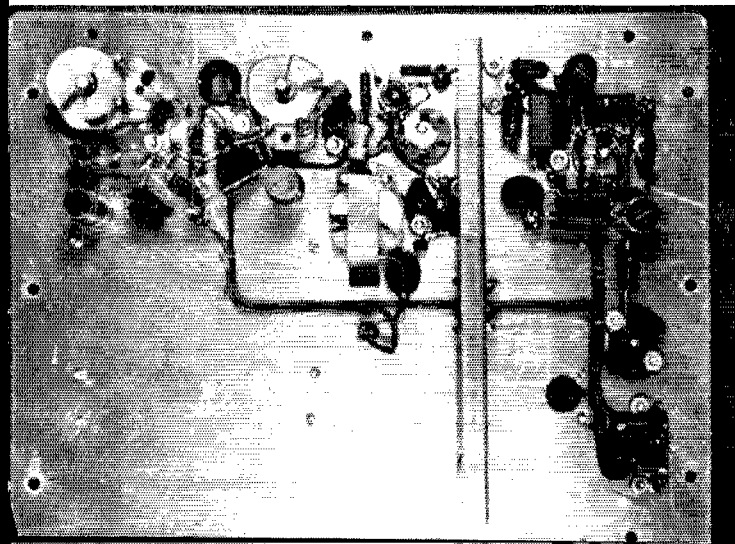
One precaution to be observed in the construction of the preamplifier is the location of the ground returns, especially on C_{31} and C_{11} . If these two capacitors are returned to the same ground lug oscillation may occur. To prevent trouble install three separate lugs on one side of the socket and two on the other. Capacitors C_9 and C_{10} connect to one of the three lugs, C_{14} and L_5 to another and C_{11} and Pin 5 to the third. At the opposite side of the socket, the cathode resistor and Pin 9 are grounded to one lug and C_{31} to the other. Also note that the grid of the 6BQ7, Pin 2, connects to the end of L_3 which is near the chassis plate, and the plate coupling capacitor C_{12} connects to the end of L_4 away from the chassis

plate. This will help maintain the desired circuit capacitances.

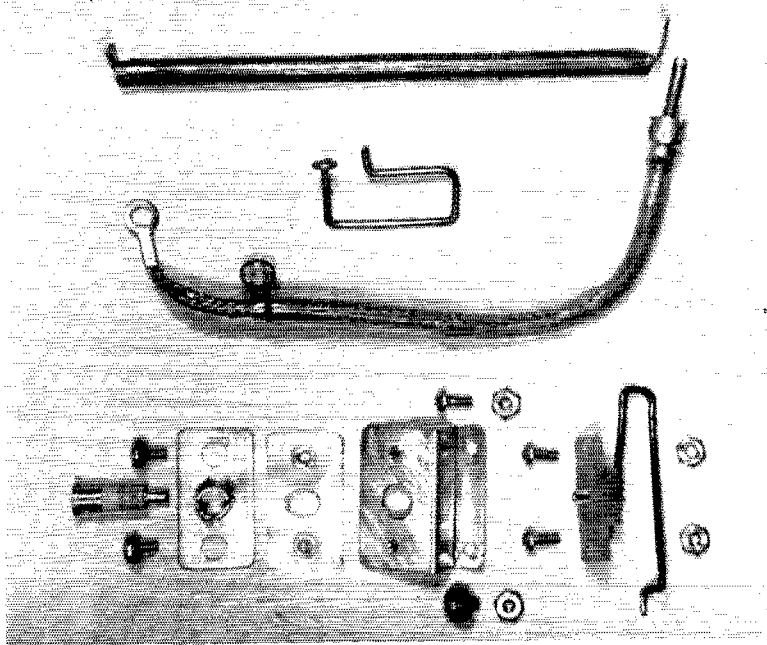
Oscillator Multiplier Section

The oscillator-multiplier section is constructed on the main chassis plate in line with the i.f. amplifier stage. Its operation and construction are very much like a low-power u.h.f. transmitter. The output frequency, 418 Mc., is fed to the mixer where it beats with a received signal in the range of 432 to 436 Mc., to produce an i.f. of 14 to 18 Mc.

The triode half of a 6U8 can be used as a regenerative overtone oscillator with a standard cut 8708-kc. crystal oscillating on its third overtone, or as a standard triode crystal oscillator with no extra feed-back, for a 26,125-kc. crystal cut for overtone operation. The use of an overtone cut is recommended, as others may not come out on the right frequency. Overtone crystals with accurate calibration are available from



The main portion of the 432-Mc. converter is built on a plate that fastens on top of a standard chassis. In this view the i.f. stage is at the right. Oscillator and multiplier stages run from left to right.



Parts of the r.f. amplifier and mixer assembly. At the top is the inner conductor of the line. Next are the output coupling loop and the coaxial assembly that carries the i.f. output from the mixer. In line across the bottom of the picture are the mixer crystal, the top plate of the mixer assembly, the insulating leaf, the bottom plate and the mixer coupling loop.

stages should be for maximum crystal current, read on a 0-1-ma. meter connected from C_8 to chassis.

As a starting point in the r.f. alignment, set C_{16} in the second r.f. amplifier-mixer assembly to mid-range. Apply power to all sections of the converter and tune C_{20} (418-Mc. doubler) for maximum crystal current. This should occur at mid-range of C_{20} .

The chassis plate should now be mounted on the base. This detunes the circuits slightly, making it necessary to trim up the adjustments for maximum crystal current, except for the oscillator which should be set at the point where it starts readily each time. If the crystal current is much over 1 milliamperes bend the injection loop, L_{11} , toward the chassis.

With the converter connected and the receiver tuned to 16 Mc. (434 Mc.) and an antenna or noise generator connected to the first r.f. amplifier, tune C_{16} (second r.f. amplifier) for maximum crystal current. Continue toward minimum capacity until a noise peak is reached. Another peak due to the image may occur on the low-frequency side of the crystal current peak, but this may be ignored. Tune C_{15} in the first r.f. amplifier for maximum noise, making sure it is not tuned to the image. The image will be weak if it can be heard at all. The next step is to check the crystal current and adjust it by bending the injection loop L_{11} until it is 0.6 milliamperes when the second r.f. amplifier is tuned for maximum noise. At this point the 418-Mc. doubler can be trimmed up.

The best point to connect the decoupling resistor on the amplifier plate line can now be found. Touch a lead pencil along the plate line and note the point which causes minimum drop in signal. Connect the resistor at this point. It is necessary to unscrew the amplifier trough from the main chassis plate and tilt it to make the above check. The same check should be made on the second r.f. amplifier.

Next, tune the i.f. amplifier. This is best done by using a signal generator at 16 or 17 Mc., if your receiver performance drops off on the high end of the band. Remove the mixer crystal and connect the signal generator through a 250-ohm resistor to the ungrounded side of C_7 . Peak L_3 and L_4 for maximum output. If the generator has metered output the bandpass can be checked.

Response should be practically flat from 14 to 18 Mc., dropping off rapidly at 13 and at 19 to 20 Mc. If a peak occurs at 12 to 13 Mc., it usually indicates that the C_7 capacitance is too high. It should be reduced by adding more dielectric material. Another check is to note the S-meter reading on noise as the receiver is tuned over the range, with a 300-ohm resistor connected in place of the generator. In absence of a signal generator, noise from the mixer and r.f. amplifiers can be used to peak the slugs. Their tuning is very broad. If the slugs don't have the range to hit resonance, it may be that C_9 and C_{13} are off value. Touch a 1- or 2- μ l. capacitor across each and note whether the output goes up or down. Be sure the value of C_{14} is correct for the length of output cable used.

After the preamplifier has been adjusted the bandwidth of the r.f. stages can be set as desired. A noise generator is best for this. Readings of the S-meter with an antenna connected on the input give a fair idea, however. With the interstage coupling loose, a sharp peak occurs as the receiver is tuned over the band. In the converter described, the coupling was adjusted so that the noise drops off a maximum of 6 db. or 1 S unit at 432 and 436 Mc. This gives a practically constant noise figure over the band. Once the r.f. stages have been tuned at 434 Mc., it is unnecessary to retune them.

A final adjustment for best signal-to-noise ratio is to vary the length of the coax feeding the input of the converter, for maximum signal-over-noise reading. Do not adjust for maximum S-meter reading. This will be critical only if the antenna is not properly matched to its transmission line.

It should be possible to tune the capacitors in the r.f. stages through their range without oscillation. If signs of oscillation appear, here are some of the things to look for:

- 1) Bad mixer crystal, or no crystal current, so that the second stage is unloaded.
- 2) Coupling too loose in plate circuit of first and second stages.
- 3) Reactance reflected back on the first stage and improper loading caused by critical length coax between first and second stages. Best results

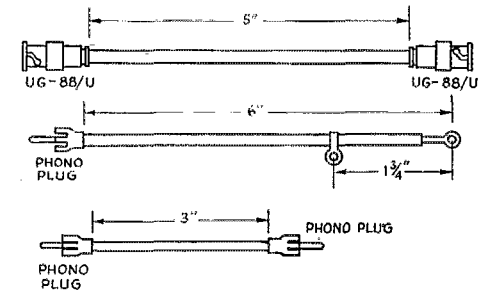
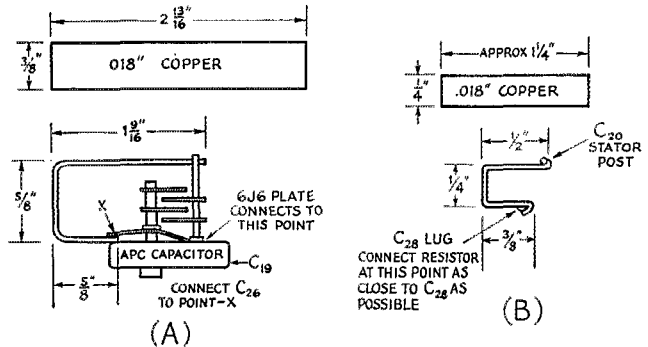


Fig. 6—Interconnecting cables for the 432-Mc. converter. Top—r.f. amplifier; center—mixer output; bottom—mixer injection.

sure the detector and indicating device are linear. Most diode detectors are not. It is possible to improve this by injecting a signal at the center frequency⁴ of the detector to bring it up to the point where it will be linear. The receiver b.f.o. usually will do for this purpose. Also, the a.v.c. has to be off, but in this condition most receivers will limit in the i.f. It is best, therefore, to raise the audio gain control to its limit and then turn up the r.f. gain control only high enough to get a readable indication on the output meter.

For the indicator, we use a Simpson 260 v.o.m. on the 2.5-volt a.c. range, using the db. scale to take readings. The meter is connected across the voice coil terminals of the output transformer;

Fig. 5—Tuned circuits for the 209- and 418-Mc. stages in the injection chain.



are obtained with the cable one-half wavelength long.

4) Antenna system poorly matched to the transmission line. Certain lengths of line will not load the input and thus they cause oscillation.

5) Grid terminals on 6AN4 socket not soldered properly.

Noise Figure Measurement

The noise generator used for measurement on this converter was built from information obtained from the *Sylvania Electric Products, Inc., Technical Manual*. It uses a 5722 noise diode. Some precautions are necessary if the measurements are to be reasonably accurate. First, be

the speaker may be disconnected, and a resistor used in place of it. The r.f. gain is adjusted to get a reading of minus 6 db. with the noise generator off. Then the generator is turned on and adjusted till the output meter reading goes up to minus 3 db. A reading of the diode current is taken, and from it the noise figure is calculated. As stated before, the image rejection is 37 db. so it can be neglected in calculating the over-all noise figure.⁵

The author wishes to thank W5ZFS for building a second model of this converter, and for the valuable suggestions that resulted therefrom. Thanks are also due the International Crystal Mfg. Co. for their help on the overtone oscillator. It is hoped that the presentation of this material on construction of an effective 432-Mc. converter will help to create more interest in our lowest u.h.f. band, which up to now has not received the amateur attention it deserves.

⁴ John Thompson, *Radio Communication at Ultra High Frequency*, Methuen & Co., Ltd., London.

⁵ R. R. Weeks, "Image Ratio and Noise Figure," *QST*, Feb., 1955, page 132.

What Value Resistor?

Simple Exercises in Ohm's Law

BY LEWIS G. McCOY, W1ICP

• Most of the arithmetic needed for amateur radio centers around the ability to count to 48 (for WAS) and to 100 (for DXCC) and to 500,000 (SS Contest) and, in some instances, only to 26 (CQs without signing). However, there are times when it is useful to know how to compute the values of voltage-dropping resistors in gear you are building or remodeling. This article shows how easy it is.

IF I HAVE a power supply that furnishes 600 volts, how can I calculate the value of resistors needed to drop the voltage to the correct level for feeding the various stages of my transmitter?"

Maybe you haven't encountered this type of problem as yet but at some time or other in your amateur career you may have to know how to figure "dropping" resistors. Similar questions are asked in the General Class license examination. So let's say we have a supply giving 600 volts, which we plan to use for the plate and screen of an 807 amplifier; how do we determine and obtain the correct operating voltages?

First, let's look up the ratings of an 807 in the tube tables of the *Handbook*. A look at the ratings shows that the maximum voltages for Class C telegraphy are 750 volts on the plate and 250 volts on the screen. In tetrodes and pentodes, the plate current depends a great deal on the screen voltage, so we must try to run the screen close to its rated voltage. We can have lower plate voltages than maximum and still get the tube to work satisfactorily, but we must keep the screen voltage at its rating.

The 600-volt supply can be used to feed the plate and, if we use a screen dropping resistor, it can also be used to supply the screen power. All we need to know is the proper value of resistor to drop the 600 volts to 250. This we can determine by Ohm's Law.¹

$$\text{Ohm's Law is } I = \frac{E}{R}$$

The R represents the resistance in ohms, E the electromotive force in volts, and I the intensity or current measured in amperes. By algebra, we know that Ohm's Law can also be stated

$$E = IR \text{ or } R = \frac{E}{I}$$

¹ In 1827, George Simon Ohm, a German mathematician published a book entitled "The Galvanic Circuit Investigated Mathematically." In his book he stated and explained the formula we now know as Ohm's Law. In his honor, the unit of resistance was named the ohm.

Of course, we need to know two of the three values to find the third.

Getting back to our problem, we know the supply voltage (600) and the voltage the screen requires (250). We need to know one more thing before we can calculate the resistor, and that is how much current the screen draws. This information is given in the tube tables as 6 ma. (.006 ampere), under the column entitled "Screen Current."

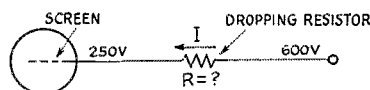
To leave 250 volts available for the screen, the drop across the resistor must be equal to the difference between the plate supply voltage and the screen voltage; that is, $600 - 250 = 350$ volts. Then, by Ohm's Law,

$$R = \frac{E}{I} = \frac{350}{.006} = 58,333 \text{ ohms.}$$

The power to be dissipated in the resistor is

$$P (\text{power}) = EI = 350 \times 0.006 = 2.1 \text{ watts.}$$

A 5-watt resistor would be satisfactory. Circuit details of this example are shown in Fig. 1.

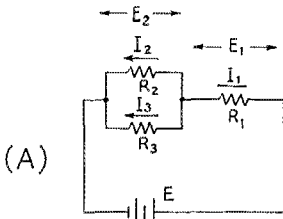


$$\begin{aligned} E &= 350 \text{ V} \quad (600\text{V} - 250\text{V}) \\ I &= .006 \text{ AMP} \\ R &= \frac{E}{I} = \frac{350\text{V}}{.006 \text{ AMP}} = 58,333 \text{ OHMS} \end{aligned}$$

Fig. 1—Circuit diagram showing a simple circuit with a dropping resistor. The circle enclosing the screen grid is the symbol for a tube envelope. The other elements of the tube are not shown because they are not needed for this problem.

If we went to a radio store and asked for a 5-watt, 58,333-ohm resistor the clerk would tell us he didn't have such a value or even a 5-watt resistor near enough to the 58,333-ohm figure for our purposes. A 2-watt resistor would be slightly below the power requirements so we would have to use two 120,000-ohm 2-watt resistors connected in parallel. This would give us a value of 60,000 ohms, close enough (within 10 percent) for the purpose. The power rating for the combination is 4 watts.

In giving the value of $\frac{1}{2}$, 1-, and 2-watt composition resistors, all ARRL publications use the "preferred value system." In this system, all values represent (approximately) a constant-percentage increase over the next lower value. There are three standard component value toler-

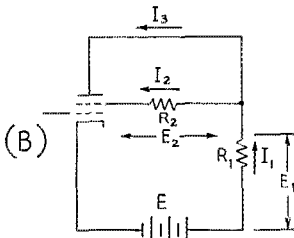


$$I_1 = I_2 + I_3$$

$$R_1 = \frac{E_1}{I_1}$$

$$R_2 = \frac{E_2}{I_2}$$

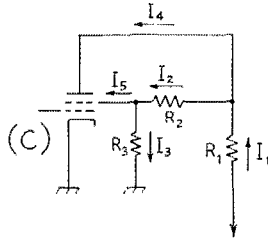
$$R_3 = \frac{E_3}{I_3}$$



$$I_1 = I_2 + I_3$$

$$R_1 = \frac{E_1}{I_1}$$

$$R_2 = \frac{E_2}{I_2}$$



$$I_1 = I_2 + I_4$$

$$I_2 = I_3 + I_5$$

ances — 20, 10, and 5 per cent. For example, a resistor with a nominal value of 4700 ohms and a tolerance of 20 per cent could be anywhere between 3800 and 5600 ohms. However, most of the radio supply houses stock 5 and 10 per cent resistors so, unless otherwise specified, a 10 per cent value can be used.

Composition resistors (and small wire-wound resistors in molded cases) are color-coded by means of colored bands. The tolerance for a particular resistor is shown by a gold band for 5 per cent, a silver band for 10 per cent, and, if no band is shown, the value is 20 per cent.

In many circuits, the power fed through a dropping resistor may branch off into several circuits. In such a case, the sum of all currents past the dropping resistor must be used to calculate the correct value for the dropping resistor. This is explained and shown in Fig. 2.

In Fig. 2 at (A) we see a simple circuit with a battery, one resistor, and then two resistors in parallel. If we know the voltages across the resistors and the current through them, it is a simple matter of arithmetic to find the values of the resistors. The sum of the currents through R_2 & R_3 is the total current flowing through R_1 . Dividing E_1 by the current through R_1 gives us the value of

R_1 . Using the same formula ($R = \frac{E}{I}$), we can

find the value of R_2 and R_3 .

Progressing to (B) in Fig. 2, we see the same type of problem applied to a tube circuit. The

Fig. 2 — At (A) we have a simple series-parallel circuit using a battery and three resistors. Progressing to (B), a similar circuit involving a tube is shown. (C) The d.c. paths in a typical oscillator circuit. Explanations of the three circuits are given in the text.

value of R_1 is determined by dividing E_1 by the sum of I_2 and I_3 . To find the value of R_2 , E_2 is divided by I_2 .

At (C), we have a circuit that is typical of many oscillator circuits. The value of R_1 is determined by dividing the voltage drop across R_1 by I_1 , which is the sum of all the currents flowing through R_1 . In this circuit, the value of the screen dropping resistor R_2 is calculated by using the sum of the screen current and the current flowing through the

bleeder resistor R_3 . The important point to remember when figuring a dropping resistor is that the total amount of current through the resistor must be used in determining the correct value.

A problem is given in Fig. 3 showing a source voltage which supplies an oscillator and amplifier. The problem is to determine the correct values for R_1 , R_2 , R_3 , R_4 and R_5 (.004 amp. through R_2). Also, calculate the amount of power (wattage) each resistor will handle. In this problem,

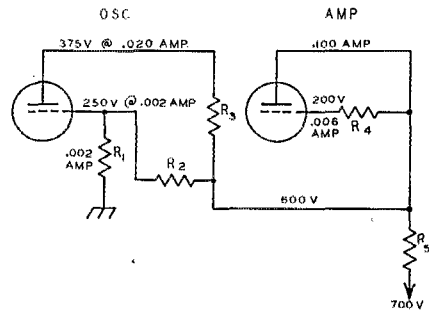


Fig. 3 — Circuit diagram of quiz problem. (Answer given on page 116.)

the chassis ground is at zero-potential or voltage. In other words, if we had a resistor connected from the 700-volt source to the chassis ground, we would have a voltage drop of 700 volts.

The answer to the problem and explanation is given on page 116.

A 10-Meter Station for Emergencies

A Complete Transmitter-Receiver Station of Small Dimensions

BY FRANK A. TATE,* KTIPU

• This complete 10-meter station includes a two-tube crystal-controlled transmitter, a superregenerative receiver with fixed tuning for network operation, an audio system common to both, and an a.c. power supply. Provision is made for connecting an external auxiliary supply.

HERE in Tangier, no organized consideration is given to civil defense by local authorities. Nevertheless, several hams have combined to form an intracity net for use in time of emergency. Special 10-meter communicator units of the type shown in the photographs were built for the job. Although an a.c. power supply is included, provision is also made for operating from an independent power source, such as a vibrator pack or dynamotor. In addition to the power supply, the unit includes a two-tube crystal-controlled transmitter, a fixed-tuned superregenerative receiver, and a two-stage audio amplifier common to receiver and transmitter.

The circuit of the transmitter-receiver is shown in Fig. 1. In the transmitter section, a 6AK5 7-Mc. crystal oscillator doubles to 14 Mc., and drives a 6AQ5 output stage which doubles to the 28-Mc. band. Normal power input to the final is 120 volts at 20 ma., or about $2\frac{1}{2}$ watts.

In the receiver section, a 6AK5 r.f. amplifier is used to provide some gain, and also to reduce radiation from the superregenerative detector,

* American Legation, Tangier, Morocco.

which makes use of one half of a 12AX7 dual triode. The regeneration control, R_1 , provides a means of controlling the sensitivity of the receiver by varying the plate voltage of the detector tube. The grid-leak (R_2) and capacitor (C_5) values were found to be optimum after trying several others.

The other half of the 12AX7 is an audio amplifier that drives a 6AQ5 which is used either to feed a small loudspeaker or to modulate the transmitter. When modulating the transmitter, the primary of T_2 is used as a coupling choke. The resistor and capacitor in the amplifier screen-plate lead are necessary for 100 per cent modulation.

A switching system connects the microphone, disconnects the speaker, shifts the antenna, and closes the transmitter cathode circuits.

Power Supply

The power-supply requirements have been held to a minimum consistent with the service to be provided in order to conserve power when operating from emergency supply. The circuit of the built-in a.c. supply is shown in Fig. 2. It is conventional except that a resistor is used in place of a choke in the filter system, and that the rectifier-tube (5Y3GT) socket is wired in such a manner that removal of the tube and a jumper connecting Pins 3 and 5 provides a means of converting from a.c. to battery operation with a minimum of effort. Connections from a dynamotor are made by inserting a plug (made from a metal octal tube shell) in the rectifier socket. The jumper connection can be made auto-



A simple, yet effective, unit for 10-meter emergency use. It contains a $2\frac{1}{2}$ -watt crystal-controlled transmitter and a superregenerative receiver which may be screwdriver-adjusted to the operating channel.

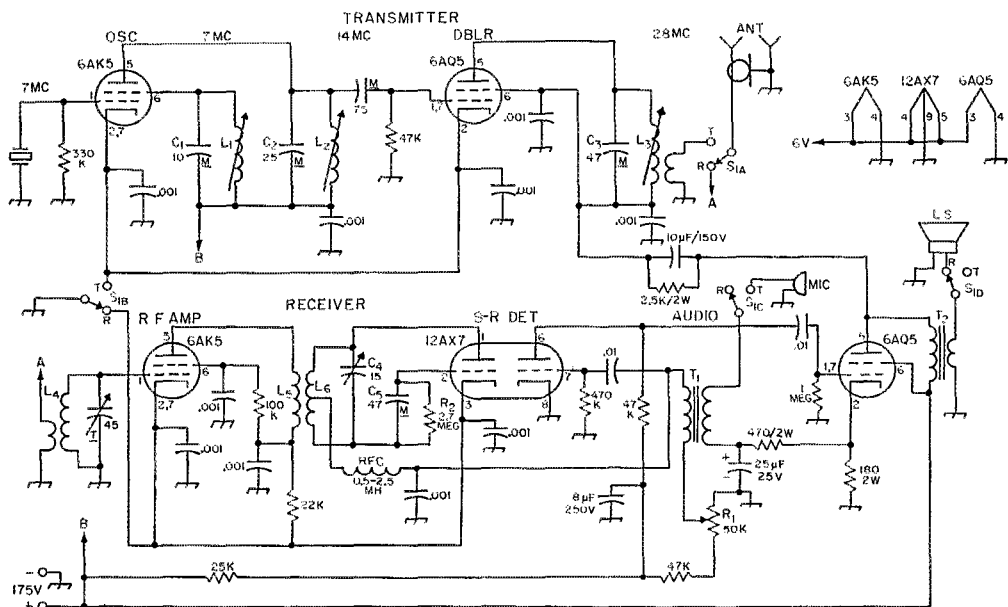


Fig. 1 — Receiver and transmitter circuits of the 10-meter emergency communications unit. All capacitances less than 0.001 μf . are in μmf . All 0.1 and 0.001 capacitors are ceramic, $M = \text{Mica}$, $T = \text{Mica trimmer}$. C_4 is a midget air trimmer. All resistors are $\frac{1}{2}$ watt unless otherwise specified. MIC — Single-button carbon microphone. LS — 2-inch loudspeaker. S_1 — Four-pole double-throw rotary. T_1 — Microphone transformer. T_2 — Output transformer, 5000 ohms to voice coil.

- L_1 — 50 turns No. 26 s.c.e. (approx. 35 μh .)
- L_2 — 12 turns No. 20 s.c.e. (approx. 4 μh .)
- L_3 — 4 turns No. 20 s.c.e., 1-turn link at ground end (approx. 0.5 μh .)
- L_4 — 6 turns No. 20 s.c.e. (slug removed), 2-turn link at ground end (approx. 0.6 μh .)

- L_5 — 2 turns No. 20 s.c.e., adjacent to grid end of L_6 .
- L_6 — 10 turns No. 20 s.c.e. (approx. 1 μh .)

All coils close-wound on $\frac{1}{2}$ -inch iron-slug forms. (See text.)

matically when the rectifier tube is plugged in by connecting Pins 3 and 5 together on the base of the 5Y3GT.

Construction

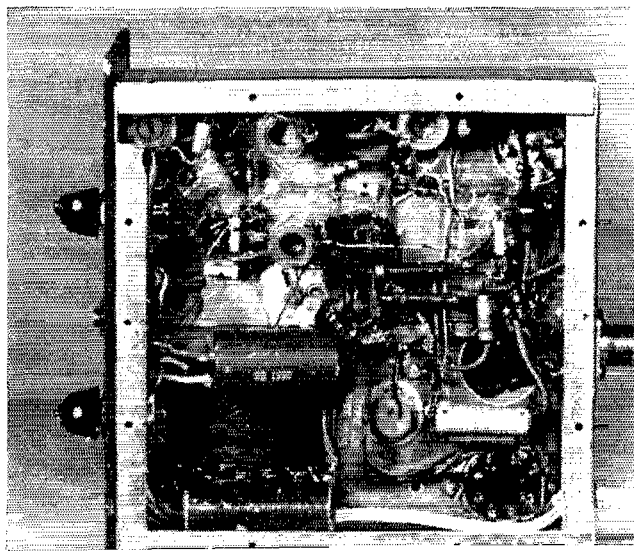
The complete station is contained on a $7 \times 7 \times 3$ -inch chassis. The panel is cut from $\frac{1}{4}$ -inch aluminum sheet, and measures 6 inches high by $7\frac{1}{2}$ inches wide. Only normal precautions need be followed in placement of components; i.e., short direct r.f. leads and proper isolation of input and output audio transformers.

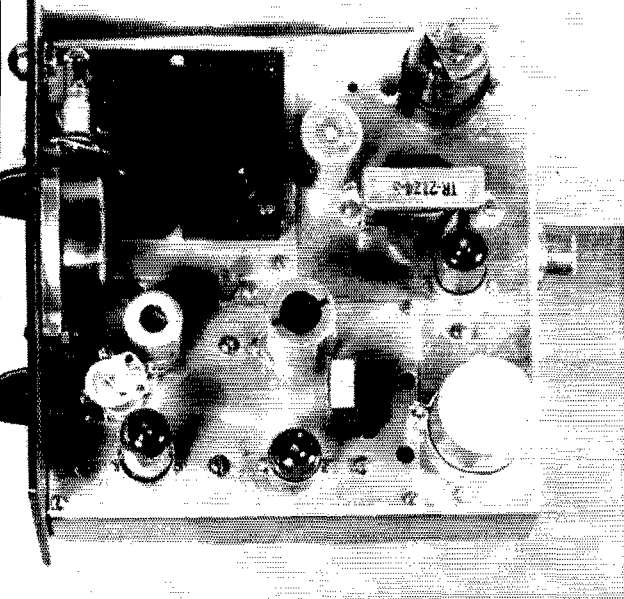
The transmitter components are lined up along the right-hand edge of the chassis, with the 6AQ5 toward the front and the 6AK5 and crystal to the rear. Underneath, the three tank coils with their tuning ca-

pacitors are in line. L_1 and L_2 are on either side of the oscillator tube socket, with L_1 toward the rear. L_3 is between the 6AQ5 and the panel, permitting short leads to the change-over switch immediately to its left.

The receiver input coil, L_4 , is on top of the chassis, between the transmitter output and receiver input tubes. This places the coil so that it also may be connected to the change-over switch with short leads. A short length of RG-59/U connects the change-over switch to the coax connector at the rear of the

Bottom view of the 10-meter emergency station, showing the distribution of the transmitter and receiver coils, and other small components.





Top view of the simple 10-meter transmitter-receiver.

chassis. L_5 L_6 is shielded from L_4 by mounting under the chassis between the 6AK5 in the r.f. amplifier and the 12AX7. The tuning capacitor is mounted close to L_5 L_6 . It is adjusted with an insulated screwdriver through a hole in the top of the cabinet.

The coil forms shown are of foreign manufacture, but Millen type 69045 forms very closely approximate the dimensions and may be used with equal results.

Across the rear of the chassis are the microphone transformer, the audio output 6AQ5, the output transformer T_2 , and the 5Y3GT rectifier tube. The microphone transformer was taken from a surplus TBY unit, but any single-button-carbon mike-to-grid transformer may be substituted. All audio leads of appreciable length should be shielded.

The cabinet is made from aluminum sheet. The top and two sides are a single piece bent into "U" shape. Lips are bent down along both front and rear edges. Holes are drilled and tapped in the lips for fastening to the panel and attaching a back cover with machine screws. The bottom edges of the enclosure overlap the chassis and are fastened to it with self-tapping screws. A bottom plate for the chassis completes the cabinet.

Adjustment

After completing and rechecking the wiring of the transmitter, the tuned circuits should be checked with a grid-dip meter and adjusted to the approximate operating frequencies. L_1C_1 should tune to the 7-Mc. frequency of the crystal, and L_2C_2 to the second harmonic (14 Mc.) of the crystal. L_3C_3 should be tuned to the fourth

harmonic (28 Mc.) of the crystal. If the coil and capacitor values are the same as those given in Fig. 1, the grid-dip meter is not essential for the tune-up. The station communications receiver may be employed.

With a 7-Mc. crystal inserted in the crystal socket, and power applied, the transmit-receive switch should be set to the transmit side. The station receiver, adjusted to the 7-Mc. frequency of the crystal, should show an S-meter reading when the slug of L_1 is adjusted to tune the circuit near resonance. Proper adjustment consists of rotating the slug for maximum meter reading, and then backing off a half turn or so to assure that the oscillator will key reliably. The receiver should next be set for the 10-meter output frequency. L_2 and L_3 should then be adjusted for maximum S-meter reading, retouching L_1 , when necessary, to maintain reliable keying. After connecting the antenna, read-

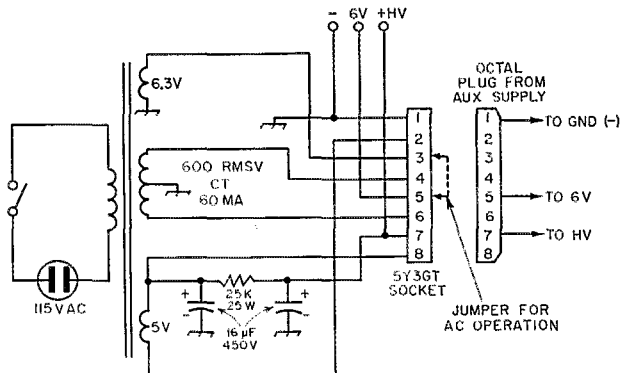


Fig. 2 — Circuit of the a.c. power supply. The octal socket for the 5Y3GT rectifier tube is wired so that an external emergency supply can be connected by removing the rectifier tube and plugging in a cable from the auxiliary supply.

just L_3 , using the S-meter reading in adjusting for maximum output. Modulation may now be checked by plugging a carbon microphone in the microphone jack and listening on the receiver.

The receiver section will most easily be checked by tuning in the signal from another transmitter. However, in the absence of such a signal, a grid-dip oscillator may be used. When the receiver is functioning normally, a rather even hissing sound should be heard. The level of this noise

(Continued on page 118)

A Two-Stage Multiband Phone Transmitter

Using the 5894 in a Compact 100-Watt VFO Unit

BY T. A. DINEEN,* ZS6TP

• A multiband phone unit of small dimensions. It makes use of a band-switching VFO and multiband tuners to cover 80 through 10 meters.

ONE of the more recently developed medium-power transmitting tubes is the 5894 (Amperex AX-9903, Philips QQE06/40) dual tetrode. Equivalent in power level to a pair of 807s, it is, however, much more compact and more convenient to use. A second tube of the same type, operating at the same plate voltage, makes a suitable Class AB₁ modulator. The result is a very compact unit, considering the power involved.

The r.f. and modulator circuits are shown in Fig. 1. To avoid a string of multiplier tubes and a complex bandswitching system to reach the higher-frequency bands, the frequency of the Clapp VFO itself is changed, reducing the r.f. section to two stages. Some eyebrows may be raised at what may appear to be insufficient buffering between the modulated amplifier and the frequency-determining circuit. However, checks have shown no trace of f.m. or other frequency instability, even on 10 meters. This can be accounted for, in part at least, by the

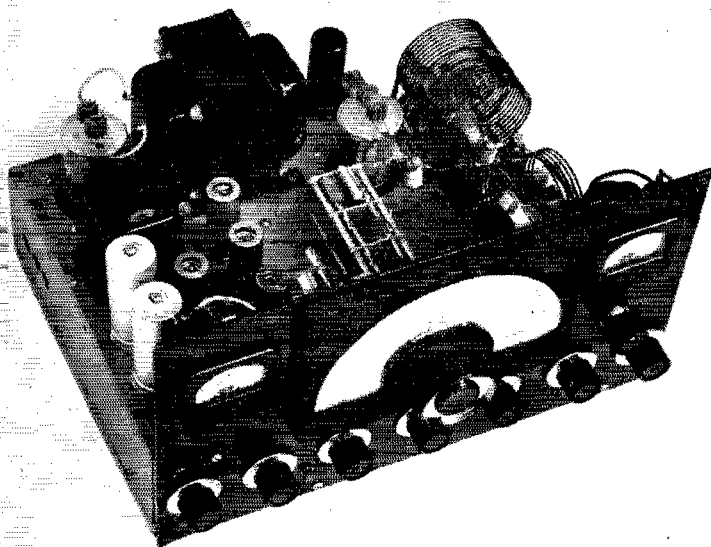
* P. O. Box 7703, Johannesburg, South Africa.

fact that the plate circuit of the 6AG7 is always tuned to twice the frequency of the oscillator.

A separate oscillator tank circuit, each with its tuning capacitor C_1 , padder capacitors C_2 and C_3 , feed-back capacitors C_4 and C_5 , and inductor L_1 , is provided for each band. The bandswitching is done in the low-impedance leads between tank-circuit terminals A and B, and the 6AG7 grid and cathode. These connecting leads are of twin shielded cable, and may be of any reasonable length without noticeable effect on the performance of the oscillator. The tuning capacitors are ganged to the single calibrated dial. Part of the fixed padder capacitance, C_3 , may be made up of negative-temperature-coefficient capacitors (Centralab TCN) as found necessary to minimize frequency drift. In the original unit, drift was reduced to 200 cycles on 10 meters. Both plate and screen voltages for the 6AG7 are regulated by VR tubes.

Switching in the 6AG7 and 5894 output circuits is avoided by the use of multiband tank circuits covering all bands from 80 to 10 meters. Since the sections of the 5894 are operated in push-pull, coupling from the unbalanced output of the 6AG7 to the balanced input of the 5894 is accomplished through the use of an untuned balanced grid coil, L_4 , with tight inductive coupling to the multiband tuner in the 6AG7 output. A balanced form of multiband tuner

Along the bottom of the panel, from left to right, are controls for the power switch, meter switch, audio gain, 6AG7 multiband tuner oscillator band switch, output multiband tuner, and link tuning capacitor. The link-selector switch is below the 10-ma. meter to the right. The meter to the left is the over-modulation indicator.



is used in the output of the amplifier.

The output link circuit is tuned by the 400- $\mu\text{f.}$ variable capacitor, C_8 , which serves as a loading control. Two output links, selected by S_2 , are provided — L_7 for 40- or 80-meter output, and L_{11} for the higher-frequency bands.

L_5 and L_6 are v.h.f. parasitic suppressors, resonant at about 150 Mc. The 6AQ5 screen clamper holds the amplifier input to a safe value when excitation is removed.

A modulation monitor and overmodulation indicator is connected across the output link. This provides a very convenient means of monitoring the quality of the outgoing modulated signal when a pair of headphones is plugged into J_2 .

The modulator section includes two stages of speech amplification, with enough gain for a crystal microphone. At 600 volts, a modulator output of 50 watts is obtainable without running into grid current. Therefore, a power driver is not required. An r.f. filter is used at the input of the audio unit to keep r.f. off the grid of the 6AU6. L_{12} and L_{13} were found necessary to eliminate oscillation in the modulator.

The 10-ma. meter, MA_1 , may be switched to read oscillator cathode current, amplifier grid current, amplifier cathode current, or modulator

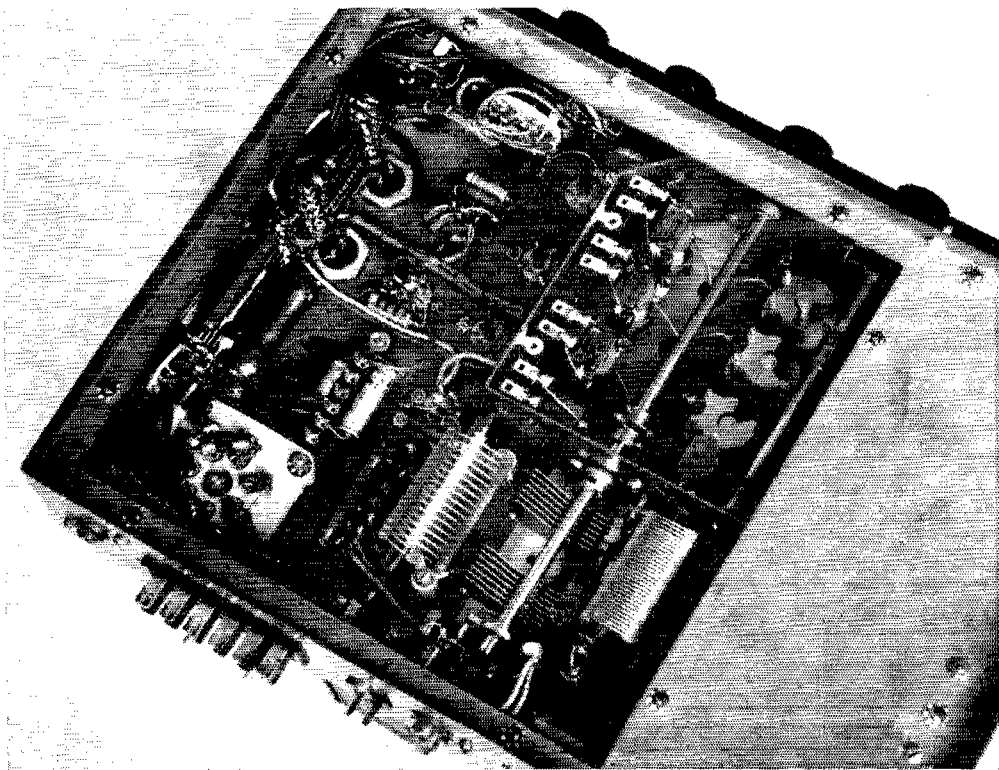
cathode current. R_1 , R_2 and R_3 are of copper wire, adjusted to give the desired scale multiplication.

Construction

Some of the components used may not be obtainable in the U. S., so the original construction will not be described in detail. Most of the essentials may be obtained from the photographs. The chassis measures 10 by 10 by 3 inches. A standard 10 \times 12 \times 3-inch chassis, with a 10-inch side against the panel, may be substituted. The base plate is 10 by 14 inches. A base plate for the output-circuit components could be made of aluminum sheet, with lips bent up along one side and across one end for fastening to the chassis and panel. The panel is 14 by 8 $\frac{1}{2}$ inches. The nearest standard rack panel is 8 $\frac{3}{4}$ by 19 inches.

The VFO tuning capacitor is a Philips type 82041/4 \times 25E. This is a gang of 8 capacitors (4 split-stator units), each of which has a minimum capacitance of 4.5 $\mu\text{f.}$ and a maximum of 25 $\mu\text{f.}$ (variation of 20.5 $\mu\text{f.}$). The first two sections are used as a split-stator capacitor (maximum capacitance 12.5 $\mu\text{f.}$) to cover the 14-Mc. range necessary for 10-meter output. The next two sections are similarly used to cover

The VFO inductors, air trimmers and fixed padders are grouped within the shielding enclosure in the upper right-hand corner. The multiband tuner in the plate circuit of the 6AG7 is in the lower right-hand corner. The r.f. amplifier tube socket is hidden by the inductor at the right. The socket showing in the lower left-hand corner is for the modulator tube. The meter switch is to the left of the shielding compartment, near the panel. The oscillator band switch is in the lower right-hand corner of the chassis opening. It is controlled by the extension shaft that runs through the right side of the shielded compartment.



the 10.5-Mc. range necessary for 15-meter output. The fifth section is used to cover the 7-Mc. range for 20-meter output, and the sixth section to cover the 3.5-Mc. range for 40-meter output. The last two sections are connected in parallel (maximum capacitance 50 $\mu\text{f.}$) to cover the 1.75-Mc. range necessary for 80-meter output. An approximately equivalent gang can be made by ganging a Bud "Tiny-Mite" 3-gang unit, type LC-1846, each section having a minimum capacitance of 5 $\mu\text{f.}$ and a maximum of 17 $\mu\text{f.}$, coupled to a dual unit, Bud type LC-1662, each section of which has a minimum of 6 $\mu\text{f.}$ and a maximum of 40 $\mu\text{f.}$ The three 17- $\mu\text{f.}$ units are used, one section each, for the oscillator bands of 14, 10.5 and 7 Mc., while the sections of the dual unit cover the oscillator bands of 3.5 and 1.75 Mc. This combination will have a greater physical length than the Phillips unit, but the 10 \times 12-inch chassis should provide the extra space. The table of inductance and capacitance values is based on the use of the Bud capacitors and is designed to give almost full bandspread on each band. If the Phillips unit is used, some slight adjustments in inductance and padding capacitance will be necessary.

The multiband tuner capacitor gang, C_7 ,

TABLE OF VFO VALUES

Band (Mc.)	L_1 ($\mu\text{h.}$)	C_1 ($\mu\text{f.}$)	C_2 ($\mu\text{f.}$)	C_3 ($\mu\text{f.}$)	C_4 ($\mu\text{f.}$)	C_5 ($\mu\text{f.}$)
1.75	58 ¹	50	none	100	1000	1000
3.5	11 ²	50	none	270	1000	1000
7	5.3 ³	50	50	91	640	640
10.5	2.5 ⁴	17	50	100	500	500
14	2.25 ⁵	17	50	30	500	500

¹ 70 turns No. 36 s.c.e., $\frac{1}{2}$ -inch diam., close-wound on iron-slug form (National XR-50 form).

² 30 turns No. 24 s.c.e., $\frac{1}{2}$ -inch diam., close-wound on iron-slug form (National XR-50 form).

³ 27 turns No. 24 s.c.e., $\frac{1}{2}$ -inch diam., close-wound (National XR-50 form, slug removed).

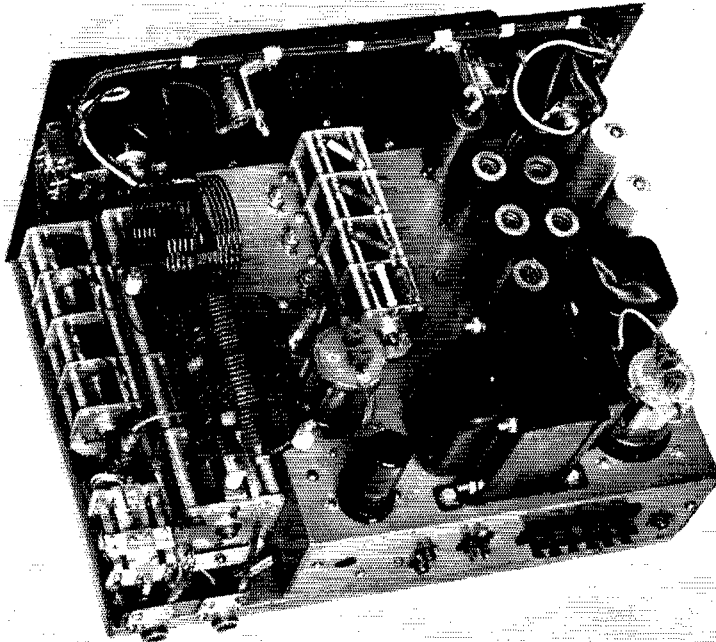
⁴ 19 turns No. 24 s.c.e., $\frac{1}{2}$ -inch diam., $\frac{5}{8}$ inch long (National XR-50 form, slug removed).

⁵ 18 turns No. 24 s.c.e., $\frac{1}{2}$ -inch diam., $\frac{3}{8}$ inch long (National XR-50 form, slug removed).

can be made up by ganging two Bud CE-2046 dual units. The rotors of both units must be insulated from the chassis. This should not be difficult, since these units have holes in their ceramic end plates for fastening mounting brackets. These brackets can be bent up from aluminum sheet and shaped so as to avoid contact with either the shaft or the stator rods.

Two Bud type LC-1633 capacitors with shafts coupled, and all four sections in parallel, can be used for the link tuning capacitor, C_8 .

(Continued on page 114)



Rear view of the transmitter and modulator. The output multiband tuner, link-tuning capacitor, and antenna relay are to the left of the chassis. The inductor to the rear is L_8 , with L_9 - L_{10} in front at right angles. The VFO and amplifier tubes are in the rear left-hand corner, with the modulation transformer and modulator tube to the right. The tubes grouped in the front right-hand corner of the chassis are the voltage regulators, clamp tube and speech-amplifiers. One of the VR tubes shown was eliminated after the photograph was made. The VFO tuning gang is at the center of the panel with the air trimmers and inductor slugs alongside.

Panel layout of nine-tube amateur-band receiver. From left to right are the antenna trimmer, C_2 , the noise limiter switch, the b.f.o.-m.v.c.-a.v.c. switch, the b.f.o. pitch control, C_{11} , and the phone jack. The r.f. gain control, R_1 , is mounted to the left of the main tuning dial, while R_2 , the audio gain control, is mounted on the right.



A Nine-Tube Amateur-Band Receiver with 3-Kc. Selectivity

Suited Your Needs at Minimum Cost

BY EMORY E. TOOPS, JR.,* W9HLH

• Using i.f. components from a BC-453, W9HLH comes up with a double-conversion hamband receiver that offers a lot of performance for the money invested. Plug-in coils make it possible to get going immediately on those bands that interest you most.

ABOUT a year ago the author traded in a pre-war receiver for one in the \$200.00 class. The new receiver was of the usual "one r.f., two i.f." variety and, while adequate in many respects, lacked sufficient selectivity to make it a pleasure to use on phone. This was particularly true on 40 meters, which is locally a popular band. Local signals occupied about 10 kc. on the receiver.

A Q5-cr was added to give good selectivity but it still left something to be desired. After much thought it was decided to construct a complete receiver rather than attempt to modify the BC-453. The following requirements were set for the completed receiver:

- 1) It must be capable of covering the 80-, 40-, 20-, 15- and 10-meter bands.
- 2) It must be simple to construct, with no

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trick circuits, yet have better than average selectivity.

3) It must be inexpensive and utilize as many parts as possible from the BC-453.

About three months were spent studying the *Handbook*, back issues of *QST*, and other radio magazines before the circuit, shown in Fig. 1, was finally evolved. It is a dual-conversion receiver with one r.f. and two i.f. stages using all miniature tubes. Intermediate frequencies of 1600 and 85 kc. are used.

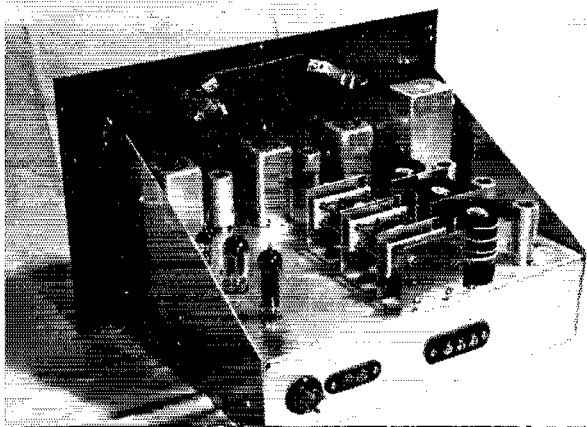
Three plug-in coils are required for each band. Bandswitching was not considered necessary since the writer does not presently operate on all bands, but only on 7 and 21 Mc. The use of plug-in coils results in mechanical and circuit simplicity, since coils need only be wound for those bands on which one operates, but future expansion is not precluded. No S-meter was included because it was considered an unnecessary expense.

The completed receiver shown in the photographs was constructed from a moderately well-equipped junk box, the Q5-cr, and about \$40.00 worth of new parts. The Q5-cr supplied three 85-kc. i.f. transformers, the b.f.o. transformer assembly, nine by-pass capacitors, assorted 1/2-watt resistors and four resistor terminal boards.

The receiver uses a 6BA6 r.f. amplifier ahead

Rear view of the receiver chassis, showing mounting of the main components and the tuning capacitors. The r.f. section is at the right. The 6BE6 second converter tube and the 1685-kc. crystal are mounted behind the 1600-kc. i.f. transformer.

The power-supply plug, speaker terminals and antenna terminals are on the rear edge of the chassis.



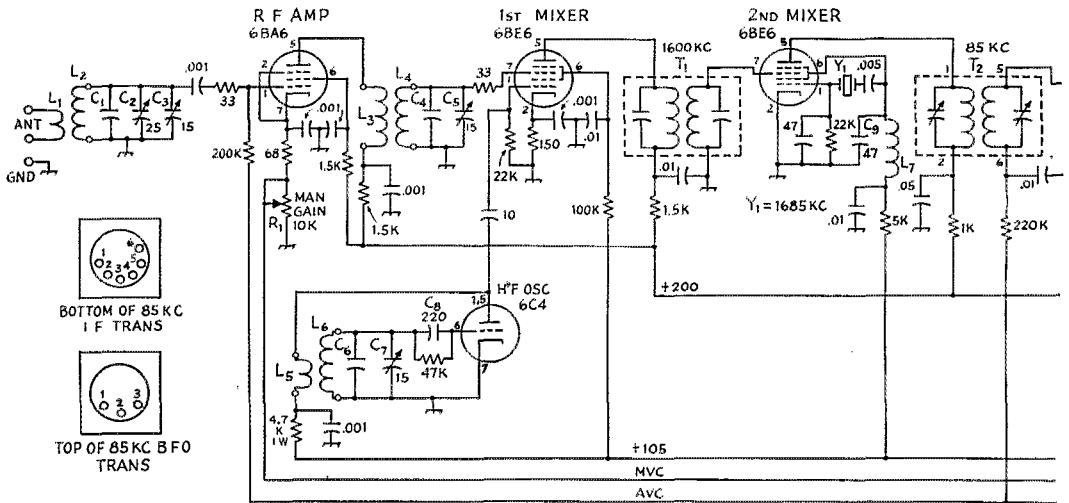


Fig. 1—Circuit of the 9-tube receiver. Resistors are $\frac{1}{2}$ watt except as specified. Capacitances below 0.001 $\mu\text{f.}$ are in $\mu\text{m.}$

C_1, C_4, C_8 —See coil table.

C_2 —25- $\mu\text{f.}$ APC-type variable.

C_3, C_6, C_7 —15- $\mu\text{f.}$ midget variable (National UM-15).

C_8 —220- $\mu\text{f.}$ NP0 ceramic or silver mica.

C_9 —47 $\mu\text{f.}$ NP0 disk ceramic, or silver mica.

C_{10} —5 $\mu\text{f.}$ (see text.)

C_{11} —25- $\mu\text{f.}$ variable.

L_1 — L_6 , inc.—See coil table.

L_7 —750- $\mu\text{h.}$ choke (National R-33).

J_1 —Closed-circuit jack.

of a 6BE6 mixer and separate 6C4 oscillator. Originally, a 6AH6 (miniature version of the 6AC7) was used with cathode injection from the 6C4¹ but oscillator pulling was appreciable at 21 Mc. A permeability-tuned 1600-ke. i.f. transformer is used between the first mixer and the 6BE6 second converter. The latter is crystal controlled at 1685 kc. The remainder of the receiver is strictly conventional, consisting of two stages of 85-ke. i.f. amplification, a 6AL5 dual diode as a detector, noise limiter, and a.v.c. recti-

¹ Goodman, "Some Notes on Improving Small-Receiver Performance," *QST*, December, 1953. See also, Longerich and Smith, "Low-Noise Receiver Design," *QST*, March, 1955, and "Technical Correspondence," *QST*, July, 1955.

fier, and a 12AX7 first audio and beat-frequency oscillator. A 6AQ5 provides sufficient volume for operating a 6-inch speaker.

Construction

The receiver is constructed on a 10 × 12 × 3-inch aluminum chassis with a 9 × 15-inch steel front panel. The placement of controls is shown in the panel view. The r.f., mixer and oscillator tuning condensers, C_3, C_5 and C_7 , are mounted on 2 × 2 $\frac{3}{8}$ -inch aluminum brackets which fasten to the chassis with spade bolts. The condensers are spaced from the brackets with $\frac{1}{4}$ -inch spacers and the three units tied together with 6-32 threaded rods. The condensers are ganged with Millen No. 39006 "slide action" couplers. A short piece of $\frac{1}{4}$ -inch brass rod connects the condensers to the dial. This construction has proved to be mechanically and electrically rigid. No variation in tuning can be detected when "leaning" on the dial or the receiver.

The i.f. transformers must have leads attached to them before mounting. After unplugging them from the BC-453, the base mounting clamp is removed and the coil carefully removed from the shield. Insulated wire is then pushed through the base plugs and soldered to the appropriate bus bars, which form the corners of the transformer assembly. The transformers are mounted using the tapped holes already in the base and are centered over 1 1/16-inch holes in the chassis.

The general placement of parts is shown in the rear view. Starting at the right and going counterclockwise are the r.f., mixer and local oscillator stages, each with its coil mounted between the

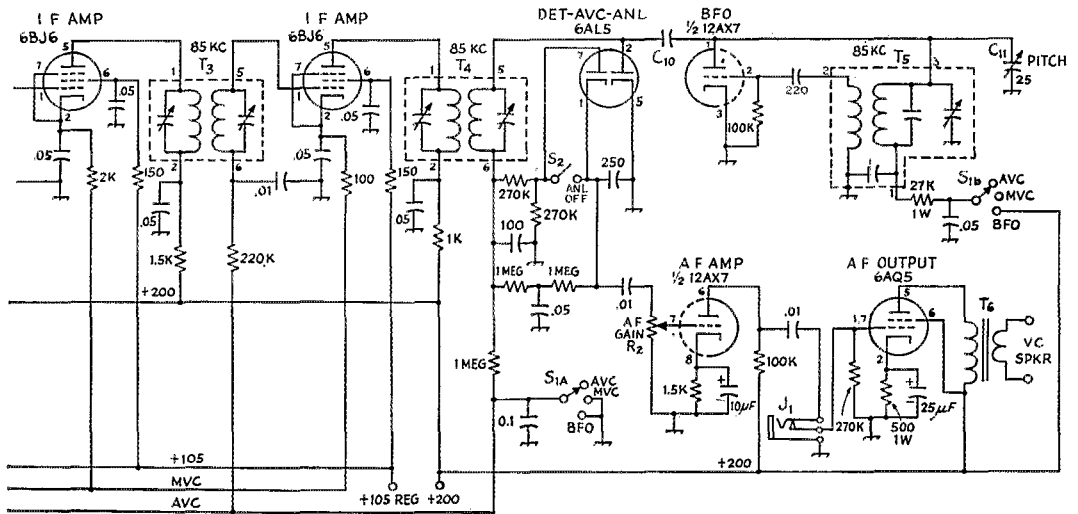
TUNED CIRCUIT DATA

	3.5 Mc.*	7 Mc.	14 Mc.*	21 Mc.
L_1, L_2	10 turns	4 turns	3 turns	3 turns
L_2, L_4	38 turns	12 turns	6 turns	2 $\frac{1}{2}$ turns
L_5	8 turns	4 turns	4 turns	3 turns
L_6	18 turns	8 turns	5 turns	2 turns
C_1	25 $\mu\text{f.}$	50 $\mu\text{f.}$	75 $\mu\text{f.}$	75 $\mu\text{f.}$
C_4	25 $\mu\text{f.}$	75 $\mu\text{f.}$	100 $\mu\text{f.}$	100 $\mu\text{f.}$
C_6	50 $\mu\text{f.}$	125 $\mu\text{f.}$	125 $\mu\text{f.}$	125 $\mu\text{f.}$

All coils wound on 4-prong forms, 1 $\frac{1}{4}$ -inch diameter, with No. 28 d.c.c. L_2, L_4 and L_6 have turns spaced to occupy total length of 1 inch; L_1, L_3 and L_5 close-wound and spaced $\frac{1}{8}$ -inch from cold ends of L_2, L_4 and L_6 , respectively.

Capacitance values listed above are NP0 disk ceramic mounted in coil form. In addition, there is an N500 ceramic trimmer, 7-45 $\mu\text{f.}$, in parallel with each fixed capacitor.

* Calculated values. Because stray inductance of leads becomes an appreciable part of the total tuned-circuit inductance at 28 Mc., it is suggested that the 21-Mc. values be used as a starting point for the 10-meter band, adjusting the coil inductances as required to give the desired frequency coverage.



- R₂ — 1-meg. volume control, audio taper.
- S₁ — 2-pole 3-position rotary, nonshorting.
- S₂ — S.p.s.t. toggle.
- T₁ — 1600-kc. i.f. transformer (Millen 64161).
- T₂ — 85-kc. i.f. transformer (BC-453 part No. 4698, color-coded red).
- T₃ — 85-kc. i.f. transformer (BC-453 part No. 7267,

- color-coded yellow).
- T₄ — 85-kc. i.f. transformer (BC-453 part No. 4677, color-coded blue).
- T₅ — B.f.o. transformer assembly (BC-453 part No. 5852).
- T₆ — Midget speaker transformer, 5000 ohms to voice coil.

tube and the tuning capacitor. The 6BE6 second converter and the 1685-kc. crystal are mounted between the 1600-kc. i.f. transformer and the front panel. The two stages of 85-kc. i.f. amplification proceed across the front of the chassis; the 6AL5, 12AX7 and 6AQ5 follow the left side.

Ceramic or mica capacitors are used throughout the r.f., mixer and oscillator stages. The bypasses for the i.f. stages were obtained from the triple 0.05- μ f. units in the BC-453. Most of the small resistors are mounted on terminal boards also obtained from the latter unit.

In wiring the receiver care was taken that all parts and wiring were firmly mounted. The tuning capacitors were connected to their respective coil sockets with No. 14 solid wire. Solder lugs were used to hold down other wiring where necessary.

Whenever possible all screen, plate and cathode by-pass capacitors were grounded at a single

point for any tube. On the r.f., mixer and h.f. oscillator stages the tuning condensers were also grounded at this same point.

Shielded leads were used to the noise-limiter switch, the b.f.o. pitch control and the audio gain control. The plate lead to the 1600-kc. i.f. transformer was also run in shield braid. The b.f.o. coupling condenser, C₁₀, was obtained from the BC-453 b.f.o. stage.

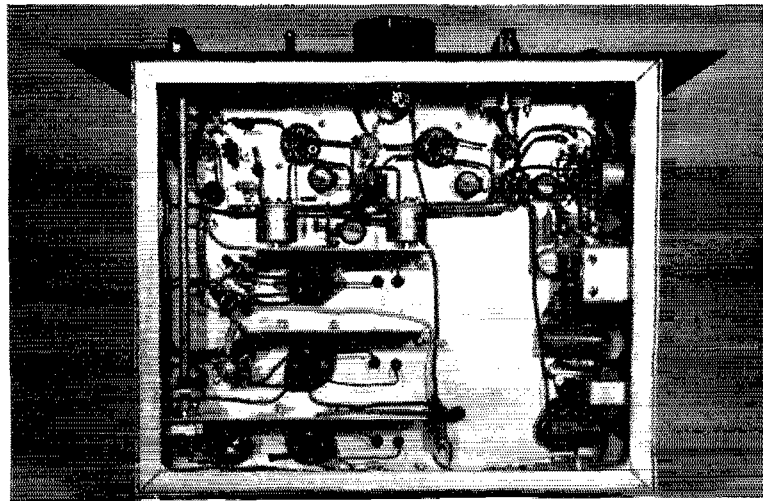
The coils are wound on smooth (not ribbed) four-prong forms, 1 1/4 inches in diameter. The bandsetting condensers are mounted inside the coil forms on No. 14 solid wire stand-offs. Actual coil data for the 40- and 15-meter bands are given in the table, together with suggested values for other bands.

Alignment

A signal generator is a necessity for aligning the completed receiver and it is not recommended

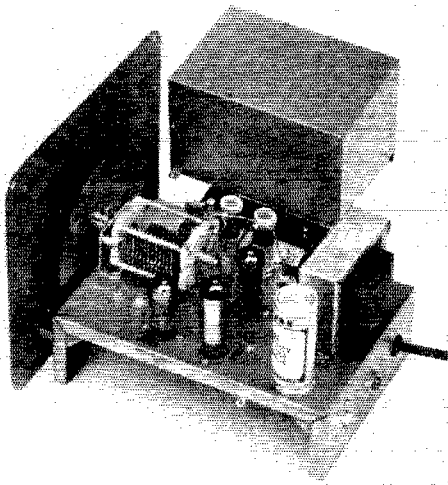
(Continued on page 118)

Components below the chassis. "Turret" sockets are used for the r.f., mixer and high-frequency oscillator stages. Aluminum shields are placed between these stages, with the one between the r.f. and mixer stages extending to the edge of the chassis. The antenna trimmer, C₂, is mounted on the edge of this shield. The b.f.o. and speaker transformers are mounted on the right edge of the chassis.



• Recent Equipment —

The WRL Model 755 VFO



The WRL 775 VFO removed from its cabinet and with the tuning-assembly shield removed. The coils for the two ranges of the VFO are wound on ceramic forms.

Notches on the periphery of the rim-driven wheel are used as stops to limit the travel of the dial.

The WRL Model 755 VFO is a self-contained VFO, complete with power supply, that delivers 160-meter output for 160- and 80-meter operation, and 40-meter output for operation in the 40-, 20-, 15-, 11- and 10-meter bands. The series-tuned Colpitts, or Clapp, circuit is used, on the same frequencies as the outputs. A 6AU6 is used in the oscillator stage and a 6CB6 in the buffer stage. The buffer stage couples to a transmitter through a short (4 feet or less) length of coaxial cable, and provision is included for peaking the output for maximum output in the two ranges.

The power supply uses a selenium rectifier, and a 0A2 voltage regulator tube stabilizes the screen voltage of the VFO stage.

In operation the buffer stage runs continuously, while the VFO is keyed in the cathode. A CALIBRATE switch on the front panel is in shunt with the key jack. For phone operation, the VFO is keyed through the same circuit, by the station's send-receive relay or switch.

A four-position switch on the panel turns on the unit and selects one of three tuning ranges. These are 160/80 meters, 40/10, and 20/15/11. The first range gives 80-meter output and the latter two give 40-meter output with different tuning rates.

Considerable attention appears to have been paid to temperature compensation, and it is interesting to note that the instruction book says: "A very important point in operation of the VFO is to always keep the cabinet in the normal horizontal position. Tilting the cabinet in any direction will degrade the frequency stability to a considerable extent. This is due to the fact that the special temperature-sensitive components are placed exactly and tilting the cabinet will cause the heat to flow around the compensating components in a manner other than that which will give best stability." (This may kill a few maritime-mobile sales on the China Seas run! — Ed.)

Although the manufacturer gives no figures on the output of the 755, the instruction book states that the buffer stage has ample output for any transmitter, driving it by introducing the VFO output at the crystal socket of the transmitter. The Model 755 VFO is available ready-to-go, or in kit form, from World Radio Laboratories, Council Bluffs, Iowa.

— B. G.

GOOD NEWS FOR DXers — VHF Included?

At least one prominent authority in the field of ionospheric propagation expects to see the sunspot numbers go even higher during the coming peak than they did in the winter of 1947-48 — when, incidentally, the peak was one of the highest on record. Mid-1957 is estimated to be the time. Since the minimum was in 1954, we're evidently in the middle of a pretty fast climb — meaning that it won't pay to put off until tomorrow what you could do today in the way of getting that 28- and 50-Mc. gear in good operating shape.

FEED-BACK

It is no fault of WIDB M that the formulas for his high-pass filter are incorrect as presented on page 46 of *QST* for February. The correct formulas for C_k and L_k are as follows:

$$C_k = \frac{1}{4\pi f_c R}; \quad L_k = \frac{R}{4\pi f_c}$$

In the "Complete 6146 Economy Transmitter" in February *QST*, Fig. 2 should show a connection from the output side of L_1 to the plate circuits of the speech-amplifier and driver. In Fig. 1, the value of the resistor between pin 9 and pin 7 of the oscillator should be 100,000-ohms at $\frac{1}{2}$ -watt.

V.H.F. Scatter Propagation and Amateur Radio

Applying Recently-Developed Techniques to Amateur V.H.F. Communication

BY MARK A. MOYNAHAN,* W2ALJ

SCATTER PROPAGATION, a newly discovered method of transmitting v.h.f. and u.h.f. signals over the horizon, has been making headlines recently with such things as a television link between Cuba and the U. S. mainland. This 200-mile path is being spanned in a single hop, a feat that was "theoretically impossible" a few years ago. Also, we now know that the Air Force¹ has a teletype circuit operating between Loring Air Force Base in Maine and Thule, Greenland. This distance is covered with only two intermediate relay points, giving three paths which range from 600 to 1000 miles each. The best path is, peculiarly, the 999-mile one from Goose Bay, Labrador to Sondrestromfjord, Greenland, with a reliability of 95 to 97 per cent. All this may cause some hams to wonder about what has become of the old line-of-sight rules for v.h.f. and u.h.f. propagation.

Like some other scientific theories, that of line-of-sight propagation lasted only until the weight of exceptions and evidence to the contrary proved too heavy for it. Amateurs may take pride in the fact that their efforts to use "useless" frequencies for "impossible" distances were again instrumental in the downfall of an established theory. Dating from the pioneering work of Ross Hull,² the v.h.f. pages of amateur publications have been filled with reports of unusual propagation of v.h.f. signals. With the introduction of high power v.h.f. television stations and the resulting co-channel interference, many people found that they had a financial interest in v.h.f. propagation. This directly resulted in the 1949 TV freeze and was one of the factors that started a spurt of scientific research into the propagation of v.h.f. and u.h.f. waves beyond the horizon. This time, though, partly because of military secrecy and partly because of the ever-widening gap between amateur and commercial interests, amateurs have not had the pleasure of watching the experts turn about-face and bury the old line-of-sight theory. But it is buried, so this may well be the last time that it is mentioned in any amateur publication.

The field of scatter propagation seems to be divided into two areas of interest.³ One is the

• By now, most hams know that there is a black-magic system for making v.h.f. waves travel far beyond the horizon. Too many of us have assumed that, because the experimental circuits probing the secrets of scatter propagation used tremendously high power, the field was not of much amateur interest. Taking information collected from many authentic sources, W2ALJ here shows that scatter techniques properly applied can open up an entirely new field in amateur v.h.f. work. Hams don't need 99.99 per cent reliability — so scatter communication can work for us. Here's how!

scattering of radio waves in the *E* region of the ionosphere. The other concerns the scattering of radio waves in the troposphere. As might be expected, the *E*-layer scatter signal covers the range from about 600 to 1200 miles. It drops off rather rapidly with frequency, though, and little signal gets through above about 60 Mc. The other phenomenon is that of the scattering of signals beamed at the troposphere. Due to the low scattering heights (5000 to 50,000 feet) the maximum range of these signals seems to be limited to about 400 miles or so. Their strength is almost not at all affected by frequency, up to a few thousand megacycles. In fact, comparison of a 4000-Mc. and a 500-Mc. signal over 150 miles showed only a 17-db. loss at the higher frequency. At lower frequencies around 100 Mc. or so the effect is even less pronounced. Ionospheric and tropospheric signals seem to blend at about the 500-mile point, but here both are quite weak. This results in a sort of no man's land from 400 to 600 miles.

The remainder of this article will be concerned with v.h.f. *E*-layer ionospheric scatter propagation. Most amateurs do not have the pocketbooks to buy kilowatts of microwaves, and one thing that effective tropospheric scatter circuits seem to require is very high power.

What is this ionospheric scatter propagation, one might ask, and what is so new about it? Amateurs have been working cross-country on 10 to 2 meters for years. Of course, one has to wait for the band to open, but when it does — wow! Sorry, this is not scatter propagation. It is usually reflection from sporadic-*E* ionization. The difference is in that phrase "waiting for the

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¹ J. R. McNitt, U. S. Air Force. Talk presented at IRE Scatter Techniques Symposium, Washington, D. C., Nov. 14, 1955.

² Ross Hull, May, 1937, *QST*, p. 16.

³ Bullington, "Characteristics of Beyond the Horizon Radio Transmission," Oct., 1955, *Proc. of the IRE*.

band to open." The scatter signal is there all the time; you do not have to wait for it, you just have to look for it. However, the v.h.f. man who works DX only during band openings will have to take a 90-db. look before he finds the scatter signal.

Closer to it are the amateurs experimenting in meteor trail reflections.⁴ Working over 800- to 1200-mile paths, they have shown that v.h.f. signals are consistently propagated in short bursts from ionized meteor trails. It takes high power, low-noise receivers and quick transmissions during the short burst of each meteor but signals are frequent and close enough together to provide a circuit of sorts. Furthermore, they are there day and night, as truly they should be, so long as this old world passes through the dust of "empty" space. However, close as this meteor-burst communication is, it is still not what we are looking for. We have to look another 30 db. lower.

Not the strong sporadic-*E*, nor the transient, Doppler-shifted meteor burst, but the weak, fluttery signal that remains in the absence of these effects is that which is called scatter. It is this signal, barely perceptible against the background of cosmic noise, that is being exploited in the long-distance v.h.f. scatter circuits. The way that this signal comes about is still in dispute,^{3,5} but there is no doubt that it does exist. Weak and rapidly fading, it is probably the most miserable sounding thing ever heard on a communications receiver; the type of signal that arouses feelings of sympathy for the poor bloke at the distant end pumping 40 kw. into a 2000-foot rhombic. But it has one priceless quality — reliability. Never before have long-distance

radio circuits shown the reliability that present scatter circuits maintain with ease. Operating above the m.u.f., scatter signals are even enhanced during regular radio blackouts and geomagnetic disturbances. The median level of a scatter signal will often rise 10 db. or more during a blackout of short-wave circuits. Other forms of propagation such as *F*-layer, *E*-layer, sporadic-*E*, aurora, and meteor bursts superimpose their effects upon the scatter signal but the times that the scatter signal itself drops out are very few, amounting to only minutes per year.

Nature of the Signal

The v.h.f. scatter signal is weak; so weak that it went unnoticed by experts and amateurs alike, appearing only as occasional unexplained errors in their experiments. For years, with our low-power, high-noise v.h.f. gear, we were in no position to find it until v.h.f. techniques improved. Now, with higher power and low-noise narrow-band receivers coming into general use on the v.h.f. bands, we are so close that only a little deliberate effort is needed to set up the first amateur v.h.f. scatter circuits. In fact, it is very likely that a number of DX contacts have already been unknowingly made by scatter propagation on our 20- and 10-meter bands. Here are data from the existing commercial and military circuits and some hints on how amateur circuits may behave:

The first scatter transmissions⁶ were made from Cedar Rapids, Iowa, to Sterling, Virginia, in January of 1951. This circuit is still in operation on 49.800 Mc. The power output is about 30 kw. (40-kw. input) to a rhombic antenna 25 wavelengths on a side. At Sterling, 773 miles away, a similar rhombic is used for reception. Over a period of a year the signal was at least 1 microvolt across a 600-ohm line for 99.99 per cent of the time. It was above 2 microvolts for 99 per cent of the time. The median value (50

⁴ "World Above 50 Mc.," Oct., 1954, *QST*.

⁵ O. G. Villard, et al., "The Role of Meteors in Extended Range VHF Propagation," Oct., 1955, *Proc. of the IRE*.

⁶ Bailey, Bateman and Kirby, "Radio Transmission at VHF by Scattering and Other Processes in the Lower Ionosphere," Oct., 1955, *Proc. of the IRE*.

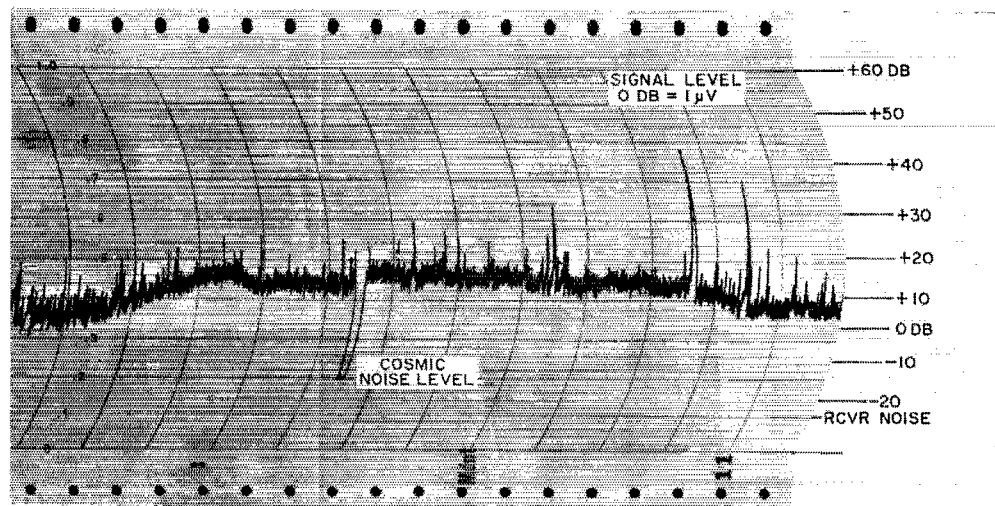


Fig. 1 — Typical scatter signal over a four-hour period showing meteor bursts, cosmic noise level, receiver noise level and hourly median signal variations.

per cent of the time) was 16 db. above 1 microvolt. The only noise received is the cosmic noise from our galaxy and from the rest of outer space, which is fairly constant. The average background noise level is about -11 db. from 1 microvolt for a 1000-cycle bandwidth. Thus the median signal-to-noise ratio is seen to be 27 db. and for 99.99 per cent of the time the signal-to-noise ratio is above 11 db. Now 99.99 per cent reliability works out to less than one hour lost per year, which is pretty good for any 700-mile circuit. Other paths were tried up to 1400 miles in length, frequencies from 21 Mc. to 107 Mc. were tested.^{6,7} Many conclusions from these and other circuits are reported in detail in volume 43 of the *Proceedings of the IRE*, October, 1955. It is an excellent reference, and from it a good idea of the behavior of amateur equipment on amateur bands can be drawn. In the following section the main factors that affect scatter-signal strength and signal-to-noise ratio will be discussed and amateur band relationships illustrated.

It was previously mentioned that the scatter signal fades rapidly. Fig. 1 illustrates this well. Frequent and often overlapping meteor bursts can increase the level by 20 to 40 db. The hourly and daily variations are of somewhat less magnitude. Evening hours generally bring weak signals. Meteor effects are most noticeable during these low-signal periods. Summertime signals seem to be stronger than those of the rest of the year. Spring and fall signals are weaker, with the minimum levels usually occurring in February and March. Thus it is very difficult to pin down an average signal level for circuit designing purposes. The custom has been to refer to the median (50 per cent of the time) value for each hour as recorded on an instrument with a 12-second time constant. The number of times per year that these hourly median values are above a certain value determines the reliability of the path.

Equipment

From experimental data taken on the Cedar Rapids and Churchill paths an estimate of the performance of amateur circuits can be made. Fig. 2 shows how a kilowatt six-meter rig with a simple Yagi antenna and a good receiver might work out over an 800-mile circuit. The two curves more or less represent extremes in path location. Northern paths seem to have higher signal intensities, though the hourly and daily variations are greater. A penalty for east-west paths is the high cosmic noise they experience whenever their antennas swing through the galactic plane. Each curve shows the percentage of time the median signal-to-noise ratio may be expected to exceed any particular value. It can be used both ways: if you desire a 0-db. signal-to-noise ratio an east-west path will give it to you 50 per cent of the time, or if you want the

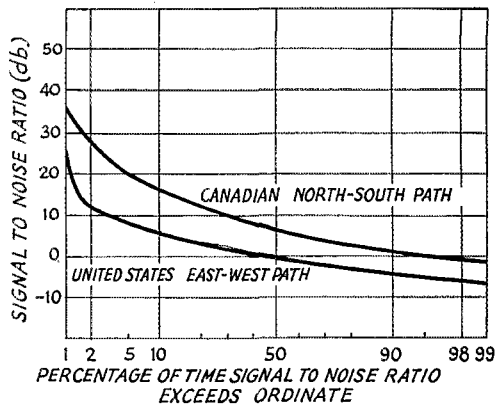


Fig. 2 — Probable characteristics of an 800-mile circuit on 51 Mc., 1-kw. plate input, Yagi antennas with 9-db. plane-wave gain at send and receive ends, 1-kc. bandwidth.

circuit 90 per cent of the time you will have to do with a -4 db. signal-to-noise ratio. Of course, if you are stubborn and want both a 90 per cent circuit and a 0-db. signal-to-noise ratio, the missing 4 db. will have to be made up by changing one of the other parameters.

One of the easiest ways to increase the signal-to-noise ratio is to narrow the receiver bandwidth. This has recently become popular among c.w. men as a way of avoiding QRM. It works even better against cosmic noise. The only requirements are that all the oscillators be stable enough to prevent the signal from drifting out of the narrow receiver passband. The simple receiver noise bandwidth relationship is shown in Fig. 3. The optimum bandwidth for certain information rates has been indicated.⁸ However, the c.w. values should be considered as minimums and lots of allowance made for receiver drifting and individual operator skill.

In practice, much wider c.w. bandwidths can be tolerated because good operators seem to develop a sort of "mental bandpass filter" which very closely approximates the optimum filter. This mental filter is remarkably effective against random background noise such as the cosmic noise of scatter circuits. Since Fig. 2 assumed a 1000-cycle bandwidth, the increase in signal-to-noise ratio shown in Fig. 3 for other bandwidths

Change Receiver Bandwidth From	Information Rate	Receiver Noise Power Will Change	Signal to Noise Ratio Will Change
1000 to 6000 cy.	VOICE (AM)	+7.8 db.	-7.8 db.
1000 to 2700 cy.	VOICE (SSB)	+4.3 db.	-4.3 db.
1000 to 70 cy.	RTTY 60 wpm.	-11.6 db.	+11.6 db.
1000 to 50 cy.	CW 40 wpm.	-13.0 db.	+13.0 db.
1000 to 25 cy.	CW 20 wpm.	-16.0 db.	+16.0 db.

Fig. 3. — Effect of receiver bandwidth on signal to noise ratio.

⁷ Abel, deBettencourt, et al., "Investigation of Scattering and Multipath Properties of Ionospheric Propagation, etc.," Oct., 1955, *Proc. of the IRE*.

⁸ S. Goldman, *Frequency Analysis, Modulation and Noise*, Chapter IV.

can be simply added to that of Fig. 2. For example: 90 per cent of the time an east-west path will be above -4 db., whereas if the bandwidth is dropped to 50 cycles, then 90 per cent of the time the signal will be 9 db. above the noise. The entire curve is shifted up 13 db.

Another way to improve the signal quality, which is new to amateur radio, is to drop to a lower frequency amateur band. This is a characteristic peculiar to ionosphere-scatter signals only. It was found experimentally⁶ that signal levels dropped very rapidly as the frequency was raised through the v.h.f. bands. The cosmic noise dropped also but not nearly as quickly as the signal. This frequency dependence is shown in Fig. 4 for band-to-band changes from 2 to 20 meters. Notice the great loss in signal strength when one moves from 6 meters to 2 meters (145 Mc.). This may account for the difficulty some 2-meter experimenters in weak signal DX have had in maintaining reliable circuits. The information of Fig. 4 is expressed for scaled antennas because the original experiments were made in that manner. At the higher frequencies a smaller

from 51 Mc. to 14 Mc. results in a 30.4-db. signal-to-noise ratio for 50 per cent of the time.

Antennas

The frequency dependence shown assumes that the antenna and height above ground are scaled according to the wavelength. This means that the beam pattern and effective radiated power at the desired radiation angle are all the same. Such an assumption is not necessarily valid. One of the reasons amateurs move to 2 meters is to take advantage of the compact size of high gain beams found there. One might reason that a nice 64-element broadside array or a 400-foot rhombic on 144 Mc. would go a long way toward making up for the additional propagation loss at that high frequency. This might be for a direct path, but it is not so for a DX circuit where a fading signal is encountered. Actually, when receiving a fading signal propagated through the ionosphere, the big broadside array may show little more gain than a simple Yagi. This may come as a great shock to those who thought they could make up for low power by building big beams.

The gain shown in the textbooks and antenna manuals is the plane-wave gain of an antenna. It is not the gain that the antenna will show when used on a particular ionospheric scatter circuit. Experiment has shown that the realized gain can be very much less than the plane-wave gain. It seems to be a function of the plane-wave gain of the antenna, its physical shape, the characteristics of the ionosphere, and the pattern of the antenna used at the other end of the circuit.

The realized gain of a broadside array may be much less than the realized gain of an in-line Yagi, even though they both have the same plane-wave gain. This may be said to be because of diversity effects within the broadside elements. Two elements widely separated, perpendicular to the direction of the incoming wave, will receive signals having a random phase relationship, so they will not give much gain when combined in a beam. The elements of the Yagi or in-line antenna, on the other hand, will receive signals with a more constant phase relationship and can be interconnected to form a good beam. This is

Change Frequency From	Signal Will Change	Cosmic Noise Will Change	Signal to Noise Ratio Will Change
51 Mc. to 145 Mc.	-48.2 db.	-12.0 db.	-36.2 db.
51 Mc. to 29 Mc.	+20.9 db.	+ 6.6 db.	+14.3 db.
29 Mc. to 21 Mc.	+11.0 db.	+ 3.8 db.	+ 7.2 db.
21 Mc. to 14 Mc.	+13.7 db.	+ 4.8 db.	+ 8.9 db.

Fig. 4.—Frequency dependence of VHF ionospheric scatter signals expressed for scaled antennas.

rhombic was built and placed closer to the ground according to the ratio of wavelengths. Frequencies of 27.775 Mc., 49.800 Mc., and 107.800 Mc. were used on the Cedar Rapids to Sterling path, so the resulting formula should apply to our amateur bands as well. Below 2 meters it is hardly likely that amateurs will experiment with ionospheric scatter, although tropospheric scatter may be very successful.

There is no reason to doubt that ionospheric-scatter signals continue to get stronger as the wavelength increases; however, around 10 meters or so one runs into the problem of atmospheric noise propagated from tropical storms. Twenty, especially, is almost always open to some part of the world, and the chance of finding a channel cleared of everything but cosmic noise is practically nil. Nevertheless, it is quite likely that many scatter contacts have been made when this band was really dead, by the use of high power and accidentally-correct beam headings. There are certainly enough kilowatts on twenty to justify this, although low-noise receiving locations are not so common. The signal-to-noise ratio increases shown for each band change, Fig. 4, may be added together and then added to Fig. 2 to give the new signal strength. Thus, changing

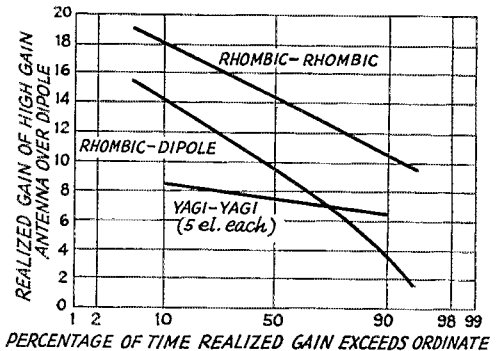


Fig. 5.—Realized gain of antennas in various combinations.

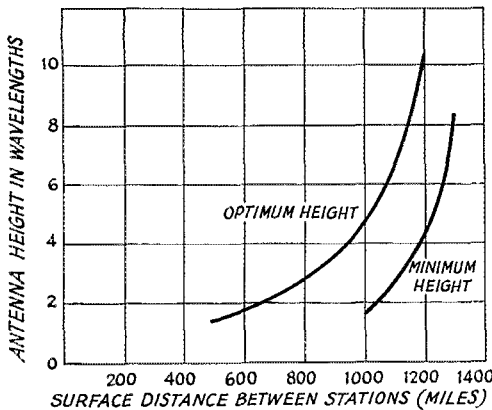


Fig. 6 — Antenna height to aim main lobe at scattering point 56 miles above path midpoint.

not to say that a Yagi will never show diversity effects between its elements; however, the ratio of in-line length to width for equal diversity seems to be about ten to one. Thus a half-wavelength-wide Yagi could be made five wavelengths long before diversity effects became destructive. Certainly this ten-to-one shape factor results in a far different looking antenna from the billboards we have been accustomed to seeing at v.h.f. DX stations.

If the transmitted signal is in the form of a tight beam there will be less diversity effects at the receiving end. A high-gain antenna at one end of the circuit permits the other antenna to realize more of its plane-wave gain. Fig. 5 shows the realized gains observed on scatter circuits for a few antenna combinations.⁶ As in Fig. 2, percentage of time is plotted along one axis, indicating that part of the time an antenna will realize its full gain, while most of the time it realizes considerably less. Unfortunately, the experiments showed that the times of least realized gain usually coincided with the times of minimum scattered signal, just when the gain was most needed. In Fig. 5 the Yagi-Yagi curve is the best guess that can be made from available data; however, notice that most of the time it loses very little gain. In actual scatter circuits there has been a trend away from the wide rhombics to antennas like a five-wavelength-wide corner reflector, or more recently, a set of four 13-element Yagis stacked two over two.⁹ Even in this super-Yagi the question arises as to whether the four are much better than one alone.

Antenna height plays an important role in all amateur operation, and scatter propagation is no exception. A horizontal beam placed at a certain height will have a main-lobe radiation angle which decreases as the antenna is raised. Since the scattering we are concerned with takes place in the E-layer at a height of about 50 to 60 miles, the radiation angle pretty much determines where the signal will return to earth. Fig. 6 can be used to find the optimum antenna

height for common scatter circuit distances. The antenna height is given in wavelengths which can be a limiting factor at the lower frequencies. For a 900-mile path, a twenty-meter beam would have to be 250 feet high to perform at its best. This is not the sort of thing found in the average ham's backyard! For this reason the large frequency-dependence gains, Fig. 4, that come with lowering the operating frequency may be partially nullified in practice by the high radiation angles associated with antennas that are close to the ground in terms of wavelength.

The calculation of this loss for low antennas is a bit involved and will not be attempted here. One test with a Yagi antenna on a thousand-mile path showed only about 4-db. loss at one third the optimum height. On a slightly longer path, about 1200 miles, the loss at one half the optimum height was of the order of 10 db. In general, it seems that for distances below about 900 miles antenna height is nice to have but not of vital importance. This is because at these distances there is always some volume of the ionosphere that is common to part of the radiation pattern of the antennas. However, at a certain height an antenna may have a main lobe of such an angle that it sees none of the ionosphere in common with any radiation from the distant end. This is the minimum height in Fig. 6. Signal strength will probably drop very rapidly when this point is passed.

Amateurs are used to signals that get weaker as the distance is increased. It is interesting that,

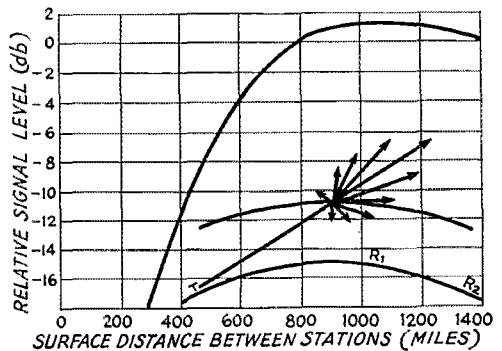


Fig. 7 — Angle and distance dependence for 56-mile scattering height.

up to a point, scatter signals behave in the opposite manner. Near the transmitter site the scatter return is very low (a sort of radar case) but it increases rapidly as the receiver moves from the limit of tropospheric scatter out to about 1000 miles. Past that point the antenna effects described above start to take their toll. The sketch of a scattered signal in Fig. 7 may help in understanding why this is so. Most of the scattered signal is in the same direction as the original signal with less and less being radiated as the scatter angle from that direction becomes greater. The near receiving point, R₁, actually

(Continued on page 120)

⁹ Symposium on Communication by Scatter Techniques, IRE at George Washington University, Nov. 14-15, 1955.

New York City Okays Towers

• As a result of the efforts of members of the Federation of Long Island Radio Clubs, Inc., the Commissioner of the Department of Housing and Buildings of the City of New York recently issued a directive to all Borough Superintendents outlining the conditions under which amateur towers could be erected. Structural requirements and other conditions imposed were as specified in a memorandum submitted to the Commissioner by Morris Brody (W2ARW), an architect and member of the Federation.

The League believes that the directive contributes significantly to the field of municipal regulation of amateur antenna towers. Since the directive should be useful to other amateurs, or their organizations, in securing similar actions in their communities, we are printing the text of the directive in full.

THE CITY OF NEW YORK

Intradepartmental Memorandum

To: Borough Superintendents
From: Bernard J. Gillroy, Commissioner
Date: November 22nd, 1955
Subject: RADIO TOWERS

Numerous radio towers have been erected throughout the city for amateur radio stations. Because of the small size and light construction of such towers and since such towers are frequently used for a temporary period only, they have been accepted as being similar to poles. In order to obtain uniformity in all boroughs, permits for radio towers for amateur radio stations may be issued under the following conditions.

1. The application may be filed by the radio amateur. The applicant shall file a location plan, the manufacturer's specification for the tower and its support, the manufacturer's analysis of the stresses in the tower and its supports, the details of footings, guys and braces.

2. Where the tower is erected by a tenant, the consent of the owner shall be filed. Towers shall not overlap adjoining property unless the consent of the owner of such property is filed. Guys may be fastened to anchors on adjoining property, if the consent of the owner is filed.

3. The height of such towers shall not exceed seventy-five feet above the adjacent ground, except that towers constructed of wood may not exceed 20 feet in height.

4. The construction of such towers shall be checked to insure safety. If constructed according to the specifications of the manufacturer, the tower may be accepted. Foundations of such towers shall meet the requirements of the code.

5. The thickness of steel in towers shall be not less than one-eighth inch when galvanized. If not galvanized, steel shall be not less than one-fourth inch in thickness. Aluminum shall be not less than one-eighth inch in thickness when used structurally. Where towers are constructed of tubing, the minimum wall thickness of the tubing shall be not less than one-sixteenth inch and such tubing, if steel, shall be galvanized on the exterior.

6. Such towers may be accepted in rear yards as they are not substantial enough to effect light or air. They may be accepted in residence districts as accessory to the dwelling.

7. Towers constructed of wood may not be erected on roofs.

BERNARD J. GILLROY
Commissioner

Stays

Believed to be among the youngest hams in the United States is eight-year-old Elizabeth Deck, KN6MTQ, of San Bruno, California. Elizabeth received her ticket recently and at that time was given her own rig by her father, Russell Deck, W9JVI.

After this experience, Ken Schultz, W0EXJ, says "maybe our beams shouldn't be so high, particularly on Mondays." He reports that shortly after installing his high atop the roof, a neighbor drove by and was later overheard to

remark to a passerby: "It looks good to me, but I cannot understand how Mrs. Schultz gets up there to hang out the family laundry."

STOLEN

Some time between 1100 February 4th and 1300 February 5th, the following equipment was stolen from the Region 4 c.d. control center in Philadelphia. A Collins 75A3 Serial No. 531 and a Collins 32V3 Serial No. 1250, together with mike and antenna relay. Anyone having information as to the whereabouts of this equipment is asked to contact E. W. Haldeman, W3PST, 6212 Ogontz Ave., Philadelphia 41, Pa.

"My Feedline Tunes My Antenna!"

Plain Talk About a Fancy Subject

BY BYRON GOODMAN, WIDX

YOU DON'T have to be in ham radio very long before you hear some self-styled antenna expert talking about "cutting the line to reduce the standing-wave ratio." An allied problem — and misconception — is exemplified by the card that came in the mail some time ago:

"I carefully cut an antenna for 7 Mc. according to formula in the *Handbook* and fed it in the center with 300-ohm Twin-Lead. Using a grid-dip meter I found the frequency was 5 Mc. instead of 7 Mc. It had dips at 10 Mc., 20 Mc. and 25 Mc. Adding more 300-ohm Twin-Lead brought the frequency in to 7 Mc., but what I don't understand is why the feeders affect the flattop frequency in untuned feeders. If they are supposed to, then how can I check the flattop for its resonant frequency?"

This is a good subject. If you know the correct answers to all of the questions in the quote above, you aren't likely to have trouble understanding most of the common feedline problems. Let's see what it's all about.

Transmission Lines

Ask any amateur if he knows all about coaxial cables and he will probably say, "Sure. RG-8/U is 50-ohm line and RG-11/U is 75-ohm line. What else is there to know?" The answer to that one is "Everything."

In the first place, RG-8/U is *not* 50-ohm line. It has a "characteristic impedance" of 50 ohms. This fancy language can best be illustrated by Fig. 1. Here we show a long length of RG-8/U with a 50-ohm resistor connected at one end (we'll call that end the "load" end). If we measure the impedance at the input end (by using an impedance bridge), it will measure 50 ohms. This, of course, is just what you expect, and you're probably wondering what we're driving at. Patience, please.

Now suppose we take this same piece of

• Over a period of time one hears some weird and wonderful discussions and explanations of what takes place in transmission lines. The cumulative effect of all this loose talk is to propagate some misconceptions. It is the purpose of this article to clear away some of the clouds that surround the subject.

RG-8/U and connect a 100-ohm resistor at the load end, as shown in Fig. 2. Measuring the impedance at the input end, what should we get for an answer? 50 ohms? 100 ohms? 200 ohms?

If you came up with an answer, any answer, you had better continue reading this article, because there isn't any answer to the question in the preceding paragraph! There isn't any answer because the problem isn't definite enough to be capable of solution. In order to know what the input end of the 50-ohm line looks like when a 100-ohm resistor is connected at the load end, you must also know the *electrical length* of the line. This is another way of saying that you have to know the frequency and the physical length, from which you can compute the electrical length. (Electrical length is measured in wavelengths, so any given length of line has an electrical length that varies with the frequency. A line one wavelength long at a given frequency is two wavelengths long at twice that frequency, etc.)

Actually, with the "50-ohm" line terminated in 100 ohms, some interesting things happen along the line. Take the lines shown in Fig. 3. If the line is a quarter wavelength long, we find that the impedance bridge would measure the input impedance as 25 ohms. If the line is a half wavelength long, the bridge would come up with an answer of 100 ohms. If the line is $\frac{1}{8}$ wavelength long, the bridge would measure the

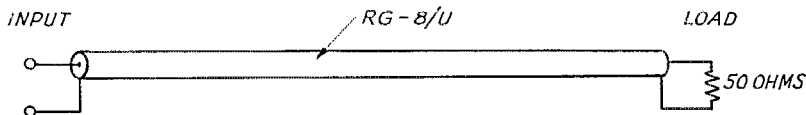


Fig. 1 — A length of RG-8/U with 50 ohms connected across one end will look like 50 ohms at the input end of the line.

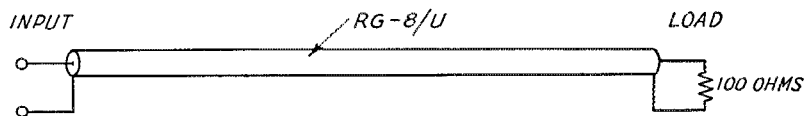


Fig. 2 — With 100 ohms connected at the load end of a length of RG-8/U, the problem is to determine what the line looks like at the input end.

input as a 40-ohm resistance in series with a capacitor, and a $\frac{3}{8}$ wavelength line would be measured as 40 ohms resistance in series with an

frequency of the antenna proper. By changing the physical length of the line our friend was able to get a length that showed "resonance"

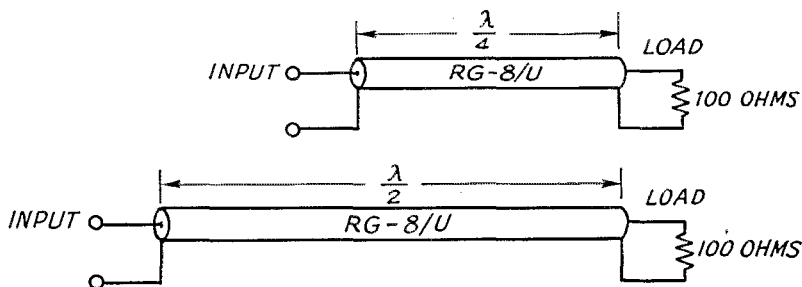


Fig. 3 -- Part of the answer to the problem posed in Fig. 2. When the line is a quarter wavelength long, it looks like 25 ohms at the input end when the load is 100 ohms. When the line is a half wavelength long, the input end shows an impedance equal to that connected at the load end.

inductance! These effects repeat every half wavelength along the line, as shown in Fig. 4A.

The example we just discussed used a load for the transmission line that was higher than the characteristic impedance of the line. When the termination is lower than the characteristic impedance of the line, the impedance varies along the line in the manner shown in Fig. 4B.

Now let's get back to that "characteristic impedance" thing again. Here's what it is: *The characteristic impedance of a transmission line is the value of resistance that, when used as a termination for the line, makes the input impedance of the line independent of the electrical length of the line.*¹

Measuring Antenna Impedance

By now you may begin to see where the card-sender of the opening paragraph went astray. He connected an antenna to a length of "300-ohm line" and expected that the line was acting as a direct connection between antenna center and the shack, adding no effects of its own. It wasn't, of course. The antenna was probably resonant at 7 Mc., and a half-wave antenna looks like 70 ohms at its center. Hence this was the same as connecting a 70-ohm resistor to the end of the 300-ohm line, for measurements made at 7 Mc. At other frequencies the antenna becomes a complex termination, involving both resistance and reactance. From the previous discussion you know that the 300-ohm line terminated in something other than 300 ohms is going to show various values of resistance and reactance at the input end, depending upon the electrical length of the line. Consequently, the resonant frequencies checked with the grid-dip meter (these would be the frequencies where pure resistance showed at the input end of the line) have no bearing whatsoever on the resonant

at the frequency for which he cut the antenna, but all this means is that his electrical line length at 7 Mc. is now a multiple of a quarter wavelength, since it takes that length to show pure resistance at the input end when the load is a pure resistance (we're assuming it is).

OK, how do you measure the resonant frequency of the antenna? Well, it isn't too easy, but fortunately, it isn't too important.

(WHAT?!!! It isn't important that the antenna be resonant? What kind of sacrilege is this?)

Our friend of the postcard is using what is known as a "tuned antenna system." He is terminating a 300-ohm line with a load other than the characteristic impedance, and consequently, what the impedance looks like at the input end of the line depends upon the electrical length of the line (see Fig. 4). To put power into the antenna, the line is connected to the transmitter through a network that compensates for any reactance showing at the input end of the line, and a resistive load is presented to the transmitter. In plain language, the "network" is the output stage plate tank or, to handle a wider range of conditions, the plate tank plus an antenna coupler.

Perhaps we should mention at this point that only resistance can use up power, reactance can't. You know this from practical work; you can pass a.c. through a capacitor but the capacitor never gets hot (if it's a pure capacitor) or uses power in any other way. The same is true of a pure inductance, but they are harder to come by because the conductor of the coil has some resistance. When a coil heats up, it is the resistance of the coil that causes it, not the reactance.

Since only resistance can use up power, what difference does it make if the antenna is resonant or not? When the antenna is resonant it appears as a pure resistance (made up of the conductor resistance plus the "radiation" resistance), but when it isn't resonant it looks like a resistance and a reactance. Only the resistive part can use up power, so we don't throw anything away. We do want the antenna to be resonant and look like a

¹ This is strictly true only for a lossless line, where the input impedance will be equal to the characteristic impedance for any length of line. Lines with appreciable loss will show a gradual variation in input impedance, depending upon the length, as a result of the cumulative effects of series resistance and shunt conductance. In most amateur applications, however, this aspect of the effects of the losses can be neglected. — Ed.

resistance if we are planning to use it as a load for an "untuned" transmission line, but to do this we have to use a line with a characteristic impedance equal or close to the value of resistance the resonant antenna shows. We can't feed a 70-ohm antenna with a 300-ohm line and expect it to be anything but a "tuned antenna system," exhibiting the variations shown in Fig. 4. We can feed a 70-ohm antenna with 70-ohm line, and then no matter how long we make the line, it will always look like 70 ohms at the input end, and we won't have to use an antenna coupler if 70 ohms will load the transmitter satisfactorily. But the antenna *has* to be a 70-ohm antenna, resonant at the frequency we're interested in.

Standing-Wave Ratio

By this time it may or may not have occurred to you that all this talk about the way the input impedance varies with a mismatched line may have something to do with that old conversation piece the "standing-wave ratio." It does. Since the power at any point along the line must be constant, you can see that as the resistance and reactance vary along the line, so must the voltage and current. Take the line of Fig. 4A. Let's say we're putting 100 watts into that 100-ohm load. The current at that point is 1 ampere and the voltage is 100. ($W = I^2R = E^2 \div R$). quarter wavelength from the load, the line

looks like 25 ohms, and 100 watts at this resistance level is a current of 2 amperes and a voltage of 50. At the half-wave point from the load we're back to 1 ampere and 100 volts. Thus you can see that the current and voltage vary along the line, and of course they can be measured and that will give us something called the "standing-wave ratio." This s.w.r. is the ratio of a current maximum to a current minimum, or the ratio of the voltage maximum to the voltage minimum, and in this case it is equal to 2.0. We say, "The s.w.r. of the line is 2.0." Note that this ratio of 2.0 is also the ratio of the resistive load to the characteristic impedance of the line ($100 \div 50 = 2$). It always works out this way; the s.w.r. of the line is equal to the ratio of mismatch between load and line, for resistive loads. (When the load is smaller than the characteristic impedance, you divide by the load, because the s.w.r. is normally stated as a ratio larger than 1.0.) The solution is more complicated with some reactance in the load.

And now you can see why those "brains" who change the s.w.r. on the line by changing the line length just don't know what they're talking about. What they are doing is adjusting the length of the line so that at the input end it looks like a resistance and hence becomes a little easier to couple to. But *the s.w.r. is determined by the load*, and don't you forget it.

(Continued on page 124)

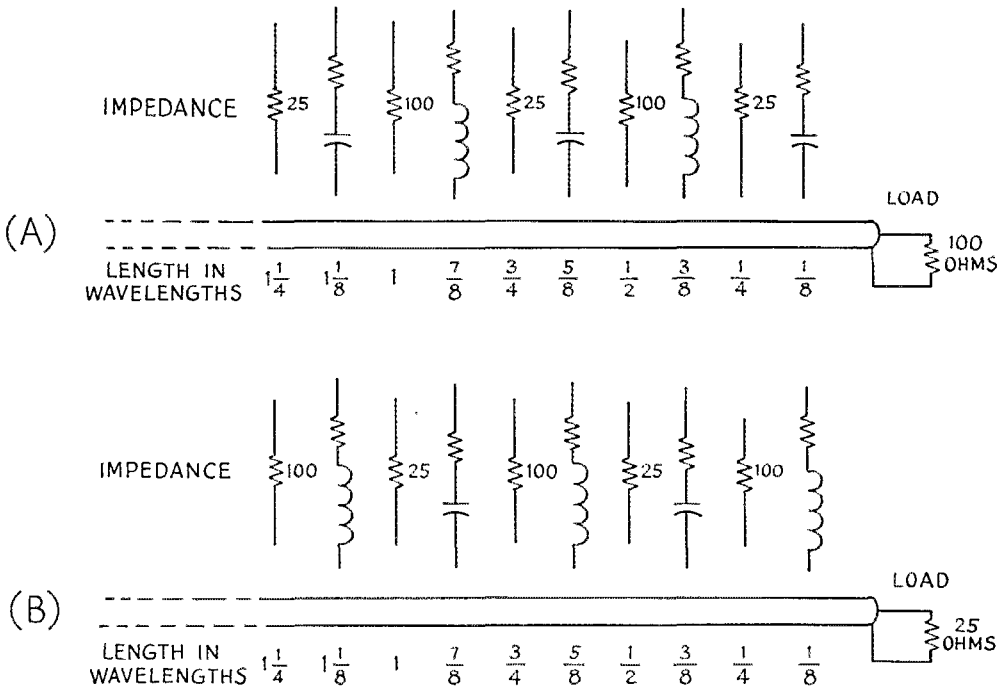


Fig. 4 — These two examples show how the input impedance of a line varies with the length of the line when the line is terminated in something other than the characteristic impedance of the line. It should be realized that the impedance is continually changing along the line, repeating every half wavelength. The impedance is purely resistive only at the quarter-wave (and multiples) point, and it becomes reactive either side of this point, reaching a maximum reactive condition at the odd multiples of 1/8 wavelength.

When the load includes reactance as well as resistance, the impedance along the line varies in the same manner as shown here, but the purely resistive points do not occur at multiples of 1/4 wavelength from the load.

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

Results: Anniversary Party

"The turnout was beyond all expectation." This rousing appraisal of the Sixteenth Anniversary Party conducted by the YLRL last December comes from the YLRL Vice President W9YBC. Gloria reports 196 YLs entered the phone section, and 89 took part in the c.w. section. Only 38% of the total possible phone logs were received; while the c.w. girls did better, however, with 50% sending in logs.

Comments received from enthusiastic participants indicated approval of the new middle-of-the-week rather than weekend schedule, although it is "hard on the poor working girl," as W3MSU laments. The biggest controversy involves the scoring question, "to multiply or not to multiply?"

W9YBC has passed along comments that accompanied some of the logs:

C. W. Participants

VE3DDA — "Had lot of fun in the party, but wish more gals were on c.w. Wonderful not to have the QRM as we do on week-ends."

KZ5KZ — "Sorry more gals were not on 21 mc. c.w."

W0QXF — (operated by W0QXF and W0QXA) "We ask that there be some allowances made for stations with two or more operators, so that club stations or families having more than one YL operator may enter into competition in a separate class."

W6WSV — "I never remember hearing so many gals on in a contest before. Judging by the numbers being exchanged we will have some new record holders this contest. It is a great thrill to me, because as First Vice President and Activities Manager of the YLRL, it became my duty to originate some of these contests. Back in the good old days you could spend hour upon hour listening for a YLRL member, and if you were lucky, might work a couple over an entire weekend. The only suggestion I might make is that the contest be pushed back earlier in December, so that we won't be feeling mental qualms about Christmas duties."

KL7YG — "Would like a state multiplier."

Phone Participants

W8HUX — "Hope they always have the Party in the middle of the week."

W5RZJ — "Last year had 17 contacts and a score of 1,275. This year I had 32 contacts and a score of only 200. Hi."

W4HLF — "Liked the contest FB, except would like a state multiplier."

W3MAX — "Would like to have the A. P. held in early November."

W6CEE — "Certainly enjoyed the A.P. this year. Thanks so much for the rule change."

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



You are seeing double; W0QXA and W0QXF are identical twins. Taking time from their electrical engineering studies at the University of Minnesota, Janice and Janet Robidoux received honorable mention for their third place c.w. score (see A.P. results).

And now the all-important results:

Winning the first place phone award for the second consecutive time, was Barbara Houston, W3OQF, operating W3MAX, with a score of 625. Arlie Hager, W4HLF, followed closely behind with 612 points for second place phone, and Elsa Wheeler, W6JZA, made third place phone with 543 points.

Also winning a YLRL gold cup for the second (but not consecutive time) for highest place c.w. score was Frances Shannon, W4RLG, with a score of 293. Frances had the top c.w. score in the Fourteenth Anniversary Party, too. W4HLF took second place honors in the c.w. section as well as the phone section, with a score of 268. Evelyn Chase, W1WXP, placed third highest in the c.w. portion with 218 points. The same score of 218 was also made by W0QXF, operated by W0sQXA and QXF, Janice and Janet Robidoux, who received honorable mention. W1WXP took third place c.w. honors on the basis of being a single operator station.

All winners will receive certificates. Second and third place winners will receive token gifts. Certificates will be given for high score for phone and c.w. in each district, area, or country.

Hearty congratulations to all winners!



DON'T FORGET
the
SEVENTH ANNUAL YL-OM
CONTEST

March 3rd and 4th, phone section

March 17th and 18th, c.w. section

Complete details were published
in last month's department.

With the interest shown by OMs in the various YL certificates offered, participation in this year's YL-OM contest should reach a new high. Even if you aren't certificate-minded, our annual rendezvous is always intriguing. Make plans to keep your dates now!

The complete tabulation of scores follows (fractions omitted). *denotes highest scorer in each district. Call appearing without score indicates log was submitted for checking purposes only.

PHONE SECTION

<i>First District</i>		W6DXI.....250	
W1CEW.....356*	W6FHA.....75	W6GGX.....312	
W1QON.....193	W6GZA.....543	W6NAZ.....	
W1VOS.....	W6PJU.....	W6WRT.....375	
W1VXC.....118	W6RFX.....	<i>Seventh District</i>	
W1VYH.....	W6TAX.....	W7FTX.....243	
W1WFX.....156	W6WYQ.....	W7HDS.....	
W1YNI.....343	W6WYQ.....	W7OOY.....337	
W1YPI.....250	W6WYQ.....	W7QXH.....212	
W1YPT.....162	W6WYQ.....	W7RAX.....268	
<i>Second District</i>		W7TGG.....443*	
K2AHG.....	W7YFG.....256	W7YFG.....256	
K2CUQ.....150	W7YFG.....	<i>Eighth District</i>	
K2DXD.....50	W7YFG.....	W8ATB.....82	
K2IWO.....362*	W7YFG.....	W8DNF.....155	
W2EEO.....210	W7YFG.....	W8PTT.....	
W2OWL.....187	W7YFG.....	W8HUX.....493*	
<i>Third District</i>		W8HWX.....450	
W3MAX.....625*	W7YFG.....	W8K LZ.....200	
W3NNS.....261	W7YFG.....	W8LGY.....331	
W3TSC.....5	W7YFG.....	W8UUV.....	
W3TYC.....93	W7YFG.....	W8VRH.....68	
W3UTR.....243	W7YFG.....	<i>Ninth District</i>	
W3UUG.....412	W7YFG.....	W9GME.....318	
W3YTM/3.....300	W7YFG.....	W9LDK.....	
W3ZFB.....387	W7YFG.....	W9LOY.....412*	
<i>Fourth District</i>		W9MLE.....125	
K4APF.....250	W7YFG.....	W9RUJ.....275	
W4AGX.....43	W7YFG.....	W9TON.....	
W4HLF.....612*	W7YFG.....	W9YBC.....162	
W4KYI.....	W7YFG.....	<i>Tenth District</i>	
W4RLG.....381	W7YFG.....	W0BFW.....318	
W4SGD.....330	W7YFG.....	K0BTY.....	
W6QYL/4.....293	W7YFG.....	W0MLR.....155	
<i>Fifth District</i>		W0OCP.....475*	
K5BNQ.....468*	W7YFG.....	W0ZWL.....125	
W5EGD.....343	W7YFG.....	<i>Other Districts</i>	
W5EYE.....81	W7YFG.....	KG4AC.....125*	
W5HWK.....	W7YFG.....	K17ALZ.....193*	
W5RYX.....395	W7YFG.....	K17BEW.....181	
W5RZJ.....200	W7YFG.....	K25KA.....112*	
W5WUX.....218	W7YFG.....		
<i>Sixth District</i>			
K6ANG.....187	W7YFG.....		
K6OPX.....331	W7YFG.....		
W6CEE.....343	W7YFG.....		

By winning second place phone and c.w. honors in this year's A.P., Arlie Hager, W4HLF, of Orange, Va., sustains her record as a veteran YL contest winner. Formerly W8HILF, Arlie has five jr. ops. to contend with while operating too.



Third place Phone winner in the Anniversary Party is W6JZA, Elsa Wheeler, Temple City, California. A member of the Los Angeles YLRC and active on bands 2 thru 80, Elsa is the wife of W6GRW and mother of W6DXZ.

C.W. SECTION

<i>First District</i>		W6ENK.....110	
W1CEW.....12	W6PCA.....143*	W6WRT.....	
W1VOS.....	W6WRT.....	W6WSV.....125	
W1VXC.....118	W6WSV.....	<i>Seventh District</i>	
W1WFX.....218*	W6WSV.....	W7COX.....145*	
W1YNI.....143	W6WSV.....	W7PTX.....93	
W1YPH.....137	W6WSV.....	W7RAX.....68	
<i>Second District</i>		W7VYG.....137	
K2DXD.....150*	W6WSV.....	W7ZOB.....43	
K2INQ.....65	W6WSV.....	<i>Eighth District</i>	
W2EBW.....90	W6WSV.....	W8HUX.....	
<i>Third District</i>		W8HWX.....212*	
W3MAX.....87	W6WSV.....	W8KLZ.....118	
W3MSU.....62	W6WSV.....	W8MBI.....131	
W3QPI.....193*	W6WSV.....	W8VRH.....50	
W3TYC.....143	W6WSV.....	<i>Ninth District</i>	
W3TSC.....15	W6WSV.....	W9MLE.....25	
W3UTR.....100	W6WSV.....	W9MYC.....50*	
W3YTM/3.....187	W6WSV.....	<i>Tenth District</i>	
<i>Fourth District</i>		W0QXF.....218*	
K4APF.....6	W6WSV.....	W0ZWL.....6	
W4HLF.....268	W6WSV.....	<i>Canada</i>	
W4KYI.....	W6WSV.....	VE3DDA.....43*	
W6QYL/4.....156	W6WSV.....	VE5DZ.....160*	
W4RLG.....293*	W6WSV.....	<i>Other Districts</i>	
W4SGD.....68	W6WSV.....	KL7BEW.....6	
<i>Fifth District</i>		K17YG.....100*	
W5EGD.....156	W6WSV.....	KZ5KA.....6*	
<i>Sixth District</i>			
W6EHA.....	W6WSV.....		

REVISED LIST OF NETS REGISTERED
WITH THE YLRL
as of January 15, 1956

Band	Freq. (kc.)	Day	Time	NCS
			PHONE	
75	3820	Mon.	9:00 A.M. PST	Rotates W7QYN Manager Northwest YL Operators Net (NYLONS)
			7:30 P.M. EST	W1RLQ

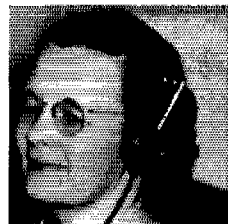
(Continued on next page)

Page No. _____									
Station Call: _____ Operator _____ Power Input: _____									
QTH: _____ 'Phone _____ C.W. _____									
Date-Time	Freq.	Sent		Received		STATION WORKED	STATE OR COUNTRY	Multi-plier	
		No.	R.P.T.	No.	R.P.T.				

Suggested log form for YL-OM Contest.

3900	Mon.	3:00 P.M. PST	W7HHH; Alt. W7NJS
3970	Mon.	10:00 A.M. CST	W0UDU Alt. W0BFW & W0PTK
3900	Tues.	3:00 A.M. EST	Iowa Net
3838	Tues.	9:00 A.M. CST	W4HLF W0KJZ Pi-Net
3900	Wed.	8:00 A.M. EST	WITRE
3900	Wed.	9:30 A.M. EST	W8ATB
3915	Wed.	9:00 A.M. PST	W6PJF- Alt. W6GQZ Ironing Board Net

Top c.w. winner W4RLG, Frances Shannon, of Cottondale, Alabama, also won highest c.w. honors in the 1953 A.P. The XYL of W4MI, Frances is an OPS, ORS, and Asst. EC and has WAS, A-1 Operator, Code Proficiency (25 w.p.m.) and Alabama Section net certificates.



During a lengthy illness Leona Peacor's OM, WIGAG, prescribed "radio frequency therapy." The call W1YPII was the resultant cure, and now Leona recommends amateur radio as a tonic for everyone. Leona's solid c.w. list can be heard on 80 daily from her Stoneham, Mass. QTH.

5. Six QSL cards or other written confirmation, showing proof of contact, must be submitted with application. IRCs, or the equivalent thereof, must be sent with the confirmations to finance their return by first-class mail. The YLRL will not be responsible for any loss or damage to same.

6. Decisions of the WAC-YL custodian regarding interpretations of these rules as here stated or later amended, shall be final.

7. Send applications and confirmations for this award to Opal Jones, W6PCA, WAC-YL custodian, Route 1, Box 180, Esparto, California.

Note: To date the four WAC-YL awards issued have gone to OMs! — W2QHH, ZL1BY, G4ZU, and CE5AW.

Band	Freq. (kc.)	Day	Time	NCs
	3880	Thurs.	9:30 A.M. CST	W5WXY W5ZPD, Alt. Texas YL Round-Up NET
40	7215	Thurs.	9:00 A.M. EST	K2IWO
	7236	Thurs.	10:00 P.M. CST	Texas YL Round-Up Net (rotates)
20	14,240	Thurs.	1:00 P.M. CST	W9RUJ
10	28,900	First Tues. each month	9:00 P.M. EST	QRMary Round Table- (KZSYLs)
	29,000	Tues.	1:00 P.M. EST	W9GME Hair- Pin Net
C.W.				
80	3610	Wed.	9:00 P.M. EST	W1WPX

Inquiries concerning nets should be directed to YLRL Vice President Gloria Matyska, W9YBC, 2322 South Second Avenue, North Riverside, Illinois.

Grace "Chata" Swenson, W1RLQ, of Morningdale, Mass., operates 10, 15, 20, 40, and 80 both c.w. and phone. Licensed in 1948, Chata made WAS and WAC on 10 meters with 15 watts input. Frequency Measuring Tests are her special interest, and she participates in as many as she hears about.



WAC-YL AWARD

1. The Young Ladies Radio League issues a Worked All Continent-YL certificate to any licensed amateur in the world.

2. Two-way communication must be established on the amateur radio bands with the six continents: North America, South America, Europe, Africa, Asia, and Oceania. Any and all authorized amateur radio bands may be used. Cross-band contacts are permitted; contacts may have been made over any period of years.

3. Contacts with all six continents must be made with duly licensed woman operators.

4. Contacts with all six continents must be made from the same location. Within a given community, one location may be defined as from places no two of which are more than 25 miles apart.



W2FZO of Carthage, New York, says she is "mainly a rag-chewer, either local or DX, with equal pleasure." Ginger Sherman's DX record substantiates her statement, for she is DXCC with 100 countries confirmed on phone. Ginger and her OM W2BEO run a home-built KW on 20 and 15 phone.

Keeping Up With The Girls

During the floods in northern and central California K6GIB and W6SFEA, HTS, PJF, and QMO were heard round the clock handling emergency traffic. . . . Officials of Schoharie County, N. Y. gave public commendation to W2NAI, Marge, and local amateurs for their outstanding service during the floods in the area last Fall. Emergency

Licensed for general class a year ago, thirteen-year-old Elaine Pedersen, K6CSM, of Huntington Beach, Calif., is on the air as often as her eighth grade school studies permit. Elaine keeps in contact with her dad, W6MRP, when he is away on business trips.



Coordinator and Radio Officer for Schoharie County, Marge said that they were able to be of such help because they were prepared. . . . W9LDK, Adeline, is moderator for the Chicago LARK NEST net which meets Friday at



Eileen Stuber's ham ticket saves her lots of letter writing, for her OM W8PJH is aboard a Great Lakes freighter nine months a year. Operating W8VSL on 75 from her Amherst, Ohio QTH gives Eileen's four young jr. ops. a chance to talk to their dad regularly too.

(Continued on page 128)

The World Above 50 Mc.

1215-1300 2300-2450 3350-3750 5650-5925 6000-10500 21000-22000 30000-7

To v.h.f. men in the wide open spaces, it may not seem to be much of a problem, but the 9th V.H.F. Sweepstakes showed us that QRM is potentially a source of considerable trouble on 50 and 144 Mc. in many urban areas. Interference in bands 4000 kilocycles wide? How come? Didn't we solve all that when we went to selective receivers and stable transmitters years ago?

One by one we've licked quite a few problems in our v.h.f. work over the years. We've extended our reliable coverage in dozens of ways, through increased transmitter efficiency, lower-noise receivers, bigger and better antennas. But interference between stations has been given little consideration all the while. Now, when everyone starts up at once, as in the heat of a contest, we realize that it's high time to do something about cutting down the job we do on one another, before our increasing activity reaches the point of diminishing returns.

The problem breaks down into two categories: equipment design and operating techniques. We can improve matters in both these departments, and it's time we did. Why, for instance, need everyone pile up in the first 1/4th of each band? The obvious answer is that the guy nearest the low edge is the one who gets the nod, nine times out of ten — that is, if he is strong enough to override others on the same channel. Not many fellows are going to move up in the band as long as low-edge calling brings results. The solution: Tune from points in the band other than the low edge. Do it often, and announce that you're doing it. During a CQ, or at the conclusion of a contact, make it plain that you are "tuning from 51 Mc. down," "from 145 Mc. up," and so on.

In a contest it usually pays to be even more specific. "Tuning from 144.1 to 144.2" and similar small slices moving up the band each time paid off for your conductor handsomely. It prevents needless calling by stations scattered through other parts of the band, and encourages calling by stations who might otherwise call CQ. If you can't get your rig to work anywhere but the first half of the first megacycle, at least you can tune for the fellows who can. And if you let it be known that you are tuning the upper reaches of the band, more of us will move up there to call you.

If you're presently tied to a low-edge spot it's time to do some revamping. Crystals are cheap and very few antennas are so sharp that you can't work them effectively over at least half the band. Why, then, use a rig that has all its tank circuits designed so that it becomes inoperative if you try to tune it above the first 500 kc.?

When you build that new exciter, plan for a little surplus of grid drive all along the line. It'll come in handy when you want to shift frequency quickly over half the band or so. Then *shift!* With the possible exception of a marginal #2-layer

2-METER STANDINGS

Call	States	Areas	Miles	Call	States	Areas	Miles
W1RFU	19	7	1150	W5MWW	9	4	570
W1HDQ	19	6	1020	W5MLL	9	3	700
W1REZ	18	5	710	W5SWV	8	3	600
W1UZZ	17	5	680	W5BRD	8	2	570
W1CCH	17	5	670	W5FEK	8	2	580
W1LZY	16	6	750	W5VX	7	4	—
W1KCS	16	5	600	W5VY	7	3	1200
W1CLH	16	5	565	W5ONS	7	2	950
W1BEO	16	5	475	W5FSC	7	2	500
W1AJB	15	5	690	—	—	—	—
W1AZK	14	5	650	W5WVS	5	3	1380
W1MNF	14	5	600	W5DNG	4	2	350
W1BCN	14	5	650	W5ZL	3	2	1400
W1DJK	13	5	520	W5BAZ	3	2	320
W1MNN	12	5	520	W5NLT	3	2	360
—	—	—	—	W5MMU	3	2	240
W2ORI	26	8	1000	—	—	—	—
W2NLY	23	7	1050	W7VMP	6	4	1280
W2AZL	21	7	1050	W7LEE	5	3	1020
W2BLY	21	7	1020	W7JU	4	2	353
W2UTH	19	7	880	W7YZU	3	2	240
W2AZP	19	7	650	W7JUO	3	2	140
W2OPQ	19	6	—	—	—	—	—
W2DWJ	19	6	630	W8WVX	28	8	1200
W2AOC	18	6	660	W8LPD	25	8	750
W2AMJ	17	5	550	W8SFG	24	8	850
K2CEH	16	7	910	W8RMH	24	8	800
W2WFB	16	6	900	W8RRW	23	8	850
W2PAU	16	6	740	W8SRV	22	8	725
W2PCQ	16	5	650	W8DX	22	7	675
W2LHL	16	5	850	W8BAX	21	8	685
K2IEL	15	5	620	W8WRN	20	8	670
W2CFT	15	5	525	W8JWV	19	8	710
W2BRV	15	5	590	W8WOK	15	7	800
W2FJH	15	5	435	W8ZCV	17	7	970
W2LFX	15	5	—	W8RWV	17	7	630
W2DFV	15	5	—	W8WSE	16	7	800
—	—	—	—	W8EGR	16	6	680
W3BGT	28	8	740	W9EQC	24	8	820
W3RUE	25	8	950	W9EHC	24	7	725
W3KCA	21	8	—	W9FVJ	23	8	850
W3KWL	19	7	740	W9BPV	23	7	1000
W3KEM	19	7	660	W9KLR	23	7	820
W3IBH	19	7	650	W9ZHL	23	7	690
W3GPK	19	6	800	W9WOK	22	8	860
W3TDF	19	6	720	W9UED	22	7	960
W3BNC	18	7	750	W9KPS	21	7	660
W3FPH	18	7	—	W9UCH	21	7	750
W3LNA	16	7	720	W9CAB	20	7	750
—	—	—	—	W9MUL	19	7	640
W4HHK	28	9	1280	W9REM	19	6	—
W4AO	23	7	950	W9ALU	18	7	800
W4MEJ	20	8	725	W9JGA	18	6	720
W4PCT	20	8	—	W9MFL	16	7	660
W4JFV	18	7	830	W9JLY	15	7	560
W4VLA	17	7	825	W9WFO	15	6	—
W4TLV	16	7	1000	W9LEE	15	6	780
W4UMF	16	6	600	W9DSP	15	6	760
W4HJQ	15	7	650	W9DDG	15	6	700
W4OLK	15	6	720	W9FAN	14	7	680
W4CLY	15	5	720	W9QKM	14	6	620
W4ZJU	14	5	800	—	—	—	—
W4OKC	14	5	500	W0EMS	27	8	1175
W4JHC	14	5	720	W0GUD	25	7	1065
W4WCB	14	5	740	W0IHD	24	5	870
W4TCR	14	5	720	W0UOP	18	6	—
W4UBY	14	5	435	W0IONQ	17	6	1000
W4VNH	13	7	650	W0LNI	15	5	830
W4IKZ	13	6	720	W0OAG	14	5	725
W4JFU	13	5	720	W0TJF	13	4	—
W4SOP	13	5	680	—	—	—	—
W4UDQ	11	5	850	VE3DIR	26	8	895
W4MDDA	10	4	680	VE3ATB	22	8	890
—	—	—	—	VE3DER	15	7	800
W5RCI	21	7	925	VE3BQN	15	7	790
W5FTL	19	7	1000	VE3BPB	13	6	715
W5AJJ	13	5	1260	VE2AOK	12	5	550
W5IEH	11	5	850	VE3AQC	11	7	800
W5ABN	11	3	780	VE3IQY	11	4	900
W5GNL	10	5	1400	VE7FJ	2	1	365
W5CVW	10	5	1180	—	—	—	—

DX opening on 50 Mc., there is nothing magic about the use of the lowest possible frequency in a v.h.f. band.

What a job we do on each other through the use of excessive modulation! Adequate audio is a must for an effective v.h.f. station, but too many of us carry it too far. How many signals did you hear that covered 100 kc. or more either side of their center frequencies during the V.H.F. SS? We set out gain controls for good high modulation at ordinary conversational voice levels, and then during a contest, or when the band is open for some rare DX, we grab the old microphone and start to shout at it. Take it easy — or install some form of automatic level control in your speech equipment.

When we have achieved the Utopia, where everyone has a clean signal and we are neatly spread throughout our bands, will we have solved our problems? Not entirely, for there will still be cross-modulation and other spurious receiver responses to contend with. Quite a few things can be done to help out along these lines, as some of our smarter operators are fast learning.

Practically all our crystal-controlled converters are designed with just one objective in mind: the lowest possible noise figure. It's time to consider other factors, as is being done everywhere in commercial circles. We could use some of their ideas to advantage; there are ways to cut down cross-modulation. A gain control on the r.f. stage or stages; adjustable antenna coupling, to be backed off slightly when the going is rough; use of some of the new tubes that are designed especially for use where cross-modulation is severe; reduction of the degree of coupling between the converter and the communications receiver, to give the receiver front end a chance; operation of the receiver with the a.v.c. off and its r.f. gain (and that of the converter as well) at the lowest usable level — these are just a few of the ways by which we can reduce that unholy mess we hear when several strong locals all fire up at once.

Antenna design may figure in the picture. A well-designed long Yagi has very low side and back lobes, with a narrow but very long front lobe. At least one 28-foot Yagi we know of worked to its owner's advantage on 144 Mc. in the V.H.F. SS, by keeping near neighbors below the overloading level. If your friends are on the verge of becoming enemies during times when the band is jumping, there are many things you can do about it besides making the rounds with the wire cutters the evening before the next contest!

Selective Input Circuit for 2-Meter Converters

Not all the troublesome signals come from ham stations. In almost any location these days there are TV, f.m. or other commercial v.h.f. signals that can ride through in the v.h.f. bands. Sometimes the trouble is the result of images. Other cases involve signals beaten into the i.f. by harmonics or other unwanted frequencies in the injection stages of a crystal-controlled converter. If there is just one interfering signal it can be trapped out with a tuned circuit or stub. But when there are several, the cure may be achieved more

readily by increasing the selectivity of the input circuit of the converter.

This approach is illustrated by the sketch of the coaxial tank used by W4RFR, Nashville, Tenn., in the first stage of his 2-meter converter. Red has a tough problem in the

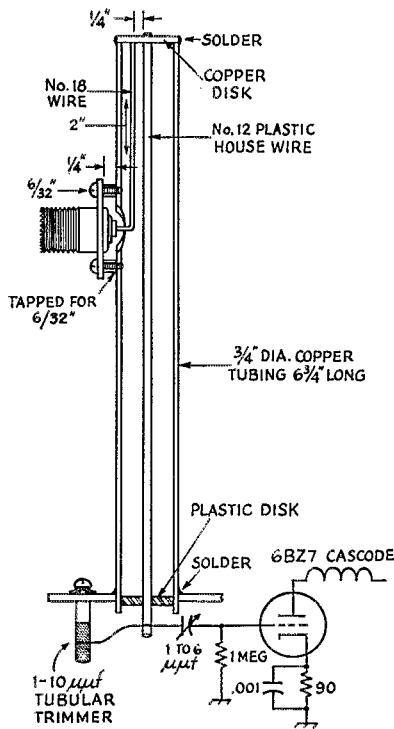


Fig. 1 — Coaxial input circuit used by W4RFR to replace the usual coil and capacitor in his 144-Mc. cascode converter. Its selectivity eliminates a troublesome heat between TV stations on Channels 4 and 5 that had wiped out the band around 144.5 Mc.

form of a beat between the video carriers of TV stations on Channels 4 and 5 (67.25 Mc. plus 77.25 Mc.) producing a strong spurious signal at 144.5 Mc., and buzzy intervals every 15 kc. on either side. Simple stubs and traps tuned to the TV frequencies did not completely eliminate this, but the coaxial tank circuit cut out the spurious signals and improved the signal-to-noise ratio as well.

The tuned circuit replaces the usual coil and capacitor in the grid circuit of the first half of the cascode. The circuits following are unchanged. Such a high-Q circuit cannot do its rejection job and still cover the whole band without retuning, however. As shown, it works well over 144 to 145.5 Mc. If the tubular trimmer were replaced by a capacitor that could be knob-tuned, it could be repeaked readily to cover the higher parts of the band effectively. The capacitor in series with the inner conductor is tuned for best signal-to-noise ratio.

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

Contest QRM was plenty rough in Northern New Jersey; take it from W2CXY. Walt feels that "barn-door front ends" have outlived their usefulness, and that more attention should be paid to cleaning up antenna patterns. One easy way of accomplishing the latter objective is to add trigonal reflectors to Yagi arrays. This will usually net an improvement of up to 15 db. in front-to-back ratio, and a general attenuation of response in all other directions except the front that may make the difference between cross-modulation and the lack of it on many signals.

Several times in past months we have reported the details of c.w. schedules being kept by CO2CT, Havana, Cuba.

Dave says that all his testing has come to practically nothing to date, and he wonders if this may be due to his frequency being above the average 2-meter man's habitual tuning range. He is planning to move down into the first 100 kc. or so and have another go at it. If this should produce results where 144.9 Mc. failed, it is a sad commentary on the 2-meter picture. The 500-watt rig at CO2CT is now being keyed automatically with alternate periods of transmitting and listening each of 5 minutes' duration, 1900 to 1930 and after 2100 nightly. The keyer, incidentally, was made from a tomato juice can rotated by a clock motor. A contact arm completes the circuit for keying when it rubs the surface of the can in passing across holes cut in the paper.

When your conductor gives the old selectivity sales talk at radio clubs, one question is invariably raised: "If selectivity helps signal-to-noise ratio, how about single sideband?" We've had nothing but a theoretical answer until recently, but now we can offer a practical demonstration, thanks to W2JJC, New Market, N. J. Army is now on 144.38 Mc. with s.s.b. nightly, Sunday through Wednesday, at 2100, working W1s. Several times when the going was rough we've had him change modes, with results that are nothing if not convincing. On a good night, he can reduce peak power to about two watts and still put in a solid signal with the s.s.b. method. When carrier is inserted to the same power level, and the receiver is reset to the usual a.v.c.-on, S-meter-reading method of reception, the intelligibility drops to zero — and it stays there until the carrier is removed at the transmitter end, and reinserted, by the b.f.o., at the receiving end.

The improvement in weak-signal reception is hard to discern on lower frequencies, because communication seldom fails on those bands because of signal weakness, but rather because of QRM. But on 144 Mc. the margin that s.s.b. provides is frequently the margin between solid voice communication and no readable signal at all. Can we throw out the modulator iron in v.h.f. work, too?

Since the appearance of the W2NLY-W6QKI long Yagi article in January *QST*, long in-line arrays have been sprouting everywhere on the v.h.f. scene. W9KQX erected a wood-boom version, shortening the elements by approximately 3/4 inch from the dimensions given for metal mounting, but otherwise following the design outlined. His boom is 12 feet 10 inches long, with No. 7 aluminum wire elements mounted on phenolic insulating blocks. Whitey reports that performance and pattern are excellent, and that now that he is getting used to having to aim the beam carefully for every station, he likes it fine. Stacking two of these will be done with the advent of better antenna weather.

All over the country we find 6-meter activity springing up. In some places it prospers and in others the interested parties have a rough time of it. Organization helps, and W9KSL sends us a copy of "50-Mc. News," issue No. 1 of a sheet devoted to 6-meter activity in the Milwaukee area. Listed therein are the calls of 52 W9s who are on 6. For a while the night of January 16th it sounded as if all of them were on the air, when the band was open to W9 from New England!

W0SMJ, Indianola, Iowa, says that he and W0s WKB, ZTW and ERN are doing their best to keep 6 occupied, but they could use some help in the form of skeds with other areas. Jim has a 4-over-4 array for 6, a 32-element job on 2, and 100 watts, c.w. or phone, for either band. He welcomes long-distance or local skeds.

There's no lack of 2-meter activity around the New York area, except above 146 Mc. To help to remedy that bad situation, the U.H.F. Club of Jamaica is reactivating its 2-meter ragchew net on about 146.5 Mc., according to W2QPQ. Julian reports that some of the old-timers are using "choppers" to generate tone for A2 work and code practice sessions. The device consists of a wooden disk about 3 inches in diameter, with about 8 nails around its circumference. These pass near the pole pieces of an old ear-phone (usually an obsolete telephone unit) as the disk is driven by a motor. The small pulsating voltage thus generated is fed into the microphone circuit of the modulator.

Candidate for DX skeds on 144 Mc.: W5SWV, Denison, Texas. Daily has 500 watts to 4-125As and 32-element array 78 feet up. Will keep skeds on either phone or c.w.

Looking for 144-Mc. DX from Oklahoma is W5HXX at Watonga. Clyde runs 600 watts on phone, 800 on c.w., to 4-125As, with a 32-element array 75 feet above ground. He is transmitting nightly on c.w., 144.01 Mc., 2100 to 2105 CST, with beam northeast. Skeds kept nightly with W8KAY, Akron, Ohio, 980 miles, produced identifiable

meteor bursts each way, but not sufficiently long to permit QSOs. Number and duration of bursts picked up markedly during Geminid Shower in December.

W9UED, Belleville, Ill., wants 432-Mc. skeds. He has the legal 50 watts input, and a crystal-controlled converter. Chuck also works on 144 and 220 Mc., having covered 605 miles on the latter band.

V.h.f. business is picking up all across Tennessee. W4ZZ, Knoxville, says that there are three 32-element 144-Mc. arrays in the Maryville-Alcoa area near there. KN4EYE, W4FCJ and W4IYI are doing well in Bristol. KN4EYE also has a 32-element job, and recently made the first Bristol-to-Chattanooga contact, with W4LNB. When W4ZZ operated portable from a Jefferson, N. C. tower, the last week of December, he hooked up KN4EYE with the Piedmont gang in Greensboro and Winston-Salem, for the first over-the-mountains QSOs from home stations at either end. W4GIS was worked from the home station of W4ZZ early in December, but has not been heard since.

W4RFR, Nashville, says that there is activity regularly in that area on both 6 and 2. The Nashville 6-meter net meets each Monday and Friday at 1930 CST; frequency 50.6 Mc. Red has worked W4ZZ on 50 Mc., and reports that the plans for a statewide net on 6 should be producing results before long. W4RFR may be found on 50.01 and 144.28 Mc.

50-Mc. riddle proposed by W0INI: What does Pleasant Hill, Mo., have that no other community in the world can boast of? Two holders of 50-Mc. W0S1 W0HVW and W0INI didn't work it together, either. Their awards were issued a couple of years apart.

(Continued on page 124)

50 W A S Mc.					
W0ZJB	... 48	W8CPZ	... 42	W8SSQ	... 43
W0BJV	... 48	W4OXC	... 41	W8OJN	... 43
W0CJS	... 48	W4MS	... 40	W8LPD	... 42
W5AJC	... 48	W4FNR	... 39	W8YLS	... 41
W9ZHL	... 48	W4TUJ	... 38		
W9OCA	... 48	W4RFR	... 37	W9ZHB	... 48
W6OB	... 48	W4BEN	... 35	W9QIV	... 48
W0INI	... 48			W9HGE	... 47
W1HDO	... 48	W5VY	... 48	W9VZP	... 47
W5MJD	... 48	W5SFW	... 47	W9RQM	... 47
W2BHZ	... 48	W5GNZ	... 46	W9AJU	... 47
W1ILL	... 48	W5ONS	... 45	W9QKM	... 47
W0DZM	... 48	W5JTL	... 44	W9JIA	... 47
W0HVW	... 48	W5ML	... 44	W9UNS	... 45
		W5PSC	... 44	W9MFL	... 40
W1GJO	... 47	W5JLY	... 43		
W1CLS	... 46	W5JME	... 43	W9QJN	... 47
W1CGY	... 46	W5VY	... 42	W0NFM	... 47
W1LSN	... 45	W5PAL	... 41	W0TKX	... 47
W1DJ	... 41	W5HEZ	... 41	W0KYV	... 47
W1RFU	... 41	W5HLD	... 40	W0WKB	... 47
W15FX	... 36	W5FXN	... 38	W0JOL	... 46
W1E0S	... 32	W5NSJ	... 24	W0MVG	... 46
W1WAS	... 23	W5ZVP	... 23	W0TTF	... 44
				W0URQ	... 44
W2MEU	... 47	W6WNN	... 48	W0JHS	... 43
W2AMJ	... 46	W6ANN	... 45	W0PKD	... 43
W2BYM	... 46	W6TML	... 45	W0PFI	... 41
W2RLV	... 45	W6IWS	... 41	W0KRE	... 37
W2FEL	... 45	W6CAN	... 40	W0ESQ	... 36
W2GVY	... 40	W6ABN	... 35	W0ZTW	... 36
W2QVH	... 38	W6GCG	... 35	W0VIK	... 34
W2ZUW	... 36	W6BWG	... 33	W0FKY	... 32
W2ORA	... 33				
K2AXQ	... 32	W7HEA	... 47	VE3AET	... 44
K2JNS	... 30	W7ERA	... 47	VE3AIB	... 35
		W7BQX	... 47	VE1QZ	... 34
W3OJU	... 46	W7FDJ	... 46	VE1QY	... 32
W3TIF	... 42	W7DYD	... 45	VE3DER	... 31
W3YKM	... 41	W7JCG	... 44	VE1EF	... 28
W3MQU	... 41	W7AGD	... 43	X1IQE	... 25
W3OTC	... 40	W7BOC	... 42	CO6WW	... 21
W3KMY	... 39	W7JPA	... 42		
W3RUP	... 38	W7TIV	... 41	Calls in bold	
W3MXW	... 38	W7CAM	... 40	face are holders	
W3LPC	... 37			of special 50-Mc	
W3FPB	... 35	W8NSS	... 46	W4S certificates	
		W8CMS	... 46	listed in order of	
W4FBH	... 46	W8NQD	... 45	award numbers.	
W4FQM	... 44	W80Z	... 45	Others are based	
W4QN	... 44	W8RFW	... 45	on unverified re-	
W4FLW	... 43	W8LPD	... 44	ports.	

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Well:

It's KN6JQJ by a nose!

Our Novice Class ham ticket came into being almost five years ago—July 1, 1951, to be precise. Since that time plenty of Novices have worked plenty of DX. But it wasn't until a few weeks ago that the first Novice licensee successfully applied for the Worked All Continents certification.¹ Twelve-year-old Skip Cuevas of Los Angeles, coolly calling his shots with a Johnson Adventurer, broke the tape at the

So this first Novice WAC had to show up sooner or later and it's now ham history. The next order of business? Why, a Novice DXCC membership, of course. Impossible, you say? Improbable, to be sure. But such a development grows more possible all the time!

— . . . —

Two down and two to go! How did it go with *you* during the opening c.w. and phone sessions of the 22nd ARRL International DX Competition? (Well—no one can work 'em all.)

We're halfway there, now, and the gala affair's homestretch looms ahead. Bear in mind that the final week ends of these annual affairs traditionally exhibit two interesting trends. Firstly, the closing hours are seized by the Big Boys to hunt down those rare multipliers which so far have eluded them. Secondly, QRP c.w. fans find the contest's quota system operating to their definite advantage as competition for the less juicy DX species subsides to an ear-splitting roar.

All set? Good fishin'!

What:

Did we mention *multipliers*? You'll find a few candidates in the text to follow. Remember that frequencies (given in number of kc. above the lower band limit) appear within parentheses, times without. E.g., (9) = 14,009 kc. if the paragraph treats 20-meter work. Times are GMT, using the nearest whole-hour figure, such as 7 for 0720, and 0 for 2349. As a rule each DX call sign appears but once per band.

20 c.w., where preferred prefixes predominate, gave CR7s CN (64) 17, IZ (62) 16, FB8BR (8) 16, FK8AO (31) 16-17, IYCYZ/Trieste (62) 15, KA2KS (68) 4, KGs 4AN (20) 15, 6AAY (68) 9, KJ6BN (68) 19, OQ5BT (56) 17, VO2IM (35) 17, VSIGP (20) 0, ZC4IP (49) 15, ZEs 2JC (28) 17, 6JY (43) 8 and 4X4BX (11) 16 to W6SUQ's



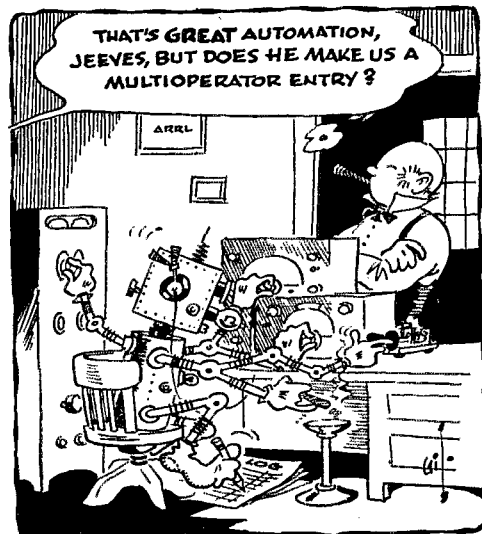
KN6JQJ's Big Six

finish line of our Novice WAC derby only days ahead of Missouri's WN0ZQV. And now that the ice is broken we anticipate a steady traffic of WN/KN applications for these dandy diplomas.

In all fairness to past generations of Novices, many of whom now are crack DX communicators, a substantial share of credit for KN6JQJ's feat must be accorded (1) the 15-meter Novice allocation as of early 1953, and (2) the fast-rising positive slope of our new sunspot cycle as of early last year. Prior to the ascendance of these factors Novice WAC possibilities were remote, indeed. The old 11-meter WN/KN range never had a chance propagationwise, and the Novice 40-meter segment is mercilessly riddled by s.w.b.c. hash during most DX hours.

* *New Mailing Address:* Effective immediately, please mail all reports of DX activity to your conductor at 4822 West Berteau Avenue, Chicago 41, Illinois.

¹ WAC, an award of the International Amateur Radio Union, is described in the "Operating a Station" chapter of your ARRL *Radio Amateur's Handbook*.





You've probably logged several of these Guantanamo Bay (Cuba) Radio Club members during the 22nd ARRL International DX Competition now in progress: (standing, l. to r.) pres. KG4AF, custodian KG4AA, KG4AC, KG4AD, associate member A. M. Smith, KG4AN; (seated) secy. KG4AK and KG4AV. That small emsrent one at far left is KG4AK's jr. op.

304TL and Gonset Bantam. Chuck works at KTTV with DXers W6s OXS SWG and VUP. . . . K4GSU (W9TCY) recommends GR7AD (47) 20-21. Amsterdam Isles' FB8ZZ (24) 14, FM7WD (96) 13-14, FO8AL (37) 1, FO8AY (100) 17-22, FY2s YE (65) 0, YF (15) 13, MP4BBE (79) 13-14, OD8AV (60) 14, PZ1LL (23) 0, SV8WL (61) 14, VP5 5DC (25) 19, 8BC (32) 2, 8BL (50) 3, VQ8CB (93) 13, VS9AS (100) 20, VU2s EC (63) 14, KV (82) 13-14, YN1PM 13, XZ2OM (21) 15, ZC4WR (65) 14, ZDs 2DCF (68) 22, 3D (10) 20 and 4S7TG (23) 13. . . . CR6CV (20) 17, F8RVE (35) 17, F08s AK (40) 4, AO (40) 13, an FY7, GD3BQ (40) 18, IS1PIC, a KJ6, OD5AV (95) 16, SP6WM (30) 16, ST2AC (50) 17, VOs 2EW (55) 17, 4AQ (10) 17, Y12AM (20) 17, 3V8AN (5) 16, 4X4DH (15) 16 and 9S4AX pushed K6ENX over the top to 139/109. . . . W6GAL/7 favors us with a hard-to-beat example of DX grapevine efficacy: ". . . I worked VS9AS, 1430 GMT, who had a message from VS1GX for W8BRA. The message was from AC5PN confirming a schedule on the following morning on 14,090 at 1230 GMT. I worked W8PUD and asked him if he could QSP to 'BRA. W8BRA overheard us and broke in; was he surprised when he heard the sked info! It seems he had worked VS1GX only the night before and had asked him if it was possible to work AC5PN for schedule arrangement. . . W8BRA to VS1GX to AC5PN to VS1GX to VS9AS to W6GAL/7 to W8BRA again within 24 hours! . . . This morning W8BRA nabbed the AC5, told him to stay on until the band opened to W7, and I nabbed him, too. Some fun!" Other items on George's list: FB8BU (20) 14, FD4BD (17) 22, MD5UK (30) 14, MP4QAL (50) 14, PZ1BS (20) 20, ST2AC (40) 15, SU1DD (48) 17, SV8WY (20) 14, UB5KAB (70) 14, VQ8AG (35) 15, XZ2AD (20) 13 and 5A1TD (80) 14. . . . W4AUL collected CR6BX (90) 23, HA7OL (5) 20, LU9ZT (85) 22, LZ1KPZ (75) 20, VO2WM (43) 15-16 and 3V8AB (8) 20-21 to reach 140/119 with his Konfederate Kilowatt. . . . W8QXQ picked off CR6s AP 20, CA (78) 20, GR7LU 4, DU7 SV (78) 23, HP1BR 3, YV5AE 12-13 and ZS90 (15) 20-21, as well as W7 PZ1 ZD2 and ZD3 goodies. . . . GC8KAV (80) 17, JA5 2NX (65) 23, 6AA (28) 23, SAA (33) 22, 8AQ (65) 2, LA5TE (57) 17 who is Narvik for WAE, SPIKAA (10) 13, VQ4EO (83) 21 and desperate for

N. Dak., a VS9, ZE6s JR (22) 20 and JY rallied 'round K2BZT. . . . W4TFB awaits QSLs from CE7ZJ 0, CR6DA (50) 21, CT3AB (80) 18-19, EA9AP (45) 19-21, IS1CKF 20, JAs 1AG 0, 4AF 0, TF3MB 1, ZB1AY 19 and a 3V8 specimen. Don now has BERTA plus WBE and is lining up his ducats for several other awards. . . . On the frustrating U.S.S.R. tangent, K2DSW hears UAs 1DG 2KAW 2VAV 3BF 4KHA 4KPA 6KOT, UB5s DL KAW and UH8KAA with ample amplitude. Other Russians registered by our 14-Mc. c.w. correspondence this month: UAs 1KAI 1KAL 1KAO 1KAQ 2KAO 6KOD 6KOB 6UI 6CE 6KOA, UB5s KAA KAG KBE, UC2KAA, UD6AL, UI8KAA, UL7KAA and UR2KAA. Except for the UAs, who show up between 1 and 3 GMT, all these U phantoms appeared between 12 and 16 hours, and between 14,040 and 14,080 kc. . . . Callphabetically, now, let's sample the 20-c.w. luck around the nation and points beyond: A4 W1JLN: FG7XB (92) 20, W1ODV: VQ8, VU2IK (35) 12, W1P YK: ET2PA (82) 15, 3V8, W2CUC: ZB1GB (100) 20, K2EQD: CR6, FG7, PZ1, TF2WAH (40) 19, VP3YG (28) 21, ZB1TD (23) 18, W3HQL: ET31F (45) 22, PZ1CD (15) 23-0, VP5BE of Turks & Caicos, ZP5GM, K2KTK: KV4AA (80) 23, W6BF 21, W3HH: CX6, KV4, V8SCG, VP6PJ (40), W3VCH, FM7WP (28) 23, JA1AXV (74) 24, PZ1, W3YUW: CN8AF (10) 20, FA9VN (40) 20, JA6, OX3UD (20) 15, SL3AG (20) 14, VP4LZ (40) 21, K4DGI: VS1BJ (35) 13-14, W4GUV: JA3AB, KAs 2SK, 8SD (75) 0, W1HSJ: KA9MF, VS9, ZB1, W4YOK: HP1LO, VP9CL, W6ZNT/VES on Baffin. W8A0A: ET2LR (30) 14, Amsterdam FB8, L13D claiming Spitzbergen environs, OA4AU (48), ZD6RM (20), ZIEJG (40), 4X4GS (45) 16, K6HFA: CX5CO, JAs 1AKZ 2, 3AZ 1, KA3AC 2, KJ6, LU2XI 2, W6NJU: FB8s, VOs 2AB (53) 17, 4AQ (6) 16-17, 3V8, K6OIZ: JALAGW, YV5BZ, W6UFD: CE7ZN (5) 3, CR7CK (20) 15, ET2AG (20) 16, W7UYZ: FASHI, FB8, FOS, GD3BQ (20-40) 19, W7YAG: CX, JA4AF (70) 12, W9KXK: FB8, VP1KT (82) 19, VS6CG (90) 1, XW8AB (14) 15, ZC4IP (47) 14, W6DRL: ET3AH (20) 13, P12AY 20, Z6JY, W9VFM: P12AI 21, PZ1, DL4ZC: CR6AY 17, FB8BS (59) 15-17, OX1TR 17, VS9. . . . W9MQK made it 162/150 by way of GRs, 4AL 5AF, EA6AF (78) 20, F9YP/FC,

OK1CX first tangled with ham radio way back in 1929 and now has one of the more prominent Central European signals on DX bands 40 through 10. Karel is approaching the 200-country rung, and among his wallpaper collection you'll find WAS (1948), WBE, DXCC and BERTA diplomas. (Photo via OK1MB)



HA5KBA, KC6CG, KM6AX, LU7ZM, MP4JO, OY2H (50) 14, VK9AU, VS2DW, VU2SX (50) 15, YS10, ZK1AB, ZS9G and 4X4GT. W1WPR, in the slot at W1AW, notes several stations working one ELES/MM. It should be borne in mind that amateurs risk FCC citations by calling or working nonamateur prefixes even though the weirdies be using amateur frequencies. Four choice catches appear on numerous reports this month. South Sandwicher LU3ZY, due back in the Argentine next month, QSOd W2s GVZ HQL, K2BZT, K4GSU, W5TPC, W6s HPB NJU, K6ENX and W9MQK around 14.030, 1-4 GMT. South Georgian VP8BK (QSL to LA1RC or via NRRL) hooked K4GSU, W6s HPB NJU, K6s ENX and HFA on the low edge at 0-2. Ever-popular VQ6LQ (50) 13-15 made W1ODW, K2EQD, W4AUL, W6GAL/7, W9s KXK MQK and W0DRL gleeful. YA1AM (75) 12-14 clicked with K2BZT, K4GSU, W6GAL/7, W9MQK and others. West Gulf, No. Calif. and So. Calif. DX Clubs bolster our 20-meter c.w. picture with notes on AP2s C (76) 13, M (60) 13-14, BV1US (50) 23 of Formosa, CE7ZM (64) 6, CNs 2AY (90) 21, 8MM (7) 18, CRs 8AC (94) 23-0, 9AI (94) 23-0, CS3AC (70) 7, DU1s CV (48) 23, DR (5) 0, EA6AU (59) 14, EA8BP (5) 23, EL2s D (5) 21-22, L (38) 0, ET2s LF (62) 19, US (60) 15, F9SC/FC (7) 16, FB8XX (71) 8-14, FF8s AJ (54) 22, AY (53) 17-18, BI (11) 16, BN (122) 22, GP (53) 17, FK8AC (30) 8, FP8AP (16) 14, FQ8s AV (39) 16, AX (45) 21, FUSAK (85) 6, GD3FBS (0) 13, HR1AA (45) 22, one HV0EA (80) 16, HZ1AB (22) 13, HVCV/T (30) 18, KG1AR (3) 12-13, KR6QW (54) 23, KT1EXO, outpost LUs 3ZK (24) 13, 8ZC (90) 0, 8ZF (90) 23, 9ZB (30) 2, 9ZC (90) 4, LZs 1KAB 1KAC 1KPR 1KSA 1KSP 1K5Z 2KAC 2KSK all 13-16, MP4s QAI (75) 15, TAA (56) 16, OD5s AB (125) 14, AU (75) 14, LX (35) 14, OO5s BT 16, PE (65) 22, PU (64) 21, OYs 1R (20) 15-16, 2Z (25) 18, ST2NG (10) 21, SV1SMX (60) 17, SU1C (64) 18, TF2WAS (45) 3, VK1s EM (50) 14-15, IJ (80) 14, RA (16) 95, VK9s DB (59) 17, XK (45) 8, VPs 1AA (1) 30, 2LC (145) 23, 2GW (68) 3, 3VN (75) 12-13, 8AI (40) 1, 8AQ (90) 1-2, 8BL (55) 3, VOs 2AG (15) 18, 2GW (58) 15, 3EM (50) 14, 3CF (66) 15, 3JTV (50) 14-15, 4DT (30) 20, 4ERR (67) 21, 4FK (85) 15, 4FI (85) 20, 4FM (20) 16, 8AL 13-14, 8CB (70) 13, VSs 1EW (10), 1FH (35), 1GS (78), 1HC (30), 1HE (49), 2CP (77), 4BA (100), 5CO (44), 5EW (8) all 13-15, VU2s BL CP DE DF JA JG JO JY KU MA SL XS all 14-16, VU6J1 (40) 23, YJDL (5) 16, YK1AB (21) 21, YN1CAA (48) 14, YOs 2VM 3FT 3RL 3RF 3CF 8MS all 14-16, ZAG (80) 16, ZBIHKO (64) 16, ZC4s CK (25), CP (55), RX (75), VP (48) all 14-16, ZDs 2FNX 2WAF (100) 17, 4BT (50) 7-8, 6BX (62) 15, 6EF (25) 19, ZD9s AB (27) 22, AC (95) 16, AD (26) 22, ZE6JX (65) 20, ZK1BS (64) 3, ZSs 2MI (see Whence), 3AA (81) 2, 3AP (62) 17, 3HX (37) 16, 7H (35) 23, 9I (50) 15, 9O (15) 21, 3V8AJ (85) 15, 3W8AA (no touches), 4S7s GE (54), HM (38), KH (78), MR (40), NX (52) all 13-15, 4X4s CK CS DH FG FQ FW GY IA ID IO all 14-15, 5As 1AM (37) 20, 2TG (78) 19 and 9S4BS (21) 17. And if you're a mike specialist

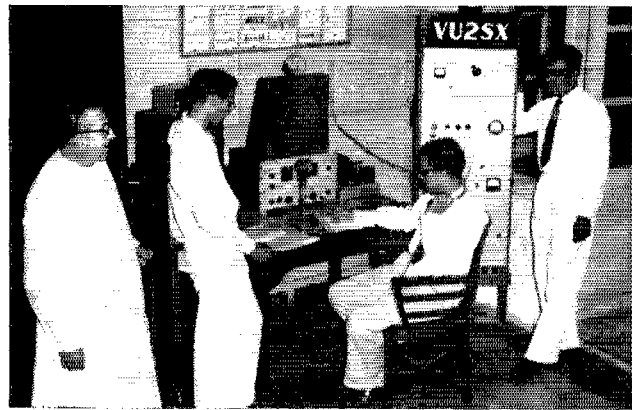
20 phone is always worth scrutiny. W8QXQ appropriated CS3AC 13, EL9A (305) 21, FB8AK (35) 16, KT1PU (158) 16, PJ2AQ 23 and 5A2TZ 20. KA2YA, Deception Islander VP8EQ (198) 1 and ZS81 (110) 4 attracted K2QOQ (ex-W1YOU), South Shetlander VP8BS, CR6AU and KR6KS still are on George's stalk list. WIAPA forsaking baffling 7-Mc. A3 frequencies, garnered F9WT/Cosica, GD2FRV, HP3EL, HZ2AEH, KG1s CG FR, KV4s A BI, VP2DA and YN1AN. CN8s IW and MM also came back, as well as northern outposts K5BZT/VE8, K5CYA/BES and W9RJV/VE5. ET2US (183) 14-14, VPs 1HA and 4TK hooked W4GUV. W9WHM stashed away HC8GI (165) of the Gala-



IS1EHM attracts a frantic phone following whenever her favorite bands open to the Mediterranean area. Maria once received a gold-plated antenna as a gift from HZ1 ham royalty. IS1EHM prefers a chatty QSO but also finds time to give her countries total an occasional boost. (Photo via W6YY)

pagos and LU2Y (120) of South Sandwich for nice voice varieties. CR7CZ, EA8BA, EL2D (130) 21-23, VOs 2HJ, 2SK, 4EO and ZS3AH have QSLs en route W4HKJ (ex-W2NXX). W4TFB found VPs 1AB 13 and 2DN 13 amenable. AC4NC (140) 7, FB8XX, MP4KAB (175) 15, VK1IJ of Macquarie (170) 8-14, VR6AC (143) 14, VS9GV, ZD6RD and one 3W8AK interested W6YY. John nominates ST2DB as the standout African A3 signal of late. NCDXC's DXer, SCDXC's Bulletin, WGDXC's DX Bulletin and Newark News Radio Clubbers direct your attention to 20-meter phones ACs 3QR (120), 5PN (90) 12-13, AP2s A (130) 13, L (104) 13, CRs 4AG (150) 21, 6BH (148) 22, 7AH (110) 17, 7AR (148), 7BB, EA8s 8AI 8BL, 9AC (108) 17, 9DF (125) 20, EL2B (135) 3, ET2s AB 19, MZ (155) 23, XX ZZ, FB8s BC (140) 2-3, BO, BV (160) 15, ZZ (124), FP8AP (260) 16, FM7WF, FO8AB (138) 17, FP8AP 21, GC6FQ, GD3UB, HA5KBA (162) 14, HI6EC (175) 17, HR1OS, HZ1s AB (127) 15, ST (185) 15-16, TA (130) 14-15, 1S1s BV, EHM, KA2UN, KG4AO, KJ6s AZ, BM, KP6AK, KT1EXO, LUs 1ZE 11, 8ZD (130) 1, M1B, OX3RC, OY2Z, TF2WAU, TG7CB, VKs 1AW1, 1RA (170) 17, 9DB, VPs 5DC, 7ND, 7NJ, 7NS, 8AQ (120) 1, 8BF (84) 3, VOs 4ERR, 4FK, 5FS (140) 15, 6LQ (185) 15, 8AL (137) 4, VR2CT, VSs 2UW (172) 12, 6CW, VU2s AK (145) 13, EH (142) 14, ES 16, XZ2s OM (120) 17, SS (150) 16, YI2AM (170) 15, YN1CAA, YO3s GM, RD (195) 15, ZCs 4RX (117) 16, 5CA (240), ZDs 4BK, 4BZ (151) 22, 9AC (105) 17-18, ZEs 3JG 21, 8JI, ZM6AT 7, ZP5AP, ZSs 3HX (150) 17, 9G (21) 7, 4S7YL (112) 13, 4X4s DK (140) 14, FV (120) 14 and 5A1TM.

15 phone synopses next. CR9AH (180), DU7SV (245), FO8AK (210), FV7YE (130), KC6CG (350), KG6s BX (330), FAE (305), LX1SI (180), ZDs 6RD (205), 9AC (225) and ZS81 (200) mobbed W9WHM. W4GUV



VU2SX, operated by the faculty and students of St. Xavier Technical Institute, Bombay, shoots solid signals over the short and long paths. The station's director is at left, then operators Jo, Kini and Theo. The VU2SX QSL policy is 100 per cent and fast. (Photo via W9MQK)

DUIFC, one of the more widely worked of the Luzon gang, rates this tribute from DU7SV: "Fred is an OT who has done much for Philippine amateur radio and since 1935 has helped and encouraged many KAs and DUs to get started in the game." When not teaching professional electronics in Manila DUIFC pats a swift bug or researches v.h.f. techniques.



worked KTIWX 17, VP1EE and VO3DQ 16. . . . The 2-el. spinner and 35 watts at VE7AIH scored with CN8CS (220), CR6BH (210), a CR9, EA8AX, FFRAP (215) 0, EA9s AZ, EE (180), KR6AF (225), KW6BV (250), an LX1, OQ5BI (240), TF5TP (245), VQ2s AS, GW, RH, SB (220), VR2BC (235), VSs 2CU (190), 2BD (240), 6AE (150) and last but hardly least, Formosa's BV1US (228) W7PBG went for JA5 IANG 4AH, KA2KS and ZE2KR. . . . W3DDV (ex-W4TFD) set his Ranger upon OY2A, SP9KAD, SV9WU, VP7NY, YU5 IAD 3JN and ZS3AC. . . . At W6ZZ we find CR9, FFS, HGI1FS, JA4s BB FI, KA2LZ, KG6s AFX NAA, many KH6-KL7 brethren, KR6GW, KX6ZB, W6RQM/KW6, VP2SI in the Windwards, VS6CW and sundry ZLs. . . . W9ICL's voice collection is select: KW6BB (360) 22, SP5AH (220) 17, TA3US (210) 13, VP4TE (220) 22, ZD6RM (170) 16, 3V8AX (150) 13, 5A2TZ (240) 14-15, plus CR9 FY7 HA KX6 and VQ2 items. . . . Down the list, now, for 21-Mc. phone numbers here and there. At W10DW: KA2GS (220) 23, PZ1A (140) 12. K2DSW: VP7NA, W3YDF: first W for MP4BBW (355) 18. W4TFB: VO5EK, W4YO K: OA5G, V1, VE8MD, K5JFP: KX6. W61M: KA5CL, KR6PI, VP5EM. W6PRM: 9S4AX. . . . W6YY mentions the all-continent roundtables of G2CIDI, HC1ES, KV4BE, ST2DB, VK4SF and VS2DB congregated around 21,140 kc. at 12-13 GMT when conditions permit. These go-arounds are tangible testimony that fifteen is quite the band. . . . Additional 21-Mc. A3 multipliers CR7ID, CS3AC, CTs 2AG, 3AN, EA8s BF, BO, ELs 3A, 3X, 12A, FB8EZ, FF8s AK (155) 18, GP 18, FO8AD, FO8AG, GDs 3ENK, 3IBQ, 61A (220) 18, KA2s GH, KC, KQ, KA7RC, KG1KW, W6FQK/KG6, KM6AX 22-23, KV4BI, OD5AV, OQ5s BK, EB, HH (220) 20, RO, VD, PZ1RM (230) 20, TF2WAU, UQ2AN, VP8AQ (155) 23, VQs 3ES (175) 18, 4EO, 4EU, 4RF, VS2BE, VU2RX, YN1CAA, ZB1s AI, AJ (150) 15, AJX 19, ZC4RX, ZDs 4BA, 4BQ, 4BV (205) 18, 6J1, ZE2KP, ZSs 3AB, 3BC 19, 3G 19, 9G (203) 20, 4X4s DK and IE (245) 14-15 courtesy WGDXC and NNRC spotters.

15 c.w. is a strong second to 20 in the contest line. W8OCA demonstrates this by way of CR7AD, FO8AG, FV7YE, GC3EML, JA5 1EC, 3AB, 4AF, KG6AFY, VQ2GW 22, ZB1AY 19, ZEs 3JJ, 3JO, 4JE, 5JE, 5JJ, 6JY and 4X4FA 15. Red and neighbor W8DLZ bumped into one ZP6AA 16 of questionable pedigree. . . . SP5AR, VQ4SS and 9S4AX swapped code with W6PRM. . . . K2DSW preferred VPs 1KT, 7NG and VQ4RF. . . . W1CTW traded pleasantries with CT3AB, HA5BI, 11BLF/Trieste, ZB21, 3V8AN and a 4X4 while chasing people like TFSKA, UA6KOD and one ZA1AD. Cal also heard ZL1LZ sending his call backwards with ease. . . . EA9AF and CR6AI helped W6ZZ reach 104 countries on fifteen. . . . Hither and yon, at W10DW: HA5KBA, K6CG, K2BZT: TF3MB, VP5DC, K2EQD: GD3FXN (58) 17, IT4ZGY (42) 17, O44ED (142) 19, FQs, W2QHH: MP4QAL, W3YUW: odd and even Europeans, K4JUSU: CR9AH (73) 0, ZB1GBF (40) 16, W4GUT: JA5 1ACB 3AB, 3BA, W4YOK: SP, XE1CM, K6ENX: DU7SV (90) 22, W6SUQ: ZE, W7PBG: JA5 ex masse, W7YAG: sobs of JAs, DU, FAs DA (30) 19, RJ (30) 18, W8QXQ: VQ4, W9KXK: ZB2. . . . Many a 21-Mc. Novice is getting his wits sharpened by the hot pace of ARRL's 22nd International DX Competition now at hand. Recent WN/KN luck around the circuit, at K2MEFY: HB1OI atop Mount Rigi, VQ4EO, c.w.-to-phone, W93BVU: CT1, FQs, HC1KD (105), OEs 2KF, 5WW, VP6TR (140) c.w.-to-phone, VPs and ZSS for 36 countries, K8SBCB: ZL1, KN6JQ, KN6KPG/KL7, ZL1 for 28 countries (and WAC, of course), W9SIBX: Europeans, WNTBSP: ZL2IC. . . . CN2AD (60) 16 and EA6AF (10) 19 are suggested by WGDXC.

40 c.w. returns grow more scattered as higher-frequency bands improve their performance during hours of darkness. W8GB's 120-watter came out with CR6AI, HB1GJ on Rigi, VQ4EO and ZS3RH. Carl also reports a flock of LZ and YU customers who seem to make 7 Mc. their DX headquarters. . . . CT2BO, HA5KBB (19) 5, HB1 and KG1JB (27) 23 entered K2BZT's log. . . . W2CUQ got out his 814 for PZ1LM (2), LZ1KRF (20), OEs 1FT (4), 3SL (41) and SP8CK (22). . . . HKs 4BQ (41) 3, 5BY (12) 3, KG1KK (34) 3, LZ1KNB, W4FMK/VP5 (33) 4 of the Caicos, 4X4CK and ubiquitous EA6AF came back to K2EQD who reaches the 87th rung. . . . W10DW got that EA6 as well as SP5FM. . . . FA8RJ, PZ1BS and VP4JL QSOd K2DSW. . . . CX6CM 6, EL9A 7 with W4DCW keying, FA30A, an HB1, JA8AH 8 and VP2GY did it with W4TFB. . . . W2HQL skimmed off PZ1s, VP2MD (3) and VQ6LQ (1). Joe says PZ1BS is in need of components which would permit him QRO. . . . Armed with a new S-85, K4ADU/4 apprehended CE7ZJ, a CT2, HP3FL, HK4DP, VPs 1VR, 3YG, 5DC, 9BZ, YV5BJ and ZM6AS. One UC2FI/UA9 was heard. . . . W7UVC's 15-watt 6L6 c.e.o. caught up with VP7NM and VS1GX. . . . Quickly, now, at this shack and that shack, first W1AMY: OK, PY, K2GMS: CT1, OK, SP9CS, YU, W3HH: 5A1TJ (5) 5, W3YUW: Euros galore, W3GHY/AM, K4ARP: OKs, LA6U (15) 6, W4BXV: Euros, K4CQA/4: Euros, CM5HF for Cuba awards, HR1JZ (25) 7, W4GUV: HA, ZL, W4ZWW: YV, W61IM: a dozen assorted JAs K6OIZ: KV4BK, W7YAQ, 15 different JAs, W0VBS: LZ1KAB, TI2VMB 23, VQ4EO 5, 5A1. . . . WGDXC adds CR7CI (12) 4, EA8GF (21) 0, FG7XC (17) 4, LU6ZI (18) 6, LZ1KRF (5) 4, UM8KAA (20) and VR2CB (18) 11 to our 40-meter melange. . . . Forty Phone has the usual North American, South American and Caribbean multipliers handy but all others are rough to come by. VPs 1AB 2DN 7NG, HR1JM and the VK-ZL gang will do their share, however. . . . W7AMM caught CT1EX 4 and ZL3FP 8; heard DL4AIR, KJ6BG, UA9AA and 4X4DD, all on 40 phone.

10 phone is returning in spring attire for another DX spree. W3ZKH has around 50 ARRL DXCC Countries List entities accounted for on 10 A3 in just two short months as a 5-year man. CN8DS, CRs 5AC, 7BB, EA9AZ, HH7W/m, LX1DC, OD5BR, ZBs 1GBF, 2P and ZP5JE. No wonder Jack keeps his Viking on 28 Mc.1. . . . W3QMG, another 10-meter proponent *con gusto*, tapped the ether for CN8ES, CR7, HC1TC, KT1PU, TG9AD, ZDs 3BFC, 6RM, 5A2TZ and ZE2KR. . . . W9JSM has no luck (yet) with GN2AD, TA3US and VQ4KPB. But CT2AG, FA30A, KT1W, OQ5DQ, PJ2AP, VPs 1EK, SD, VQ2As AS, AT, FJ, JW, YN1CAA, ZD4BR, ZD6, ZE1JE, ZS3B, 4X4s BD, DK and 5A1TA bit hard. . . . G3IDG logged voicers SV9WO, YO3RF, ZB1s AJX, AY, EB and TD on rather short skip. . . . NNRC and WGDXC volunteer 28-Mc. A3 candidates EA9BC, GD3ENK, OD5BR (160) 14, OQ5s in number, ZC4RX (140) 15, ZD4BR, ZE4JN (360) 17, ZP5EA, ZSs 3G and 7C 18.

10 c.w. becomes more reliable by the day. K2DSW found FAs CR, DA, KG1JB, ZL1BY, assorted Europeans and many KH0s agreeable. . . . W5JWZ and W9PRM first tuned up on the low end and captured Europeans right off the bat. . . . CR6BX (80) 17, HZ1HZ (20) 16, ZS3E (60) 17 and 4X4FV (50) 13-14 gladdened W10DW. G3IDG's 40-watter came away with YO3LM, UB5KAB, ZB1HKO and numerous Ws. Allan still stalks UA3CR, UB5s CI, UA and YO3FT. G3IDG urges all phones to stay above 28,200 kc., figuring that 300 kc. is ample space for non-FCC-licensed stations

who modulate on ten meters. We agree, of course, but on those wide-open week ends will 10-meter gentlemen still be gentlemen?

80 c.w. appears to be headed back toward the traffic enthusiasts but the old slot still has a DX ace or two up its cuff. OY7ML and 3V8AB were W2QHH's 115th and 116th 3.5-Mc. countries. . . . WOPME collided with Jamaica's VP5WS on the low edge, while W5QKJ surprised himself with XV5BJ (12) on 30 watts. . . . W2HQL works DM2ACA, GD3UB and ZL with dispatch. . . . Many Europeans in addition to UC2AA (20) 3, VP4LZ (5) 4 and XE1OE (25) 4 clicked with K2BZT.

160 c.w. continues a good season. W1BB's over-all observations lead him to the conclusion that the 1955-'56 session is short of the previous year's performance by a rough 25 per cent. And that isn't bad. W9PNE, up to five continents and 21 countries on 160, has Gs 3PU, 5JU,



YN1RA radiates one of Central America's most familiar 14-Mc. phone signals and is nearing DXCC membership. Rigoberto uses a Globe King, HQ-140X, Meissner VFO and 3-element Telrex twirler. YN1RA, with English or Spanish modulation, usually is found around 14,150 kc. between 2130 and 0330 GMT.

5RI, 6GM, KP4CC (1814), KZ5PB (24), TI2BX (27), VP4LZ (30), YN1AA (20) and XE2OK (24) checked off. . . . HR3HH, a new entry on the band, showed up and produced a furor by QSOing W3EIS, W9PNE and W9NWX with very slow c.w. . . . From the comprehensive 160-meter activity bulletins of W1BB we see that DL1FF (30) touched off fireworks through QSOs with W3s RGQ, FBV, W8GDQ and W1BB in that order. DL1FF, who has special transmitting privileges for 160, also reports hearing the Caribbean 1.8-Mc. gang. . . . Among participants in the top-band frolic on our side of the puddle: W7s AHX, BMW, EFN, EPE, ODW, VBD, W7s EQS, GGL, KDX, QHH, WZ, K2s BRW, BYR, COJ, DSW, W7s DGM, FBV, MSK, RGQ, TBG, W7s JSS, KFC, KMS, LW, OMW, TKR, YZC, ZQ, K4GD, W7s CQT, SOT, WEH, W7s ANO, CYH, FGB, GDO, JGA, ORW, PX, QCT, W7s C2T, KGL, NH, UDK, W7s DFV, IFH, ROK, RFT, K9DC, and VE2LZ. DX stations known to be 160-conscious and not aforementioned: DLs 11X, 300, EL2s P, X, dozens of Gs, GC3KAV, GD3UB, HB9CM, KP4s DH, KD, KV4AA, OKs in quantity, OH2YV and 3V8AX. . . . The sunspot count is rising rapidly — this could be your last chance for "easy" 1.8-Mc. DX in many a year. Hop to it — good luck!

Where:

W4CEN relays clarifications on behalf of VS9AS, whose QTH follows. Alan asserts that he has no log or other record for the previous holder of the call, now presumably back in England. . . . Via W8GZ, VK3ATN requests that IRCs accompany all QSLs accruing from his VK1JJ efforts on Macquarie Isle. . . . Try the official channel to follow if your OE13USA card still hasn't shown. All OE13 activity, of course, now has ceased. . . . W2HQL, who specializes in 80-meter DX diggings, is exclusive egress for PZ1BS and PZ1CD confirmations. QSLs bound for the two Surinamians can go via W2HQL or direct. . . . Don't look now, but G2MI may be able to have your U.S.S.R.-bound pasteboards delivered for you. One IRC is required for each five-or-less QSLs to be handled. Now all we have to do is figure out a way to dig returns. . . . W1RDV has it that Lt. (jg) Art Babine, KG4AV,

takes charge of the Guantanamo Bay bureau at Box 55, Navy 115, FPO, New York, N. Y. . . . It's a tough grind for many of us, but the *Call Book* reveals that DU1OR is on Easy Street. . . . Cards for VK3s now go via VK3WI. . . . W8PQQ undertakes to issue XZ2OM's QSLs. If you would have yours shipped directly from Burma enclose the necessary IRCs with your card sent directly to XZ2OM. . . . Rush this NNRC item into your miscellany file: Japanese postmen no longer will be permitted to tote portable b.c. sets along on their mail routes to monitor ball games. [How about ham band sets to keep an ear on conditions, Boss? — *Jeeves*.] . . . In lieu of supplying his QTH, one VP1KT tells his contacts to QRX for QSLs. . . . Via WGDXC, ZDISW notifies that he has QSLd all contacts, the whole batch via bureaus. . . . Certain halfwits have been bandying YA1AM's identity about sufficiently to endanger his undercover status. It may mean the end of Afghanistan DXwise for quite a while. . . . W1s JDE, ODW, WAI, ZDP, W2CUQ, K2s BZT, DSW, ENO, W3s CHU, YDP, W4s HKJ, TFB, W6s JR, UED, ZZ, K6ENX, W8s GZ, QIT, ROF, W9s NLY, PME, DL4ZC, V. Breuer, WGDXC, NCDXC, SCDXC, OEM and WIA offer these numbers for your QTH file:

AP2M, Razak Tejani, 110 Moolji St., Karachi 2, Pakistan
 AR1EW, Box 35, Damascus, Syria. . . . C3AR, J. A. Carmichael, U. S. Embassy, Taipei, Formosa. . . . ex-CN2BD (QSL via P8AY) . . . CN8FI, Don Burt (K2MQF), 730 Euclid Ave., Apt. 2b, Brooklyn 8, N. Y. . . . CR6AY, J. M. Pinheiro, P. O. Box 2846, Luanda, Angola. . . . CR6CH, Box 2846, Luanda, Angola. . . . CR7AH (QSL via LREM) . . . ex-CR8AB (QSL to CT1CB) . . . CR8GSW, Airport, Goa, Portuguese India. . . . FL2B, P. O. Box 69, Monrovia, Liberia. . . . EL2D (QSL to 203-100th Ave., Hollis, N. Y.) . . . ET2AG, A. Gravin, APO 843, New York, N. Y. . . . F9SG/FC (QSL via REF) . . . FG7XC, Box 38, Pointe-à-Pitre, Guadeloupe. . . . FO8AN (QSL via KV4AA) . . . FO8AY, A. Hangard, Box 538, Brazzaville, Fr. Eq. Afr. . . . HR1AA (QSL via W4PQP) . . . HZ2AEH, 8688 DU, U. S. Army Section MAAG, APO 616, New York, N. Y. . . . ex-JZ0DN (QSL to PA0DN) . . . KJ6BN, Box 65, APO 105, San Francisco, Calif. . . . KR6RI, A. M. Buta, 624th AC&W Sqn., Det. 2, APO 235, San Francisco, Calif. . . . MP4BBW, Box 425, Awali, Bahrain, Persian Gulf. . . . ex-OE13JM (QSL to W7QYS) . . . ex-OE13USA, Signal Section, SETAF, Attn. MARS Director, APO 168, New York, N. Y. . . . OQ5CP, J. Economidis, Box 982, Elisabethville, Belgian Congo. . . . OX3UD, R. Frederiksen, Angmagssalik, Greenland. . . . PZ1A, Box 679, Paramaribo, Surinam. . . . PZ1CD (QSL via W2HQL) . . . PZ1LL, P. O. Box 848, Paramaribo, Surinam. . . . ST2DB (QSL via RSGB) . . . UC2AA, Box 38, Taganrog, U. S. S. R. . . . VK1IJ (QSL to VK3ATN, Box 80, Birchip, Victoria, Australia) . . . ex-VPIWS (QSL to VP5WS) . . . VP5GB (QSL via W6OUZ) . . . VP5WS, Wm. Swan, c/o Cable & Wireless Ltd., Kingston, Jamaica, B.W.I. . . . VP8BD (QSL via LA1RC) . . . VP8BL, Box 182, Port Stanley, Falkland Islands. . . . VQ2SK (QSL via NRARS) . . . ex-VR2CD, Chas. H. Freeman (VE7ASL/KH6) 99-139e Heen Way, Aiea, Oahu, T. H. . . . VR3B, D. Lawes, Cable & Wireless, Fanning Island via Suva, Fiji Islands. . . . VS9AS, A. Swindon, P. O. Box 1245, Aden, Aden. . . . VU2DE, Box 2487, Calcutta, India. . . . VU2KM (QSL via ARSI) . . . VU2XS, Box 1015, Bombay, India. . . . XV2LD, Box 6666, Bombay 20, India. . . . YN1CAA, c/o U. S. Embassy, Managua, Nicaragua. . . . YU3ABC, Radio Club, Box 81, Maribor, Yugoslavia. . . . ex-ZB1PP (QSL to G3KOJ) . . . ex-ZC5VR (QSL to VS2EW) . . . ZK1BS, P. O. Box 65, Rarotonga, Cook Islands. . . . ex-ZK2AA (QSL to ZK1BS) . . . ZP6CR, Box 3081, Sao Paulo, Brazil. . . . ZS3AA (QSL via SARL) . . . ZS4PB, 9 Vry St., Vryburg, U. S. A. . . . ex-ZS5KM (QSL to VQ28K) . . . 4S7MR, Sgt. Marriott, RAF Ekala, Negumbo, Ceylon.

Whence:

Asia — Interesting lines from AC5PN to W1BDI: "As you know, I am a newcomer to the amateur bands. I do not know the rules and regulations very well, but I learned a few things from AC3SQ, who is my nephew, and my friend VU2AX. . . . I am the first and only amateur in the country, and took permission from the King of Bhutan to be on the air with amateurs. I had been trying hard for this. I am also in charge of government wireless and electrical equipments in Bhutan. AC5PN is catching on fast, now, and is working the U. S. with fair consistency on 20 phone. . . . VS9AS (G3ANK) who avows a 100-per-cent QSL policy, does quite well on 20 c.w. with 15 watts to a 616. Alan has been struggling along with a makeshift regenerative receiver but expects to have an HRO available shortly. Phone specialist VS9GV is the only other Aden entry currently available. This via W4CEN. . . . In a Strays-type inci-

(Continued on page 130)



Correspondence From Members-

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

40TH ANNIVERSARY

P. O. Box 115
Plymouth Meeting, Pa.

Editor, *QST*:

It isn't too often, nowadays, that the inclination to submit a few comments becomes strong enough to justify the effort of breaking out the old mill. However, your 40th anniversary issue made such good reading that compliments seemed to be in order.

... These forty years, embracing two great wars and a police action, plus innumerable major and minor catastrophes and triumphs, have seen amateur radio move far beyond the status of a hobby, to become thoroughly established in technical leadership and public endeavor.

Surely it is all done better today, but those who spent hours sweating out the code with WCC or NAA, who developed a fine technique for chopping the rotary at the end of transmission, or who fought the daily battle with the creeping solution in a chemical rectifier, perhaps, have a unique understanding of the game for what it was and what it has become. The prospects held out by H. P. M. at the old convention dinners seemed so bizarre then, so commonplace now. And A. A. Hebert's (was he 2ZB??), prognostications as to the future of ARRL, utterly out of reason then, now seem ultra-conservative, in 1955.

Operating? I suspect that "Chain Lightning" Hill was about as fast and accurate as an electronic key, with Bill Hannah (2US), Les Spangenberg (2ZM), Matty (9ZN), and a score of others able to move traffic as fast as it could be filed. Techniques? The names of Godley, Reinartz and Hull only suggest the many who made major contributions to the art, and who are a part of amateur history, perhaps little known to the majority today.

Those were great figures, and the current crop seems to move along with them, in new parameters. May your next forty years be as significant as the last.

— Al Smith, W2AFJ/3

Frick Bldg.
Pittsburgh, Pa.

Editor, *QST*:

... Unless the reprints are too expensive, I would appreciate the inclusion, from time to time, of the second, third, and so on issues of *QST*. Speculators have taken advantage of the rarity of the early issues and the prices are prohibitive for originals. Reprints convey the message to more people.

— John H. Elder, W3RSB

Box 234
Dover Plains, N. Y.

Editor, *QST*:

... Your 40th anniversary number certainly brought back fond memories, as I've been a licensed ham since 1913. That qualifies me for the Old, Old Timers, doesn't it?

— George F. Koehnig, K2EQ

155 St. Mildred's Court
Danville, Kentucky

Editor, *QST*:

In reading the 40th anniversary edition of *QST*, which contains *QST* Vol. 1, No. 1, I am moved to write you a letter of congratulation and gratitude for the splendid achievement you and ARRL have done, and are doing.

Vol. XXIX, No. 12, is a masterpiece and reflects aptly the work done in amateur radio during the last 40 years, keynoting the job of public service with George Hart's story of "The Great Flood of 1955." In fact, *QST* today covers thoroughly the varied and diverse activities of our hobby, whether it be traffic-handling or VHF research, the

pursuit of DX or perfection in mobile operation.

Being an editor myself, I know and understand fully your problems. I marvel at the wonderful job you and the staff of *QST* do each month, and I thought it high time I wrote you a line and said so. *QST* reflects, in my way of thinking, 40 years of a great American characteristic and spirit — the pioneer traditions of resourcefulness, imagination, and foresight that have created, out of only meagre beginnings, something worthwhile and something of a service to other people.

Thanks for the job ARRL and *QST* are doing.

— W. C. Alcock, W4CDA

1500 Center Point Rd., N. E.
Cedar Rapids, Iowa

Editor, *QST*:

Let me offer congratulations on one of the finest editions of *QST* I ever have received since the beginning of your magazine. I think every amateur should keep this December issue for his files as a memory of 40 years of blood, sweat and tears of the amateur fraternity in maintaining its present high respect and position in the eyes of the Government, FCC and our fellow men throughout the entire world!!!

I remember all of the things that have transpired since being on the air from 1913 continuously until the present time. I wouldn't trade my experience for anything, and it is quite a pleasant relationship we amateurs now enjoy compared to the old days when we had to make everything that went into our receivers and transmitters. . . .

How easy it is today for the Novice to get a license, buy some gear and get on the air and enjoy himself on frequencies recognized as an amateur service by the FCC. Without the past forty years of hard work, cooperation with ARRL, various other organizations, and manufacturers who had the interest of the amateurs at heart — this wouldn't be possible today!!!

After 42 years on the air with various kinds of home-made, factory and precision equipment. I am now finding an entirely new experience with s.s.b. I can recommend this to any amateur who is tired of the usual procedure of QSO's, and it satisfies my desire to once again get back on the air with something new and different. . . .

In closing, let us give silent thanks for the many, many fine things we have today in amateur radio and enjoy it to the fullest extent.

— Charles W. Boegel, jr., W0CVU

NORTHEAST FLOODS, 1955

Federal Civil Defense Administration
Washington 25, D. C.

Editor, *QST*:

The communications staff of FCDA has called my attention to your graphic article "The Great Flood of 1955" appearing in the December issue of the American Radio Relay League magazine *QST*.

Having visited the northeast states during and following the flood, I have a first hand knowledge and appreciation of your description of the many difficulties and hazards encountered by the amateur radio operators. Their willing assumption of the responsibility of establishing and maintaining otherwise non-existent communications is indicative of a fine esprit de corps and a high degree of awareness of citizen responsibilities. Both of these characteristics can well serve as a model to the general public in times of a natural disaster or a civil defense emergency.

To you and to each of the approximately two thousand amateur radio operators in the northeastern area may I offer my thanks and a sincere "Well-Done."

— Val Peterson, Administrator

(Continued on page 142)



Hints and Kinks

For the Experimenter



HOMEMADE ELECTRIC SOLDERING TOOL

THE SOLDERING TOOL illustrated in Fig. 1 was developed for students at the New York School for the Blind. The iron receives power from a modified broadcast receiver transformer and is controlled by a foot switch. In operation, the iron is held with one hand and manipulated as pliers are handled. Materials to be soldered may be clamped together with the tool, thus leaving one hand free for holding solder. Sections of $\frac{1}{4}$ -inch copper tubing have been successfully soldered with the tool.

The iron is constructed with junk-box and other readily available components. These parts are identified by the letters A through H in Fig. 1. The tips (A) are made with carbon obtained from flashlight batteries. The arms or conductors

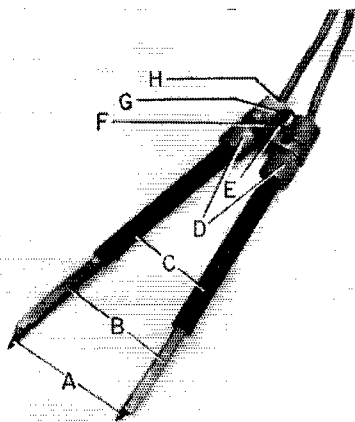


Fig. 1—View of the soldering tool described by W2UVF. See text for details of components A through H.

(B) are lengths of $\frac{1}{4}$ -inch-square brass or copper rod. Bakelite tubing (C) protects the operator's hand against burning and provides electrical insulation between the electrodes. Items D are copper-tubing unions. The clamps for the unions (F) are made from a piece of brass or copper and are joined together by a pivot assembly (E) such as a hinge. The spring return (G) spreads the arms or handles when the iron is released. The knurled pieces (H) at the top of the iron (as seen in Fig. 1) are union locking nuts that have been finished off with the aid of a lathe.

When constructing the tool, it is first necessary to drill holes in the $\frac{1}{4}$ -inch rods to accommodate

the carbon tips. The carbon may then be roughed to size with a hack saw and file. The shank that will be force-fitted into the rod may be conveniently turned down by rotating the carbon in an electric drill and working the material with a file.

The bakelite covering for the rods must extend straight up through the copper unions if electrical insulation is to be provided. The inside diameter of the tubing should fit snugly over the square rods so that the latter will actually be clamped in position when the unions are tightened around the bakelite. Leads made with No. 8 flexible wire should be attached to the top end of each rod. The leads should be long enough to reach down to a foot-operated control switch. Electric-range cable is one good source of flexible lead wire.

The transformer used here at the school is an old b.c. receiver transformer having all of the original secondary windings replaced with a single winding that delivers slightly over 3 volts under load. Because the new winding must carry considerable current, it is made with a conductor consisting of three lengths of $\frac{1}{2}$ -inch shield braid connected in parallel. Actual specifications for the secondary will depend on the type of transformer undergoing modification and must be determined experimentally.

The foot control should be a high-current push-type switch, mounted on a slightly elevated board. A 3-inch "T" hinge, arranged to swing over the switch push button, can be used as a convenient foot pedal.

Heat should not be applied to the iron until the units requiring solder have been clamped between the electrodes. Of course, excessive pressure on the electrodes will break the carbon tips. After the solder has been applied, the tool may be used as a clamp while the solder sets.

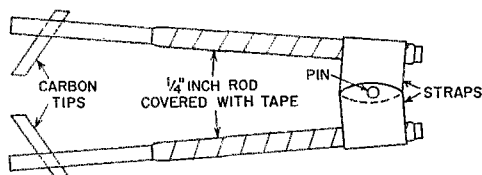


Fig. 2—A simplified version of the electric soldering tool.

A simpler version of the iron can be readily visualized. One extremely simple model would use ordinary tape for insulation, and a strap-and-pin assembly as shown in Fig. 2.

—Harold C. Dressel, W2UVF

(Continued on page 134)

Dr. G. W. Pickard

W1FUR

Amateur radio lost one of its last few remaining early pioneers with the passing, on January 8th, of Dr. Greenleaf Whittier Pickard, W1FUR. An active amateur for more than 40 years, and a scientist of note for an even longer period, Dr. Pickard made countless contributions to man's



store of radio knowledge. Pioneering was his specialty, and in many fields of amateur endeavor he was years ahead of his fellows.

He was one of the first to achieve successful transmission of speech by radio. The crystal detector, the radio compass, and devices for the reduction of noise are among the developments for which he is well known. An inventor of international reputation, Dr. Pickard was the holder of many U. S. and foreign patents.

The pages of *QST*, almost from the very first, contain many references to his work. Polarization experiments (February, 1926) when few amateurs even sensed the meaning of the word; the Pickard Antenna (August, 1933, page 24) an early attempt to match antenna and transmission-line impedance on 56 Mc.; propagation studies in the 5-meter region in the early '30s, when most of us were still struggling to get equipment to work on that "ultrahigh frequency" at all (reported by Ross Hull in December, 1934, *QST*, page 9) — these *QST* references give us some insight into the nature of the man.

Dr. Pickard held engineering positions with the American Telephone and Telegraph Company, the Wireless Specialty Apparatus Company, RCA Victor and the American Jewels Corporation. He was also an independent consulting engineer for many years. In 1945 he

became co-founder and president of Pickard and Burns, Inc., consulting radio and electronic engineers, Needham, Mass., serving as Chairman of the Board from 1952 until his death.

He was a Fellow and Past President of the Institute of Radio Engineers, receiving their Medal of Honor in 1926. The Radio Club of America, of which he was also a Fellow, awarded Dr. Pickard the Armstrong Medal in 1941. Other society memberships show the scope of his active interests: American Institute of Electrical Engineers, American Association for the Advancement of Science, American Academy of Arts and Sciences, the American Meteorological Society, and the American Radio Relay League. His ARRL membership was continuous from 1922 on.

— E. P. T.

Silent Keys

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

- W1BZQ, William E. Woodbury, Arlington, Mass.
- W1FUR, Dr. Greenleaf W. Pickard, Newton Center, Mass.
- ex-W1LC, Rev. Paul Tilden, Brooklyn, New York
- W1RGR, William G. Luppold, Lowell, Massachusetts
- W2QM, ex-W8QL, Mark W. Faville, Bergen, New York
- W2ZGL, Captain Kellogg Sloan, Cranford, New Jersey
- W2SOL, William H. Curtis, Tonawanda, New York
- W4HSZ, Richard G. Wells, jr., Pikeville, Kentucky
- W4ZYE, Everett St. George Krengel, Richmond, Va.
- W5CHT, Roy A. Pace, Lubbock, Texas
- W5KCH, John Schilleci, New Orleans, Louisiana
- W5LZM, Robert W. Chapman, Breckenridge, Texas
- W5UTK, Perry A. Terrell, Collins, Mississippi
- W6JBV, Thomas F. Eberhard, San Carlos, California
- W6KUP, Thomas E. Terral, Trinity, California
- W7EK, Everett C. Kick, Everett, Washington
- W7SEX, Edward F. Geiser, Globe, Arizona
- W7TCU, Harold W. Maxam, Nampa, Idaho
- W8AKY, John W. Kelch, Cleveland, Ohio
- W8EJN, Larry E. Wise, Lima, Ohio
- W8ID, Charles M. Jacobs, Tiffin, Ohio
- WN8UJG, Chester A. Whissen, Lorain, Ohio
- W9KNA, William H. Winings, Decatur, Illinois
- W9UIZ, James M. Dix, Verona, Illinois
- W9JBN, Willard K. Travis, Cedar Rapids, Iowa
- VE2APO, Ernest M. Brownlee, Valleyfield, Quebec, Canada
- VE3DJB, Herbert E. Park, North Bay, Ontario, Canada
- VE3SX, David O. Parks, Toronto, Ontario, Canada

Strays

QST author Charles L. Riley, jr., W1JY/3, (Interpolation Frequency Measurements with the BC-221, p. 40, Jan. '56, *QST*) would like any mail concerning his article to be directed to 1100 Edgemont Road, Towson 4, Maryland.



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINIM, Natl. Emerg. Coördinator
PHIL SIMMONS, WIZDP, Asst. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWFO, DXCC Awards
LILLIAN M. SALTER, WIZJE, Administrative Aide
ELLEN WHITE, WIYYM, Asst. Comm. Mgr., Phone

DX Test, Second Section. Here's another chance to look for any new countries coming through in March, also to extend any scores by more points and multipliers before sending in your DX log. The dates? March 9th-11th (phone) and March 23rd-25th (c.w.) are the concluding periods of ARRL's 1956 International DX Competition. This item is also a reminder to all not to forget to mail in your results large or small; even postal cards confirming individual contacts or exchanges are welcome and in the right spirit. Here's to more good DXing.

Field Day Planning. June 23rd-24th are announced as FD dates for '56 . . . the usual fourth week-end. The January Affiliated Club Bulletin included the full text of the Field Day rules. Club committees choosing locations will be glad to receive this early indication of the dates, so they can make positive commitments.

On how to get organized for FD, that is left to experience and your own discretion. Most club plans are worked out by club designated committees. Set up as many as you find useful. They go by such names as *location* committee, *antenna-and-equipment* committee, *commissary* committee and *operating plans* committee. You may wish more committees or the whole club can be the committee on everything. Individuals and small groups can work out simplified plans. Where there is an antenna committee, it may have to await club action accepting the report of the location committee before it can proceed with its own recommendations. Operators have found in the past that Field Day can be more than a contest or just another emergency test. You can place the emphasis where you will. There are early decisions to make on the transmitter-class to be entered, which phone and c.w. bands will be worked, whether there will be separate Novice and v.h.f. installations, etc. We hope you will arrange that all members of the club having mobile equipment have a chance to give this at least a brief tryout. Your mobiles can count their results up jointly for an "aggregate mobile score" in the club name. So don't forget to encourage that as well as any other ideas that will make your FD more useful to you as a real *emergency exercise*, even if not contributing so directly to the aspect of a contest setup. The Field Day is primarily the emergency equipment test but as in all communications, the operator know-how will determine your results.

A review of operator ability between now and the Field Day may help for successful work looking to emergencies or the Field Day. Many clubs

have a "dry run" which works out bugs in any new gear and familiarizes operators with handling the controls. Such can be done as a special club field project or in connection with the April CD Parties. The FD operating committee will normally examine and plan for rotation of operators in different operating positions or it may recommend setups by teams for particular bands and modes. To aid the club competitively, program committees are often asked to schedule talks covering procedures for message handling as well as good general emergency and everyday operating procedure for highest efficiency. June *QST* is scheduled to carry the full text of FD rules, such as already have been distributed to clubs. Starting in May, ARRL will have FD log forms, to be furnished you on a request basis.

Answering Directional or Informative CQs. With one's CQ an indication of direction, city, state, country, purpose or group-called is desirable. Such generally assists operating efficiency and results. It is because they help that such CQs have come into use as a recommended practice. All operators of course should refrain from answering any call that is informative and *not* specifically for them. Put yourself in the position of the operator sending an informative CQ, and you will see that he has a definite purpose in sending it. You will do neither him nor yourself any good by calling him, in fact you may waste his time and your own, and very likely get yourself labeled an unintelligent operator. This can be true especially if you break in when you are in the wrong direction, or are not informed or not a part of the group or purpose he seeks. Idle curiosity is not a good reason for improperly answering a call *not* rightly yours. Listen carefully to any other replies and you will normally find the reason for the purpose-indicating CQ. Just having heard a W3 telling off a W2 whose CQ-DX he answered we suggest "more listening" as a good way to retain your dignity. Curiosity thus satisfied by eavesdropping carries no penalty. As to exceptions on answering the CQ not really meant for you, there are exceptions to all rules, but they should be rare. A case where you have a schedule coming up (with the city named in a directional CQ) and possibly can be of assistance through routing a message that way *might* justify your call . . . if three or four tries leave our friend's directional CQ unrequited!

Active OOs Needed. All certificates issued by SCMs (see page 6) require annual endorsement to keep them in effect. This is a sound ARRL requirement, based on the reasoning that any

organization is only as good as its activity. Each appointee, and the Official Observer is no exception, must report and show monthly activity. SCMs do overhaul their appointment records, so many have really top and outstanding organizations in each field of amateur interest represented. The non-active OOs and other appointees have to be dropped as SCMs find necessary, unless some have a renewed program of activity.

Now about OO work. It is current League policy to maintain and extend the observer service. SCMs are looking for experienced amateurs for replacements of those currently being dropped from the lists. Men to mail ARRL cooperative postal card notice forms where, after careful observation, a helpful word seems needed, are wanted. The Observer post is not one for newcomers, but only for General Class operators and members with the best of receiving-observing gear, also lots of know-how in making checks for images, stability, etc., as well as real interest in such tasks which we assure you are sometimes thankless as well as never-ending. OOs must be alert to double-check against the effects of propagation conditions as well as receiver overload.

There are different categories of Observer work — such as Phone, Class III, and c.w. signal observing, Class IV. We'll send information on the Official Observer post (duties, policy, sample forms) in answer to radiogram or other inquiry, provided you reside in the U.S.A. or Canada in ARRL operating territory. Our ARRL Board of Directors has itself in the past had occasion to commend the active members of the OO group on their work; FCC officials likewise have extended praise. Nothing pleases an OO more than to be of real help to a fellow amateur and no praise speaks as convincingly to us as continuing word (in certain FCC official reports) that our amateur service is effectively a self-monitoring and well behaved service — as becomes the citizens we are, of course. If you feel yourself interested and qualified for OO work, drop us a line.

— F. E. H.

CLUB COUNCILS AND FEDERATIONS

British Columbia Amateur Radio Association, Inc., Fernie Savage, VE7FB, Secy.-Treas., 4553 West 12th Ave., Vancouver 8, B. C., Canada

Central California Radio Council, Edward J. Roussey, W6VCZ, Secy., 1509 Newlands Ave., Burlingame, Calif.

Chicago Area Radio Club Council, George M. Boyd, W9SPT, Secy., 3540 N. Seeley Ave., Chicago 18, Ill.

Cleveland Area Council of Amateur Radio Clubs, C. E. Ormston, W8YMB, Secy.-Agent, 9706 Yeakel Ave., Cleveland 4, Ohio

Eastern New York Council of Radio Clubs, George W. Tracy, W2EFU, Secy., 1138 North Country Club Drive, Schenectady, N. Y.

Federation of Long Island Radio Clubs, Robert I. Lippman, K2CFH, Secy., 30-51 Hobart St., Woodside 77, N. Y.

Indiana Radio Club Council, Joseph A. Cereszewski, W9GRA, Secy., 7441 Baring Parkway, Hammond, Ind.

Los Angeles Area Council of Amateur Radio Clubs, Mrs. Billie L. Blakesley, K6ANG, Secy.-Treas., 409 W. Brookdale Pl., Fullerton, Calif.

Ohio Council Amateur Radio Clubs, Ralph Crammer, W8VHO, Secy., 236 S. Burgess Ave., Columbus, Ohio

Philadelphia Area Council of Radio Clubs, Joseph D. Welch, W3UQV, Secy., 5026 Walnut St., Philadelphia, Penna.

Sacramento Council of Amateur Radio Clubs, Walter H. Wade, W6LLR, Secy., 7044-28th St., Rio Linda, Calif.

St. Louis Area Amateur Radio Council, Miss Marie Van Aller, Secy., 4960a Mardel, St. Louis, Mo.

San Diego Council of Amateur Radio Organizations, Sidney A. Burnett, W6KSI, Secy., P.O. Box 327, Imperial Beach, Calif.

Twin City Area Amateur Radio Council, Ben F. Swezey, jr., WØRAG, Secy., 3214 Benjamin St., N.E., Minneapolis 18, Minn.

Western Pennsylvania Amateur Radio Club Council, R. M. Heck, W3NCD, Secy., Rt. 1, Sharpsville, Pa.

Wisconsin Council of Radio Clubs, Harold W. Petersen, W9NLH, Secy., 77 W. Pine St., Sturgeon Bay, Wis.

WIAW OPERATING SCHEDULE

(All times given are Eastern Standard Time)

A lithographed local map showing how to get from main highways, or from the Hq. office, to WIAW will be sent to amateurs advising their intention to visit the station. Also, master schedules showing complete WIAW operation in EST, CST or PST will be sent on request.

Operating-Visiting Hours:

Monday through Friday: 1500-0300 (following day).

Saturday: 1900-0230 (Sunday).

Sunday: 1500-2230.

Exceptions: WIAW will be closed from 0300 March 30th to 1900 March 31st in observance of Good Friday.

General Operation: Use the chart on page 61, Nov. 1955 QST for determining times during which WIAW engages in general operation on various frequencies, phone and c.w. Note that since the schedule is organized in EST, certain morning operating periods may fall on the evening of the previous days in western time zones. WIAW will participate in all official ARRL operating activities, using schedules general operating periods for this purpose if necessary.

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

Frequencies (kc):

C.w.: 1885, 3555, 7125, 14,100, 21,010, 52,000, 145,600.

Phone: 1885, 3945, 7255, 14,280, 21,350, 52,000, 145,600.

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

Times:

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

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

Code Proficiency Program: Practice transmissions are made on the above listed c.w. frequencies, starting at 2130 daily. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately ten minutes of practice is given at each speed. *Exceptions:* On March 3rd and April 6th WIAW will transmit ARRL Code Proficiency Qualifying Runs instead of the regular code practice.

A.R.R.L. ACTIVITIES CALENDAR

Mar. 3rd: CP Qualifying Run — W6OWP

Mar. 9th-11th: DX Competition (phone)

Mar. 15th: CP Qualifying Run — WIAW

Mar. 23rd-25th: DX Competition (c.w.)

Apr. 6th: CP Qualifying Run — W6OWP

Apr. 13th: CP Qualifying Run — WIAW

Apr. 14th-15th: CD QSO Party (c.w.)

Apr. 21st-22nd: CD QSO Party (phone)

May 5th: CP Qualifying Run — W6OWP

May 14th: CP Qualifying Run — WIAW

June 1st: CP Qualifying Run — W6OWP

June 9th-10th: V.H.F. QSO Party

June 12th: CP Qualifying Run — WIAW

June 23rd-24th: ARRL Field Day

July 7th: CP Qualifying Run — W6OWP

July 18th: CP Qualifying Run — WIAW

July 21st-22nd: CD QSO Party (c.w.)

July 28th-29th: CD QSO Party (phone)

With the AREC

A good many amateurs seem to think that we will be put off the air if or when this country becomes involved in war. If they are thinking of the casual rag-chewing, DX-chasing, on-the-air-experimenting type of amateur radio, they are absolutely right. The only amateur radio that will remain operative will be the Radio Amateur Civil Emergency Service. This service will continue under certain operating restrictions prescribed in the RACES rules, plus additional "conelrad" rules still to be put into effect.

This is amateur radio, you ask? Yes, it is, in the FCC definition of the term. It's the type of amateur radio that exists for the service it can render. It is the organized kind of amateur radio, attached to and rendering service to a government agency, our civil defense establishment promulgated nationally by the Federal Civil Defense Administration. If that, to you, is not amateur radio, then your kind of amateur radio will be silenced in the event of war. You can depend on it.

One of the questions we are asked by skeptics is "What assurance do you have that even RACES will not be silenced in the event of war?" We have no more assurance of this than has any other service that is slated to continue operation. It is probably safe to say that if RACES operation is conducted in such a way as to constitute a security risk, chances are that it will be shut down also. But that's what all the preparation is about — so that we can get ourselves organized into our civil defense units and prepare to conduct operation which will be in accord with security and operating efficiency requirements. Don't think that there will be any tolerance of rag-chewing, DX-ing or any other kind of casual operation not strictly authorized under the RACES rules. There won't be. And since RACES is a combined amateur and civil defense service, its performance under pressure will redound to the credit or discredit of amateur radio.

One EC, in returning his annual report form, says "This RACES — how do you sign up?" The answer to this is that you don't just "sign up," unless your civil defense people have already established the mechanism for your doing so, namely an appointed radio officer and an FCC-FCDA-approved communications plan, in accordance with the RACES rules (see the *License Manual*). Once this has been accomplished, you can sign up in civil defense and be certified to operate in RACES in the fashion provided for in the RACES rules.

Speaking of EC annual reports, we are glad to be able to say that the response this year has been more than double that of last year, and will probably hit an all time high. Although this is most gratifying, we can't help but point out that we still have a long way to go to make even 50%, which is not an unreasonable objective. At least, this response shows that the AREC is gaining, not losing, in its overall strength — largely, we think, as a result of the impetus of RACES.

On December 2, 1955, several South Dakota amateurs participated in a search for a light plane reported missing since 1730 the night before. About 0700 Dec. 2, two amateur mobiles, W0QHJ and K9CXB left for the search area southeast of Rapid City. W0YOB was the Mobile Control Station while ZWL was the Rapid City Control Station. Liaison was maintained by radio with the CAA, National Guard, CAP, Weather Bureau and the Highway Patrol. A landing strip was established on top of Sheep Mountain

for the use of the four light planes, none of which was equipped with radio communication, participating in the search. The mobile units were stationed here to relay information from the CAA to the pilots. Weather was snow and low ceiling, so the mobiles stayed in the area until all pilots were notified that the wreckage had been found about 1355 by the owners of the ranch where it had crashed. Three people died in the crash. Communication was maintained until about 1527. Others assisting: W0s GLA YKY IWE NPV FLP VAM NEO UAJ OII QEK CZQ and K0ARE. — W0YQR, EC Pennington Co., S. Dak.

Amateurs of the Birmingham Amateur Radio Club assisted in a serious fire in Birmingham, Alabama, on November 5th. W4NZZ was asked to set up communications between the Naval Air Station and several naval fire fighting units being dispatched to the blaze. Fifteen minutes later, four mobiles had checked in, and traffic started to flow within the hour. W4FSW operated at the scene of the fire, some distance out of Birmingham, and communications were effected with city units by means of a relay chain consisting of W4NXX, W4OLG and W4PXN. W4HVV acted as control station from his fixed location, while W4NZZ and KN4GLO assisted as called upon. All operation was on 29,560 kc.

Ice jamming in the Yellowstone River near Laurel, Mont., threatened severe flooding on December 23rd. W7YZQ/m first became aware of the condition and called for assistance of the AREC. W7MQI, EC for Billings, alerted his AREC group and also notified W7LBK, EC for



The Mecklenburg County (N. C.) unit of the AREC took part in Operation "Zero," a test evacuation of Charlotte, N. C., last November. Nine mobiles were used to cover four collecting points around the heart of the city. This is control station W4BX, with EC W4ZQB holding the mike while K4BVQ operates the receiver. The test was a great success.

Laurel. In the ensuing operations, the amateurs were instrumental in rescuing a family of six persons by boat, keeping the Yellowstone County chapter of American Red Cross informed of conditions. At the request of the Highway Patrol Office, W7FTV/m drove from Billings to Highway and Joliet to scotch rumors of flooding of the highway at those points.

Returning to Billings, W7YZQ/m reported a serious accident along the road, resulting in an injured girl being taken promptly to the hospital.

W7SMY/m was able to assist the Montana-Dakota Utilities Co. by reporting conditions involving a high-pressure gas line into Laurel.

Final conditions were observed by W7RDM/m at 1445, at which time Laurel city officials indicated the immediate danger was over. W7FFB of Columbus reported conditions upstream as not above normal and stood by for further call. Other amateurs participating: W7s RDO ZCO WIB TAT FTV VZN KJS LBK SYM FFB YHS PXR.

— W7MQI, EC Billings, Mont.

The Corpus Christi Amateur Radio Club, in connection with the American Red Cross, held a simulated emergency drill on August 21, 1955. The fixed stations on emergency

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

These frequencies are generally employed by amateurs using radioteletype in the United States.

power were W5MS/5 at the disaster headquarters and W5HQR/5 at the Red Cross Headquarters. Both of these stations were operating both 75 and 2 meters, and the 2 meter stations were operating duplex. W5DQQ controlled the mobiles. Also participating were W5QKF and W5MX both operating on emergency power. The mobiles were dispatched to the different shelters throughout the city, and reported in from their stations, giving simulated storm reports. All stations were loud and clear, and were heard within a 200 mile radius. During the drill control station W5MS declared all commercial power cut off and all stations not on emergency power left the air. W5QFA was in constant communication with W5TYI in Alice, Texas, on 2 meters. The drill served the purpose of having all emergency equipment ready and in working order, and demonstrated that communications could be handled within the city and out of the city. — W5QEM, SEC So. Texas

Twelve SECs reported on behalf of 3518 members on November activities. This was the same number of reports as last November, but fewer AREC members are represented this year. Sections reporting: Minn., Maritimes, Western N. Y., NYC-LI, E. Fla., Ala., San Joaquin Valley, Wis., Santa Clara Valley, Santa Barbara, E. Pa., Missouri.

RACES News

It is understood that plans are now in the works to connect FCDA Regional Offices with state civil defense offices by amateur radio under the RACES rules. Region IV, with headquarters in Battle Creek, Mich., already has a RACES plan of operation in progress; other regions may soon follow suit. Operation will be on RACES frequencies, probably on 80 c.w. but maybe on 75 phone also. Nothing is official on this, all so far is hearsay, but

all indications are that plans are afoot to effect some kind of national radio backup for existing c.d. wire lines (mostly teletype) through use of amateur radio (RACES) facilities. We'll have more specific dope in future issues, we hope.

K2GQP, Deputy Radio Officer for Morris County, N. J., sends us some information on their RACES setup which might be of interest. Their control center is set up in an old county welfare home, installation labor provided by members of the Morris Radio Club. Four operating positions maintain contact between county and state headquarters and between county and municipal headquarters within the county. One position on 75 meters maintains contact with Trenton, and another on 80 c.w. performs the same function. Contact with municipalities is maintained on six and two meters. Radio Officer is K2DO. The county RACES group was active in three emergencies in 1955: the forest fire at Hackelbarney State Park in April, the August flood in Sussex County and the October flood in Lincoln Park and Pequannock.

Did you know that you can deduct c.d. expenses from your income for tax purposes? W8NGQ points this out and quotes a reference from the *Detroit Defender*, a monthly Detroit C.D. leaflet, which quotes an opinion by an official of the Tax Ruling Division, Office of the Commissioner of Internal Revenue as follows: "It is the opinion of this office that the actual unreimbursed expenses incurred by civil defense volunteers in the performance of their volunteer duties . . . or other expenses directly connected with and solely attributable to the rendition of such volunteer services, constitute contributions or gifts . . . and are deductible . . ." Which means, in plain language, that if you can't get reimbursed for money you spend personally on behalf of c.d., you can at least deduct it for income tax purposes.

SUPPLEMENT TO NET DIRECTORY

The following list of nets will supplement and correct the listings on page 78, Nov. 1955 QST, and page 74, Jan. 1956 QST. Please inform us of any errors or omissions so that they can be included in the final May QST installment. An asterisk (*) indicates correction from previous listing; otherwise, the listing is of a net not previously included. These nets are included in the cross-indexed ARRL Net Directory,



Last September 28th, Calgary C.D. Authority of Alberta, Canada, set up "Operation Lifesaver," a simulated emergency in which amateurs participated under civil defense radio officer VE6WT. Calgary Amateur Radio Assn. club call VE6NQ was used at control, with VE6WT (standing) and VE6HY in charge. About 25 amateurs participated on 2 and 75 meters.

available free upon request. All nets registered through January 16, 1956, are included. Nets registered subsequent to that date will be included in the May QST listing.

Name of Net	Freq.	Time	Days
Ala. Emerg. Net P (AENP)*	3955	1900 CST	Daily
Albuquerque VHF Net	148,802	1930 MST	Tue.
ARK-LA-Tex Teenage Net	3820	1600 CST	Mon., Wed., Fri.
Arkansas Louisiana Net	3695	1900 CST	Mon.-Fri.
Atlanta CW Net	7040	2100 EST	Sun.
Batavia Amateur Radio Assn. Net (N. Y.)	3720	2030 EST	Wed.
Berks Co. Civil Defense Net (Pa.)	145,400	2000 EST	Mon.
Bloomfield Communications (Group (N. J.))	145,320	1900 EST	Mon.-Fri.
Buccaneer Phone Roundtable	3945	0900 CST	Sun.
Buzzards Bay, Cape Cod & Islands Emerg. Net (Mass.)	145,260	1900 EST	Sat.
Central Area Net (CAN)	3670	2030 CST	Mon.-Sat.
Central Gulf Coast Hurricane Net	3935	1815 CST	Daily
Chattahoochee Valley Emerg. Net (Ala.) (AENI)	3910	1330 CST	Sun.
Chattanooga Amateur Radio Emerg. Net	29,600	1500 EST	Sun.
Cochise County Net (Ariz.)	7210	0900 MST	Sun.
Columbia Amateur Radio Pool (Fla.)	3870	1000 EST	Sun.
Comanche Co. AREC Net (CCEN) (Okla.)	3860	1230 CST	Sun.
Conn. Training Net (CTN)	3640	0900 EST	Sun.
Coronation Area Emerg. Net (Alta.)	3765	1000 MST	Sun.
Danvers Emerg. Net (Mass.)	145,620	1930 EST	First Mon.
Delaware Lehigh Amateur Radio Club Net (Pa.)	145,350 29,580 29,640	1000 EST	Sun.
Dixie Traffic Net	3970	0800 CST	Mon.-Fri.
Dragnet	14,280	0900 CST	Mon.-Fri.
East Able Baker (EAB)	3503	2030 EST	Sun.
East Able Fox (EAF)	3915	2030 EST	Sun.
Eastern Area Net (EAN)	3670	2030 EST	Mon.-Fri.
Eastern Mass. Net (EMN)	3660	1300 EST 1900 EST	Mon.-Fri.
Eastern Pa. CD Net (GW)	3503.5	0830 EST	Sun.
Eglin Amateur Radio Society's Hurricane Net	29,560	1900 CST	Mon.
Egyptian-St. Louis Net	29,840	0815 CST	Mon.-Sat.
Everett Civil Defense Net (Mass.)	29,560	1930 EST	Thu.
Fifth Regional Net (RN5)	3645	1945 CST 2130 CST	Mon.-Sat. Mon.-Fri.

(Continued on next page)

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for December Traffic

Call	Orig.	Recd.	Ret.	Del.	Total
W7BA	40	1515	1455	55	3065
W7PGY	24	1266	1152	114	2556
W5YIC	418	1653	1854	51	2506
W5SCA	20	1235	1247	2	2504
W6BDR	47	1245	1178	19	2489
W3CUL	171	1141	901	227	2440
W6PZO	4	1137	1115	8	2264
W2KEB	64	1010	886	264	2224
W6DQ	21	1049	1006	74	2160
W2KEV	17	1056	845	111	2029
W3WVI	604	338	979	89	2010
W6CPL	16	932	860	72	1880
W4UHA	256	828	714	6	1804
W7VAZ	23	807	709	98	1637
W6BL	7	763	747	6	1523
W6DDE	34	694	754	4	1456
W6NZZ	456	464	2	455	1377
W7FRU	4	619	525	89	1237
W4PPC	10	578	550	12	1150
W6OHJ	17	546	538	12	1113
K4ARF	11	549	482	59	1101
W3WV	15	537	362	135	1049
W9EHz	127	444	395	49	1015
W2RUF	97	470	389	57	1013
W6MLZ	19	498	104	345	966
W6KJF	106	439	107	13	954
W6GYH	11	467	376	91	945
K6ORT	6	467	467	0	940
W6GBJ	11	465	404	54	934
W1ARR	331	225	253	10	879
W6ZWL	32	477	74	295	878
K6EJT	24	418	403	15	860
K2CQP	91	382	332	11	816
W6GAR	14	392	394	12	812
W6ELW	15	401	347	25	788
W6OR	15	387	298	79	779
K6FCY	45	552	510	42	749
W7QKU	23	352	285	76	746
W6MAK	11	345	289	51	726
W6MLW	14	350	303	43	710
W7APE	74	317	297	20	708
W6JYO	177	325	243	41	686
K5AOV	22	326	256	23	669
W6WVO	14	327	311	16	668
W4PJU	7	329	280	19	665
W9JOZ	7	325	324	6	662
W8VTP	5	323	312	6	645
W7OIE	81	379	242	27	629
W4TVE	368	41	210	0	619
W6WZL	49	264	273	32	618
W6SQE	123	230	208	22	583
W6YHM	10	287	264	18	579
W6BHG	170	207	103	97	577
W8UQP	16	253	235	48	552
K6HOV	46	252	49	293	550

Call	Orig.	Recd.	Ret.	Del.	Total
W9TT	3	323	223	0	549
W4WOG	44	255	231	14	544
W6GUY	14	265	250	14	543
W9UXK	14	255	253	1	523
W1ZUU	27	247	221	24	519
K2KXZ	92	231	130	66	519
W3GIG	12	251	242	14	519
W0WDW	8	263	204	43	518
W2ZRC	9	266	228	10	513
Late Report:					
W6ZWL (Oct.) 26	288	223	84		621

More-Than-One-Operator Stations

Call	Orig.	Recd.	Ret.	Del.	Total
K0WBB	206	735	638	52	1631
K6WAX	170	401	521	26	1118
K1USA	120	467	494	28	1109
K4FDY	77	500	464	36	1077
K4WAR	436	311	272	39	1058
W6RAN	500	0	0	500	1000
K6NCG	0	300	300	0	600
W2AEE	39	262	153	104	558

RPL for 100 or more originations-plus deliveries:

W9SVZ	308	W8HNP	131	W5CF	108
W4DDY	302	K4EAQ	128	W7AHV	108
W3ELI	225	W7WOK	127	K6DDO	107
W0RDN	189	W4CXCQ	125	W6FEA	107
W9MHC	175	W9DGA	125	W9VEY	107
W6GUY	171	K2DEM	120	W8TWT	107
W8DAE	164	W0LJW	120	W6LFG	107
W0NLY	158	W1YBH	119	W0YVM	108
W1DYE	154	W9WLY	119	W1CDX	104
W7AWI	148	W4SHJ	117	K4DWP	103
W0KJZ	136	W8BNE	113	W6AIN	103
W9KLG	135	W9DDK	111	K6KCI	100
W6CTS	133	W8PEA	110		

More-Than-One-Operator Stations

W6YL	117	W7DK	113
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RPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: K6HOV, W8NOH.

The BPL is open to all amateurs in the United States, Canada, Cuba, and U. S. possessions who report to their SCM a message total of 500 or more, or 100 or more originations-plus-deliveries for any calendar month. All messages must be handled on amateur frequencies, within 48 hours of receipt, in standard ARRL form.

Finger Lakes Net (N. Y.)	145,350	2000 EST	Fri.	Mesabi Net (Minn.)	1895	1900 CST	Mon., Fri.
Flamingo Net (Fla.)	29,044	1930 EST	Fri.	Miami Valley Civil Defense Net (Dayton, O.)	147,150	1900 EST	Wed.
Franklin Co. Emerg. Net (Ohio)	145,260	1900 EST	Wed.	Michigan QMN Net CW	3663	1730 EST	Daily
Golden Empire Emerg. Net (Calif.)	1920	2000 PST	Mon.	Minn. Junior Net	3690	1700 CST	Mon.-Fri.
Goose River Net	1980	0900 CST	Sun.	Minnesota Section Net (CW) (MSN)	3595	1200 CST	Mon.-Fri.
Great Lakes Amateur Radio Net	1880	1930 EST	Tue., Thur., Sat.	Minn. Section Net (fone)	3820	1205 CST	Mon.-Sat.
Gulf Coast Sideband Net	3925	1730 CST	Daily			1800 CST	Mon.-Sat.
Hair Pin Net	29,000	1300 EST	Tue.			0900 CST	Sun.
Hillsborough Co. Emerg. Net (N. H.)	29,000	1900 EST	Fri.	Afinn. YL Pi Net*	3838	0900 CST	Mon.-Fri.
Hit & Bounce Net	7140	0800 EST	Daily	The Minute Man Net*	3912	0730 PST	Mon.-Sat.
Ironing Board Net	3915	0900 PST	Wed.	Mo. Emerg. Phone Net (MEN)	3900	1800 CST	Mon., Wed., Fri.
Jersey-Penn Net	29,400	1100 EST	Sun.	Missouri Traffic Net (MON)*	3580	0700 CST	Mon.-Fri.
Kankakee Area AREC Net (Ill.)	3920	1200 EST	Mon.-Sat.			1900 CST	
Kankakee Novice Net (Ill.)	3735	2130 CST	Daily	Mobile Amateur Radio Corps (Minn.)	29,590	1930 CST	Mon.-Sat.
Kans. Novice Net (K&N)*	3735	1400 CST	Sun.	Muskingum Emerg. Net (Ohio)	29,616	2200 EST	Fri.
Kentucky Korn Kraackers	3932	0700 CST	Daily	New England Weather Net	3915	0630 EST	Mon.-Fri.
	3945			N. H. Slow Net (NHSN)	3685	1830 EST	Mon.-Fri.
Lexington C.D. Net (Mass.)	29,460	2030 EST	Sun.	N. Y. State Civil Defense Command Net	3993	0900 EST	Sun.
	53,490						
Little Egyptian Teen Azers Net (Ill.)	147,100	7350	1615 CST	N. Y. State Civil Defense Net (CW)	3509.5	0900 EST	Sun.
Lynn Civil Defense Net (Mass.)	28,610	1845 EST	Tue.	N. Y. State Phone Emerg. & Traffic Net	3925	1800 EST	Daily
McGoon Twin Sixteen Net	3885	1600 PST	Daily	Newton CD Net (Mass.)	53,640	0745 EST	Mon.-Fri.
Medina Co. Emerg. Net (Ohio)	1805	1300 EST	Sun.		53,745	2100 EST	Sun.
Memphis Six Meter Net	50,500	2900 CST	Mon.	Ninth Regional Net (NRN)	3640	1630 CST	Mon.-Sat.
Memphis Ten Meter Mobile Emerg. Net	29,627	1900 CST	Mon., Fri.	NLI Section Net* (N. Y.)	3630	1930 EST	Mon.-Fri.
Memphis Two Meter FM Net	115,500	1930 CST	Mon.			1915 PST	Sat.
Merrimack Co. Emerg. Net (MCEN) (N. H.)	28,600	1830 EST	Tue.	The Nine, Jacks, and the Queen Net (S. Dak.)	3870	1210 CST	Mon.-Sat.

North Baltimore Net (NBN)	29,510	1930 EST	Tue.	Texas Novice Traffic Net (TNT)	7160	0900 CST	Sun.
	147,180	2000 EST	3rd Fri.	Topeka Kansas Ten Meter Phone Net	29,600	0930 CST	Sun.
North Carolina CW Net	3554	1900 EST	Mon.-Sat.				
North Dakota CW Net	3670	1830 CST	Mon., Wed., Fri.	Tri-County Net (Calif.)	3820	1200 PST	Mon.-Fri.
				Tropical Phone Tfc Net*	3945	1730 EST	Daily
N. Dak. 75 Meter Phone Net	3845	1800 CST	Mon.-Sat.	(TPTN)			
North East Texas Emerg. Net (NETEN)	3970	0800 CST	Sun.	29,520 Net (Ill.)	29,520	2000 CST	Fri.
				Twin City Ten Meter Net (Minn.)	29,400	1900 CST	Mon.-Sat.
Northampton Co. CD Net (Pa.)	29,580	1000 EST	Sun.				
	29,640			Vermont Phone Net	3860	1000 EST	Fri.
Northern Va. Emerg. Net. (NVEEN)	29,200	1230 EST	Sun.	Wabash-Edwards Net (Ill.)	3804	0830 CST	Sun.
				Weather Amateur Radio Network (Fla.)*	3675	1830 EST	Mon., Wed., Fri.
Novice Hurricane Net (NHN)* (Fla.)	3725	0800 EST	Sun.	Wellesley Civil Defense Net (Mass.)	147,250	0900 EST	Sun.
	7188	1000 EST	Sun.				
Novice Rebel Net*	7170	0800 EST	Sat.	Westside Amateur Radio Club Emerg. Net (La.)	28,900	2000 CST	Wed.
Nutley Amateur Radio Net (N. J.)	29,400	1230 EST	Sun.				
Nylon Net	3820	0900 PST	Mon.				
Oak Ridge Emerg. Net (Tenn.)	50,700	1900 EST	Mon., Thu.				
Ohio Phone Net	3860	1700 EST	Mon.-Fri.				
Okla. Phone Emerg. Net (OPEN)	3860	0800 CST	Sun.				
Old Dominion Net (ODN)	3845	1300 EST	Mon.-Sat.				
Ontsego Co. (N.Y.) Net (OTSCO)	29,600	0900 EST	Daily				
Pacific Area Net (PAN)	3675	2030 PST	Daily				
Pacific Teen Ager's Net (PTAN)	3815	1600 PST	Mon.-Fri.				
Padre Net (Minn.)	3900	1230 CST	Sat., Sun.				
Pea-Nut Whistle Net (Cal.)	3800	1145 PST	Mon.-Sat.				
Penna. Fone Net (PFN)	3850	1800 EST	Mon.-Fri.				
Pensacola Emerg. Net (Fla.)	29,560	1900 CST	Mon.				
Polecat Net (Pa.)	3665	1130 EST	Sun.				
Polecat Net	3850	1215 CST	Daily				
Post Road Emerg. Net (Mass.)	28,500	1900 EST	Mon.				
QRMary Round Table	28,900	2100 EST	1st Tue.				
Radio Club of Brooklyn Net	14,260	2230 EST	Mon.				
Randolph Civil Defense Net (Mass.)	28,560	1900 EST	Mon.				
Red Jacket Mobile Net (N.Y.)	28,730	1000 EST	Sun.				
Rhode Island Emerg. Net	1890	1100 EST	Sun.				
River Forecast Net (RFN)	3656	0800 EST	Sun.				
San Bernardino Area Net (Calif.)	29,200	1900 PST	Mon.				
San Diego Section AREC Net (Phone)	3825	0900 PST	Sun.				
	29,500	1900 PST	Tue.				
	145,500	1900 PST	Tue.				
Sea Gull Net (Me.)	3940	1700 EST	Mon.-Sat.				
Second Regional Net (2RN)*	3690	1945 EST	Mon.-Sat.				
Sector 3B Net (Mass.)	28,640	1930 EST	Mon.				
Seventh Regional Net (RN7)	3575	1945 PST	Mon.-Sat.				
		2130 PST					
Skrew Bawl Net (Minn.)	3980	0700 CST	Mon.-Sat.				
S. Dak. 160 Meter Phone Net	1915	2000 CST	Daily				
S. Dak. 75 Meter Emerg. Phone Net	3870	1830 CST	Mon.-Sat.				
		0930 CST	Sun., Hol.				
South Dakota Weather Net	3870	0745 MST	Mon.-Sat.				
St. Paul Civil Defense Net (Minn.)	29,520	1930 CST	Fri.-Wed.				
	50,700						
St. Paul Mobile Radio Club Net (Minn.)	29,520	1930 CST	Mon.-Sat.				
Teen-Age Forest Net (TAFN)	3900	1000 EST	Sat., Sun.				
Tenn. 160 Meter Emerg. Net	1817	2000 CST	Sun.				

TRAFFIC TOPICS

Every once in a while we get letters suggesting that a certain frequency or frequencies be set up for use in traffic and emergencies — such frequencies to be guarded so that calls for help, or calls with traffic, will be sure to be heard. Some of these suggestions are made by persons unaware that we already have such frequencies; others by persons who know it but don't agree that we're doing it right.

Before taking up the latest suggestion, let's review the current status. We now have National Calling and Emergency Frequencies on most amateur bands. They are printed in a box in most issues of *QST*. Amateurs, both traffic and emergency, have been urged to monitor these frequencies at all times, to be on the alert for calls; nets have been asked not to use them. The National Calling and Emergency Frequencies are for calling only, and after contact has been made one is supposed to QSY.

We have heard of very few successes using the above system, so let's lend an ear to W4IA's suggestion, and I quote in part: "... designate one frequency in each of several bands as sort of General Traffic-Clearing Frequencies. These would be spots where the lad with the occasional message could clear his hook with assurance that it would get into the established system. The factor that would make it work would be assurance that some of the NTS gang were guarding the frequency(s) at all times... Possibly you could appoint 'monitors'... who would agree to keep an eye on the Clearing Freq(s) — such guys could call CQ TFC and/or listen for TFC calls. If the idea took hold, the average ham might be more enthusiastic about originating messages."

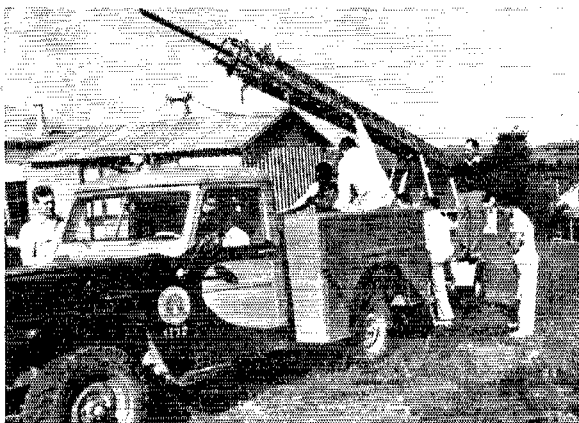
Now, the one feature about Ev's suggestion that we don't already have is the use of appointed or designated monitoring stations. The important questions then are (1) are such stations available, (2) are they reliable, and (3) will they be used? On the answers to these three questions hinges the success or failure of the proposal.

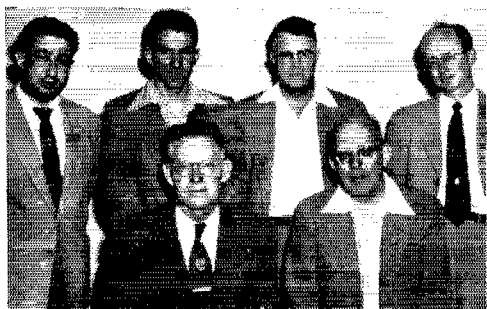
Want to try it? Let's start out the program on 3550 kc. only. We need volunteers to monitor this frequency over all possible hours, who will agree to take all casual traffic and put it on NTS or other reliable traffic system. Such monitoring will be especially valuable on Sunday, when

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On Sunday, October 23rd, amateurs of Rockbridge County, Va., conducted a test of c.d. equipment. Under the direction of EC W4YEJ, operation started at 1330 and was witnessed by Lexington and Buena Vista city as well as County officials. Part of the operation, shown at right, was erection of an antenna tower at the chosen control point. Shown in the picture, from left to right, are W4YEJ, W4AAI, W4ALY, W4ALX, K4ASO, W4FKS, KN4CFZ and W4FJB.

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A lot of traffic "brass" is represented in this photo, submitted by W6IIC. First row, l. to r.: W6WGO, SCM of Santa Clara Valley Section; W6IIC, Director ARRL Pacific Division. Second row, l. to r.: W6ZRJ, Manager ARRL Sixth Regional Net; W6UTV, Wednesday night NCS on Pacific Area Net; W6BPT, Asst. Division Director and member of NTS Transcontinental Corps; W6YHM, Asst. Division Director and NCS on Pacific Area Net Thursday nights.

NTS does not operate officially and many other nets similarly do not function. A list of volunteers (if we get any), with their hours of monitoring, in an early *QST*.

Someone asks how you can indicate on a message that you would like the delivering operator to report delivery, and has ARRL ever recommended any kind of procedure signal to use for this? Back in the days when we had "extras" on the check (word count) of a message, it used to be the custom to include handling instructions, if any, in the preamble following the check and before the place of origin, such instructions to be included in the "extra" check of the message. Now that we've dropped "extra" check and use only the number of words in the text, we see no reason why it is not still good procedure to indicate priorities (or precedences) and handling instructions at the same place in the preamble — after the check but before the place of origin. Such word or words following the check *would not* be included in the check count, of course. An example of a message originating from WINJNM and having a text of ten words: NR 1 WINJNM CK 10 REPORT DELIVERY NEWINGTON CONN 1900 JAN 16, etc.

Now let's not run it into the ground, fellows. Use this device only when there is some good reason (other than curiosity, that is) for its use.

W9TT has relinquished the managership of UTL. The new manager for central UTL is W4UHA. During December, UTL averaged almost 200 messages per night, the record being 519 on Dec. 16th. Membership consists of old timers, ex-trunk line operators and a few newcomers.

North Texas-Oklahoma Net reports 30 sessions, 970 check-ins, 475 messages in December, W5TFP manager. Transcontinental Phone Net reports as follows: First Call Area, 902 message counts, 18 stations; Second Call Area, 1386 message counts, 15 stations; Ninth and Tenth Call Area, 761 message counts.

National Traffic System. We want to re-emphasize the necessity of meeting your net obligations *on time*. NTS is a system, not a hodge-podge, and it operates in accordance with a pretty strict time schedule. Most NTS nets have a policy of excusing (QNX) all stations who are clear (i.e., no traffic for or from them) after the net has been in session 15 minutes. This is a *good* policy; it frees stations for whom there is no business after a reasonable time, and makes them feel like reporting in more often, knowing they will not be forced to sit on their hands for an hour without doing anything. And if they don't want to QNO, they don't have to.

However, we are doing more than urging you to get into your net within the 15-minute limit. Get in there on the dot! NTS operates on a time schedule, and this is very necessary for getting as much traffic cleared as you can within the time allotted for that net. If you arrive late,

even five minutes late, you might very well have held up operations for that length of time. Think it over, gang. December reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN	27	636	0.73	23.5	95.2
2RN	27	569	2.63	21.1	100
3RN	44	363	0.88	8.3	87.9
4RN5	48	1211	1.53	25.2	72.9
6RN6	54*	565	0.63	10.4	54.1
7RN7	46	253	—	5.8	26.8
8RN	46	261	—	5.3	81.2
9RN	30	1377	1.08	45.9	100
TRN	39	125	0.37	3.2	74.4
EAN	23	1447	1.98	65.6	98.6
CAN	24	1480	1.53	61.7	100
PAN	28	1677	0.73	59.9	—
Sections**	505	5737	—	11.3	—
TCC Eastern		559			
TCC Central		1955			
TCC Pacific		877			

Summary	941	19,092	3RN	16.7	—
Record	945	19,092	2.63	28.6	100%
Late report:					
3RN (Nov.)	40	95	—	2.4	75.8

* Reported out of 62 sessions scheduled.
 ** Section nets reporting: 1FN (Ind.); MON (Mo.); QKS, QKS SS & QKN (Kans.); GGN (Ga.); KYN (Ky.); Iowa Phone; Tenn. Sectional & Tenn 160; ABNT, ABNB & AENP (Ala.); TLCN (Iowa); CN (Conn.); NYX (N. Tex.); MBN (Minn.); WVN (W. Va.).

Even without reports from 4RN and TEN, we managed almost to beat our previous record of number of sessions, and exceeded considerably our previous high December traffic total (16,709 last year). Despite these steady increases, NTS is still not operating at full load. A monthly total of 25 grand is not an impossibility, within our structure, with all nets operating at top efficiency — and that includes sticking to time limits and conducting the standard number of sessions.

Rhode Island and Western Mass. get stars for perfect attendance on 1RN this month. W2ZRC reports 2RN's first "perfect" month. W3WZL has received a 3RN certificate, and it wasn't easily earned; 3RN is making progress with "rookies." W4OGG is relinquishing the reins of RN5, after making it one of the best regional nets in the system. RN7 needs more representation from sections; look at their low representation figure in the tabulation above! Another 100% month for 9RN, but this time on a daily operation basis; 9RN certificates have been mailed to W9s MAK ZYK EHZ and KJJ. Maritimes representation on TRN is improving steadily. EAN made its highest "rate" on Dec. 19th and Dec. 23rd, handling 119 messages in 60 minutes each night — but 2RN beat that by handling 79 messages in 30 minutes on Dec. 2. Perfect attendance on CAN is standard procedure.

On Eastern Area TCC, seven stations reported keeping 28 TCC schedules. W0BDR and W0SCA are still shouldering the greatest load on Central Area TCC, with W0RDN and W0DO doing a small share. W0KQD submitted an excellent detailed report on Pacific Area TCC; 87 reports of out-of-net schedules were received from 11 different TCC stations. Generally speaking, the TCC is doing an excellent job of handling inter-area NTS traffic, and very little if any of it is going begging without an outlet.

Incidentally, our apologies to K0ORT whom we listed as W6ORT in January *QST*.

ORGANIZING A NOVICE C.W. TRAFFIC NET

By Howard S. Pyle, W7OE

Organization of a c.w. traffic net limited to Novice Class licensees presents a few special problems not encountered by the organized traffic nets of the ARRL National Traffic System. For example, due to the narrow portion of the 80-meter Novice band, and the myriad of relatively inexperienced operators therein, a considerable interference problem is encountered.

Another problem is that of frequency. Careful choice of a net frequency is necessary and once this frequency is chosen, each net member must invest in a crystal. Accordingly, the net frequency cannot frequently be revised to meet changing conditions.

It appears most practical, therefore, for a Novice net to commence operation as a *daytime* net. This solves to a large extent the problem of interference from the relatively distant stations outside of the net area whose signals are ordinarily fewer and weaker during the daytime hours.

However, this method introduces an additional complication. While it is possible for a number of the younger net members to maintain a daytime schedule, many of the older Novices are employed or otherwise engaged in an activity that would prevent their daytime attendance.

This all leads to a conclusion that for the purpose of learning net operation and traffic handling, a *daily* schedule as practiced by the older networks is hardly essential. To carry the idea of a *daytime* schedule further, if we handle in a Novice net only messages among ourselves or perhaps our immediate family who understand what we are trying to do and learn, a *daily* schedule becomes unnecessary.

The average Section Net of the ARRL NTS holds evening sessions five nights a week, with sessions about a half hour long. A total then of two and a half hours weekly operation keeps these nets active and highly efficient. Approximating this amount of time, a Novice net could meet for an hour each Saturday and Sunday at a time convenient to the majority of net participants. Two full hours of instructive practice in net procedure and message handling would thus be worked in.

The one problem left is that of frequency. Relatively few stations should be operating between 8 and 9 or 9 and 10 on Saturday and Sunday mornings, and even fewer on the particular frequency chosen by the net. Those who are in operation and unfortunately have a crystal on or close to the net frequency will necessarily have to share channels with the net's operation. More established networks have found that there is a psychological benefit to be gained in continued regular operation by a net on a particular frequency. This rapidly discourages other general operation which may interfere with the net, and the "lone wolf" station soon learns to avoid the frequency. He can even be offered a swap in crystals by some net member, if he is willing to do so. This problem, while sometimes a bit difficult, usually straightens itself out with a little diplomacy and tact after the net commences organized operation. Usually the other station winds up by joining the net!

Organization Procedures

1) Choose a net manager. This individual should be one who is willing to assume responsibility for the administrative matters of the net and who will conscientiously take care of the few monthly reports all *good* nets make; a card to ARRL headquarters and a similar monthly card to the ARRL Section Communications Manager. A net manager can be chosen by popular vote or by someone volunteering.

2) The net manager should appoint Net Control Stations (NCS) and Alternate Net Control Stations. The NCS is the absolute authority during net sessions and directs all transmissions. An alternate helps out when required in the presence of the NCS and in the absence of the NCS takes over direction of the net.

3) Write the American Radio Relay League and request a copy of their Net Directory and all the information on net operation they have available. Tell them what you're doing and you'll be surprised at the wealth of data that will be sent you, without charge. Have your NCS and alternates study this material and then commence operation with your first session. You'll have fun, you'll improve your operating technique and your code abilities more quickly through a directed net operation than any other way I know of.

DXCC RULES

For the benefit of those who aspire to ARRL's DXCC Award, and for others who already have the certificate and may seek further endorsements, we present here the complete rules. Attention is particularly called to Rules 4, 5, 11 and 13.

1) The Century Club Award Certificate for confirmed contacts with 100 or more countries is available to all amateurs everywhere in the world.

2) Confirmations must be submitted direct to ARRL headquarters for all countries claimed. Claims for a total of 100 countries must be included with first application. Confirmation from foreign contest logs may be requested in the case of the ARRL International DX Competitions only, subject to the following conditions:

a) Sufficient confirmations of other types must be submitted so that these, plus the DX Contest confirmations, will total 100. In every case, Contest confirmations must not be requested for any countries from which the applicant has regular confirmations. That is, Contest confirmations will be granted only in the case of countries from which applicants have no regular confirmations.

b) Look up the Contest results as published in *QST* to see if your man is listed in the foreign scores. If he isn't, he did not send in a log and no confirmation is possible.

c) Give year of Contest, date and time of QSO.

d) In future DX Contests, do not request confirmations until after the final results have been published, usually in one of the early fall issues. Requests before this time must be ignored.

3) The ARRL Countries List printed periodically in *QST* will be used in determining what constitutes a "country."

4) Confirmations must be accompanied by a list of claimed countries and stations to aid in checking and for future reference.

5) Confirmations from additional countries may be submitted for credit each time ten additional confirmations are available. Endorsements for affixing to certificates and showing the new confirmed total (110, 120, 130, etc.) will be awarded as additional credits are granted. ARRL DX Competition logs from foreign stations may be utilized for these endorsements, subject to conditions stated under (2).

6) All contacts must be made with amateur stations working in the authorized amateur bands or with other stations licensed to work amateurs.

(Continued on next page)

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....262	W8HGW...251	W6MEK...248
W4VFR...257	W3GHD...251	W7AMX...248
W6AM...257	W3JTC...251	W5MIS...248
W6ENV...254	W0YXO...250	W8BFA...248
PY2CK...253	W8NBN...250	W6DZZ...248
W3BES...252	G2PL...250	W3KPT...248
W6MX...252	W2AGW...250	W2BXA...247
W6SYG...252	W68N...249	W5ASG...247

Radiotelephone

PY2CK...246	W1MCW...220	W8HGW...214
W1FH...244	W1JCX...219	W5BGP...214
VQ4ERR...234	W1NWO...217	W9NDA...213
ZS8BW...228	W3JFN...217	W6AM...213
W9RBI...220	W1EAC...215	G3DHD...212

From December 15, 1955 to January 15, 1956, DXCC certificates and endorsements based on post-war contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

W8KML...181	F80A...105	W4YZC...101
PY4ZS...122	OE1WH...105	W8FRW...101
F80Q...116	VT2MD...104	F9BC...101
W3MDO...110	W8CFL...103	G3GJB...101
OE5NJ...107	EB9DB...103	OY2YV...101
W3AQ...105	DL3BY...102	W6CUF...100
	W1TSL...101	

Radiotelephone

W3EQK...113	W9JLH...101	W2OXR...100
PY4ZS...107	DL3IR...101	FJ2AF...100

ENDORSEMENTS

KV4AA...242	W8DUS...151	W3FEB...130
W2HZY...212	V86AE...151	W8DGY...130
W3CGS...201	W5HDS...150	DL3FM...130
W1LAS...193	W9MQK...150	W2VPE...128
W5LGS...180	W9TCY...146	G3GIC...122
W8TMA...177	W5ABY...144	W3FGB...121
W4LYV...174	W4THZ...142	W3VOS...120
W0QVZ...170	W1JDE...140	W7PHO...120
W7ADS...166	W5UUK...140	W8ILG...120
W2BYP...161	G8PL...140	W6IPH...118
W8YHO...160	VU2JP...134	W2OGE...117
Z86BU...156	J86AD...132	W6ITL...111
W6YX...152	W2FJH...130	W7VWQ...111
W8CG...151	W3AS...130	F8PM...110

Radiotelephone

W6DI...211	W8QJR...170	W3DPS...130
W8GZ...210	PY1NC...162	W8GXP...130
PY2AHS...183	W3ECL...153	F8MY...120
W8KML...180	W7ADS...142	W6ITH...111
W9JJF...175	W4QWV...131	ON4DH...110
	W3CGS...130	

W/VE/VO Call Area and Continental Leaders

W4BPD...241	VE4XO...118	VE8AA...160
W9NDA...246	VE5QZ...140	VO6EP...190
VE1HG...150	VE8VK...115	ZS6RP...236
VE2WW...189	VE7HC...209	4X4RE...218
VE3QD...210		ZL2GX...246

Radiotelephone

W2APU...202	W0AIW...191	VE7ZM...140
W2BNA...202	VE1CR...130	ZL1HY...200
W4HA...191	VE2WV...114	OY5AB...170
W7HTA...185	VE3EY...163	G3DHD...212
	VE5YE...140	

7) In cases of countries where amateurs are licensed in the normal manner, credit may be claimed only for stations using regular government-assigned call letters. No credit may be claimed for contacts with stations in any countries in which amateurs have been temporarily closed down by special government edict where amateur licenses were formerly issued in the normal manner.

8) All stations contacted must be "land stations" . . . contacts with ships, anchored or otherwise, and aircraft, cannot be counted.

9) All stations must be contacted from the same call area, where such areas exist, or from the same country in cases where there are no call areas. One exception is allowed to this rule: where a station is moved from one call area to another, or from one country to another, all contacts must be made from within a radius of 150 miles of the initial location.

10) Contacts may be made over any period of years from November 15, 1945, provided only that all contacts be made under the provisions of Rule 9, and by the same station licensee; contacts may have been made under different call letters in the same area (or country), if the licensee for all was the same.

11) All confirmations must be submitted exactly as received from the stations worked. Any altered or forged confirmations submitted for CC credit will result in disqualification of the applicant. The eligibility of any DXCC applicant who was ever barred from DXCC to reapply, and the conditions for such application, shall be determined by the Awards Committee. Any holder of the Century Club Award submitting forged or altered confirmations must forfeit his right to be considered for further endorsements.

12) Operating Ethics: Fair play and good sportsmanship in operating are required of all amateurs working toward the DX Century Club Award. In the event of specific objections relative to continued poor operating ethics an individual may be disqualified from the DXCC by action of the ARRL Awards Committee.

13) Sufficient postage for the return of confirmations must be forwarded with the application. In order to insure the safe return of large batches of confirmations, it is suggested that enough postage be sent to make possible their return by first-class mail, registered.

14) Decisions of the ARRL Awards Committee regarding interpretation of the rules as here printed or later amended shall be final.

15) Address all applications and confirmations to the Communications Department, ARRL 38 La Salle Road, West Hartford 7, Conn.

DXCC NOTES

Announcement is hereby made of the following addition to the ARRL Countries List. The addition will be the island of Tromelin. This island is located approximately 260 miles off NE Madagascar in 54 degrees longitude.

DXCC credit will be given starting May 1, 1956, for creditable confirmations dated on or after November 15, 1945. This will permit foreign amateurs to start receiving credits at the same time as those in U. S. A. Confirmations received prior to May 1, 1956 for this country will be returned without credit.

In future ARRL DX Competitions, those making contact with amateur stations located on the island of Tromelin may claim credit for a separate country in accordance with DXCC rules.

BRIEFS

January V.H.F. Sweepstakes logs are pouring in as we go to press. Here are some high claimed scores on hand at present: W1PX/1 4119, W1RFU 6253, W1VXW/1 5214, W2CXY 4740, W2PRF 5830, W2TBD 3600, K2CMB/2 3762, W3DGI 3357, W3IBH 4500, W3SAO 2240, W3TDF 5239, W4JGJ 900, W4UMF 920, W5CVW 200, W5RCI 272, W6AJF 1100, W6EXX 1300, W6SDW/6, 2436, K6DTR 1120, K6EYN/6 3230, W7LHL 372, W8DX 1442, W8IJG 1465, W8MVE 1218, W8NSH 1260, W8SFG 1197, W9JAQ/9 915, W9QKM 1024, W9WOK 1848, W9GUD 444, W0ZJB/0 480, VE3AQC 770, VE3DIR 1152. These scores are claimed and hence subject to change. Final and complete V.H.F. Sweepstakes results, including club totals, are scheduled for next month's QST.

An unusual service was rendered recently by members of the Frye Amateur Radio Club of Chattanooga, Tenn. Some 35 miles from the city, on Chickamauga Lake, the Tennessee Camp for Diabetic Children was being prepared for its first session. Eighty-eight children had been signed up for the camp, but the telephone company could not provide lines for vital communication between camp and the doctor's office. Commercial radiotelephone did not pan out either, so someone suggested calling on the local hams. The Frye Club responded with typical amateur enthusiasm.

The services requested were a bit stringent since the presence of an operator at the camp at all times was required, as was almost constant monitoring of the frequency in event of an emergency. Jack Reeves, W4IBB, agreed to go to the camp site and remain for two weeks as camp operator. The brunt of the Chattanooga duty was borne by Verne Effer, W4IB, with heavy support from Ward Buhman, W4QT, and numerous others. All equipment was loaned by FARC members. Amateurs throughout the Tennessee-North Carolina-Georgia area learned of the project and offered their cooperation in keeping the channel clear. Jack, W4IBB, met all schedules on 75-meter phone and handled camp traffic. Camp officials expressed gratitude to the Frye Amateur Radio Club for a worth-while service which only amateur radio could provide.

From the Oklahoma section report comes this brief question-and-answer quiz:

Q. Why do amateurs use we instead of I?

A. Subconscious admission they are heupeecked or someone else built their rig.

Q. Why do amateurs use Q signals on phone when they never use c.w.?

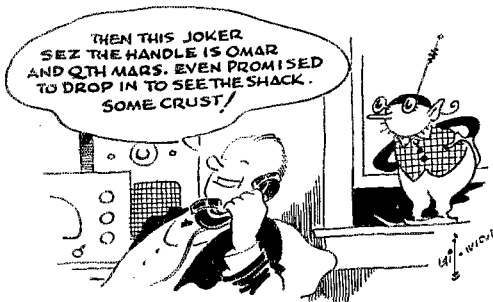
A. To make others think they are hot c.w. ops.

Q. Why do amateurs tune up on an occupied frequency?

A. An inferiority complex.

Q. Why do they interfere intentionally with an organized net?

A. To show their rugged individualism anonymously.



CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on March 15th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,010, 52,000 and 145,600 kc. The next qualifying run from W60WP only will be transmitted on March 3rd at 2100 PST on 3590 and 7128 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 nightly at 2130 EST. Approximately 10 minutes' practice is given at each speed. 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 sometimes is reversed. To get sending practice, hook up your own key and buzzer and attempt to send in unison with W1AW.

Date	Subject of Practice Text from January QST
Mar. 1st:	A "Floating Grid" Amplifier, p. 11
Mar. 5th:	A TVI Special for 50 Mc., p. 14
Mar. 8th:	Long Long Yagis, p. 19
Mar. 13th:	W6TZZ Transmitter Design. . . , p. 25
Mar. 16th:	A Three-Band S.S.B. Exciter. . . , p. 26
Mar. 19th:	Control Compliance, p. 31
Mar. 27th:	The Helping Hand, p. 49

• 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, Clarence Snyder, W3PYK — SEC: NNT, RM: AXA, PAM: TEJ, EPA nets: 3850 and 3610 kc. The attention of all ARRL appointees is called to the fact that if no indication of activity is received from you in the two-month period preceding the expiration of your appointment the appointment will be cancelled. In many cases reports have not been filed for the period of one year. Let's try to get those reports in by the first of the month. If Form 1 cards are necessary, requisition them from ARRL or your SCM. BNR, ELL, and GUL made BPL for the month. ZRQ is sending code practice on 3700 kc. Mon., Wed., and Fri. at 1800. New officers of the Frankford Radio Club are LEZ, pres.; ALB, vice-pres.; CGS, secy.; and EQA, treas. The Benjamin Franklin Jr. High of Leavittown has a new radio club called the Kite and Key Amateur RA. Officers are WN3CRU, pres.; WN3COT, vice-pres.; WN3CCG, act. mgr.; WN3KTH, pub. relations and Frank Kaplan, secy. PNL and his XYL will accompany their daughter Dianne on an all-expense-free trip to Disneyland as the jr. operator won a TV Guide Award. RFI, with the Army in New Mexico, operated mobile in Mexico with the call XE1PAY. ZUB, a new General Class ticket holder, keeps skeds with his brother, PDJ, via the Bucknell Club's station. RPB, OQG has a new QTH in Line Lexington. GES now is on s.s.b. ZPJ has a new DX-100. WGO reports VNH, VNK, and GES were operating portable during the deer season. NNV is working on equipment for FSK. BIP is doing lots of travelling throughout the country. We hope BUR and WGO are now on the mend. EU has a new VFO. New officers of the Tamawac ARC are KJJ, pres.; ZXF, treas.; ZRQ, secy.; WN3COW, act. mgr. VJZ reports a meeting of the Electric City ARC of Scranton and Wyoming Valley ARC at Wilkes Barre to discuss v.h.f. techniques with an eye to the eventual link-up of Luzerne and Lackawanna Counties in a 6-meter net. Our SEC, NNT, again is asking for a report from all Emergency Coordinators in the counties of Eastern Pennsylvania. ZXF has a new Globe Scout. RL has a new B&W 5100B received from Santa Claus. EAN is busy with a new antenna on the 20-meter band. Traffic: W3CUL 2440, OK 357, BFF 267, YDX 263, TEJ 260, ELI 244, BNR 179, (DHJ 104, YVX 104, PYF 90, OGD 60, ZRQ 42, ZLB 21, PDJ 22, PVY 22, GIY 21, ZLX 19, NOK 15, ADE 10, AMC 9, CNO 6, BUR 5, FFC 5, BIP 2, WN3CCQ 2, W3DUI 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, John W. Gore, W3PRL — EEB reports having worked 135 countries to date, 129 confirmed. WV reports the MDD is fairly active with a daily average attendance of 7 and handled 214 messages in December. PKC has installed a W3DZZ all-band antenna and reports FB signals above those with his previous antennas, from his distant contacts. 41CC gave an illustrated talk on FCC Monitoring to the Washington Radio Club on Dec. 2nd. OSR and BOD won the door prizes at this meeting. UF is out of the hospital and back on the air again. ZFK, Major Hale, USAF, gave a talk on "Experience in Microwave Sighting Problems in the Far East" to the BARC on Dec. 5th. The Antietam Radio Assn. has started incorporation proceedings. Interest in club incorporation has been stirred within several clubs and your SCM has furnished information. If any other clubs are interested, information will be furnished. The Cracker Barrel Net, on 28.6 at 9 p.m. each evening, has become a regular get-together of the 10-meter gang in Baltimore, Lisbon, Smithburg, and Washington. The group has been kept properly informed each evening on the progress of the mechanical cow at Lisbon, latest weather reports from the mountain top at Smithburg, as well as the latest happenings by all other members. The Country Store Net, on 28.7 Mc. at 8:30 p.m. each evening also has come into being and is well patronized. PRL is assembling his all-phenolic quad for 10 meters, which was

fabricated in 1949 and never installed, but the recent band opening has indicated that it is not only desirable, but a necessity to compete with DX hunters. Your SCM is pleased with the recent upswing of applications for appointments and further welcomes any requests for anyone qualifying for any of the appointments available. 12ZZ gave an illustrated talk on "Compatibility of Color TV" at the BARCS on Jan. 2nd. Traffic: (Dec.) W3YYC 2506, WV 1049, WZL 618, UE 326, UCR 205, PKC 128, PRL 114, RV 44, TN 28, FQ 9, OHI 7, BKE 4, NMX 3. (Nov.) W3COK 81.

SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2ZBG — SEC: ZVW, PAM: ZL K2PML has a new beam and is DX-hunting. EXT is a newly-elected SJRA director. K2JQJ is putting up a three-element beam. The JP Net is looking for a new spot for traffic-handling now that QRM has increased on 10 meters. The new SJRA officers are EWN, pres.; and K2JFC, vice-pres. RC continues to lead our traffic-handlers. K2BIQ is a regular on the Interstate, N. J. Phone, and NJN Nets. The following were appointed to the State Control Center Staff: ZL, chief of ed. station, supported by BZJ, SXK, ISZ, HAZ, and K2CLD. K2CPR continues to add new countries to his ever-growing list. Jack now has worked WAS on three bands. K2JGU, Glassboro, has been handling traffic and also working DX with his new rig. L.S. Pleasantville, is planning to take part in this year's F.M.T. tests with his BC-221. K2EFA reports building a new very stable VFO and a new 75-meter doublet. BAY now is operating 10-meter mobile. RUX, our new EC in Millville, is planning, with his Assistant ECs and the equipment the Tri-City Radio Club is building, to have good coverage with their mobile equipment in the Inland-Bridgeton-Millville Area. We are sorry to report the resignation of VX, our EC for Gloucester County. Charlie has done a fine job. ADA, DBP, KHV, UA, K2DAF, K2HOE, and K2BG spent an enjoyable evening as guests of the Tri-City Amateur Radio Club recently. Traffic: W2RC 250, K2BHQ 190, W2HDW 110, ZVW 65, ZI 42, K2CPR 11, W2HAZ 2.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — Asst. SCM: Joanne Walker, 2BTB. SEC: UTH/ERL, RMs: RUF and ZRC, PAMs: TEP and NAL. NYS C.W. meets on 3615 kc. at 6:30 p.m.; ESS on 3590 kc. at 6 p.m.; NYS Phone on 3925 kc. at 6 p.m.; TAR on 3720 kc. at 4 p.m.; NYS C.D. on 3509.5 and 3993 kc. at 9 a.m. Sun.; TCPN 2nd Call Area on 3970 kc. at 7 p.m.; SRPN on 3970 kc. at 10 a.m.; ISN on 3980 kc. at 3 p.m. The HUKS have a son. K2BUI's father gave him an HRO-60 for Christmas. GWJ now sports an HRO-8. 1ZNH/2, brother of K2BUI, now is 3DXR. K2BYR has an SX-20 via Santa. UTH was W.N.Y. top man in the V.H.F. SS. VEP now is 7YEQ. The Rochester DX Assn. conducted a meeting of the RARA with speakers on DX as follows: SAW on 40, QJM on 20, PUN on 15, and SNI on 10 meters. YIE has an FB signal on 144 Mc. ALL spoke at the RARA v.h.f. meeting on "Noise Generators, Construction and Operation." CPN now is 1RCQ, 3YA. Atlantic Division Director, announces he has appointed BTB as Asst. Director. 5TXZ was a visitor at the RAWNY meeting at which the Club was incorporated and OZR discussed his "Transistor Converter for Mobile Use." K2IYP has been appointed asst. mgr. of IPN. K2JVL and ZOL were busy over the holidays handling traffic from GIs to their families. The Northern Chautauque RC, K2PCQ, has code classes every Tue. evening. GBK is working the 2-meter rig by remote control. TRA, KLE, K2ALD, and JPL have DX-100s. KN2MNB purchased the 500-watt 2-meter rig of the late 3GV. RJJ is back on 2 meters after an absence of 4 years. K2IHZ has a Viking II. CDX is low power with an AT-1. K2IQC is moving to Syracuse. CDX's XYL presented him with twins, a boy and a girl. UVF is visiting K6APZ. K2KPZ has a new 184-D and a B&W 5100. K2CCL is moving to Ohio. K2KHN, the XYL of AVC, dropped the "N." RUF was on WGR-TV news, showing her operating rig, antenna layout, etc. K2CUC reports Novice graduates of Auburn classes are QIW, QJB, QJV, QLT and QPC. The recent ARAT meeting was devoted to Gadget Nite. New officers of the Auburn ARC are WQZ, pres.; K2DXP, vice-pres.; K2DAO, act. mgr.; K2KIR, secy.; and K2CXX, treas. Sorry to report the passing to Silent Keys of UOC and QM, ex-8QL. RQF is using low power until speech is repaired. K2LJT is a new OO. RUF and ZRC made BPL. NYS C.W. handled 5400 messages in 1955 and BXP and K2DSR ran neck and neck on QNIs. K2KTK dropped the "N." IYR is working on 10-, 15-, 20-, 40-, and 80-meter c.w. and phone. Ontario Co. has 3 new Gonsets for e.d. work. JXN and K2DYB were taken on a tour of WKTW-TV, Utica, by FPW. K2HVZ is handling the traffic program at CXM. Clinton Co. ARC is holding Novice code and theory classes.

K2KKE modified the AT-1 as per Oct. '55 QST. The Corning ARA, Inc. received publicity in the *Corning Leader*. EUQ and OSY are working 15 meters. QLI has a cubical quad on 20 and 10 meters. QQ has a Viking II. As far as we know RARS is the only club listed with the USN for Operation Deepfreeze. New officers of the ERCA are FIE, pres.; UXB, vice-pres.; YEU, secy.; OWT, treas. The Syracuse U. station call is ZTM. A realistic talk with slides and film on Pearl Harbor was given at a RAGS meeting by Rees White, First Class Petty Officer in charge of communications on the USS *Tangier*. Traffic: (Dec.) W2RUF 1013, ZRC 513, K2LSF 381, DYB 354, IYP 231, W2OEF 125, IYR 110, K2DJN 94, HBT 83, KIR 63, AMZ 56, DSR 42, W2GBX 40, COB 30, EMW 20, FPW 19, K2CUQ 15, W2RQF 15, IEP 14, FEB 13, K2GIG 5, W2RJJ 5, BKC 3. (Nov.) K2AMZ 27, W2FPW 13, IEP 11, K2DVC 1.

WESTERN PENNSYLVANIA—SCM, R. M. Heck, W3NCD — SEC: GEG, RMs: UHN, NRE, NUG, and GEG. PAMs: AER and LXE. The C.W. Traffic Net meets Mon. through Fri. at 7 p.m. on 3585 kc. The Radio Assn. of Erie is painting up the truck and getting ready to install the necessary gear to make it a mobile emergency system. Six-meter activity is increasing in Erie with regular 8-p.m. meetings featuring MED, KJM, POS, and DJA. A 10-meter state-wide emergency net has been activated and meets at 10:30 p.m. Sat. on 29,490 Mc. Anyone may join in; it is directed by SVE. The RAE/TVI committee, LKJ, WVG, and AQY, reports several cases have been investigated and cleared. LKJ is trustee for the new station of the Erie Chapter of the Red Cross, ENP. The ATA recently elected UGV, pres.; RSB, 1st vice-pres.; SIR, 2nd vice-pres.; OVM, 3rd vice-pres.; OAH, 4th vice-pres.; YDK, secy.; UL, treas.; NAW, TAS, VPK, and UUH, directors. The Club delegates to the WPARCC are UGV, OVM, and NAW. Horseshoe Radio Club news: New WNs are EMU, EMW, EGU, and EDQ. General Class licensees are BSK and DKH. EGU airs an NC-98 and a Command set. AFH has a nice shack and a new 140-X. YOZ and AEQ sked on 3502 kc. ZKM is WAS pending a couple of confirmations. ZUG has a new beam working into Europe. TJP soon will go to South America. The South Hills Brass Pounders and Modulators, whose officers are QNI, pres.; QWW, vice-pres.; WFR, treas.; and LDB, secy.; held a mobile hunt. BEX directed the affair. The transmitter was manned by LDB and VKS. QOQ and committee handled the annual SHBP&M blowout which was most successful. The Bucktail Amateur Radio Club announces the following appointments: Historian and *Hamster* editors: IIX and Bob Lambert. Membership: ZKY and VEF. Field Day: NGZ and VEF. Station: Joe DeMott. Program: TCP. Publications: IIX, chairman; ICP, program news; ZKY, meeting minutes; and John Rienzo, radio and press releases. Affiliation committee: PTU, VEM, RVS, and WH. Auditing committee: YUG. C.d. committee: RVS and PTU. 220-Mc. and above committee: LEL. Legislative committee: SUJ. The Breeze Shooters report via UJP. New hams are WNE ERJ and his XYL, ERK, BDW is on A.M. SIR and UJP have found 11 meters. RXT is renewing his ticket. JAV/3 helped to guide police to a minor mishap with mobile, aided by SJK, SIR, BHA, and UJP. JY works a ZL. EUL has both beams up and is enjoying the Q-multiplier. UJP is satisfied with resistance-variation n.f.m. IDO of the Washington County Amateur Radio Club, is checking for the purpose of incorporation of the club reports at the next meeting. Glad to hear that LOD is feeling well after his recent operation. TOC is trustee and treasurer of the newly-formed Etna Radio Club. The Mercer County Radio Assn. will start its wide classes in January. They will be divided into a first session for beginners and a second session to aid Novices toward their General Class ticket. The MCRA's annual banquet is planned for late March. Traffic: W3WIO 2010, GEG 519, YUL 230, KUN 194, NRE 144, ZEG 125, UHN 51, ZEW 49, YA 42, KNQ 12, NCD 10, TOC 3, VKD 3.

CENTRAL DIVISION

ILLINOIS—SCM, George T. Schreiber, W9YIX — SEC: HOA. RMs: BUK and MRQ. PAM: UQT. Cook County EC: HPG. Section nets: IEN phone, 39-40 kc.; ILN c.w., 3515 kc. at 6:30 p.m. CST. New officers of the Central Illinois Radio Club are QXX, pres.; JRX, vice-pres.; and SXL, secy.-treas. Director UQT was guest at the club's recent party. Officers of the Starved Rock Radio Club are ZEN and QLZ (vice-director) re-elected pres. and secy.-treas., respectively, and NIU, vice-pres. ERU has purchased a 35-acre antenna farm in the country; yep, it's on a hill. New Illinois calls heard are BQK and PNY. New equipment department: LMLJ with a B&W 5100; HGY a Globe King; CHM, ATU, JMY, and KLD NC-300s; VEY an HRO-60; OKI and WZV DX-100s. 510H/9 has his home-brewed 300-wattier completed. In addition KLD and GAS both air tested an Adventurer and Ranger, respectively. KN9ABO is the latest radio family; his jr. operators are Novices HFB and HEV. Congratulations to KTH on his new jr. operator. Another new father is HNL, with a YL. The Chicago Suburban Radio Assn. is very happy with its club score of 773,727 points in the Sweepstakes and the

scores of members WBL (c.w.) 107,478 and FVU (phone) 41,760. IDO tried a noble experiment by soldering one gallon oil cans together for a vertical 31 feet high. At last reports it didn't work very well, but IDO still is trying. BPL certificates went this month to DO, OR, MAK, VEY, and MHC. New LARK members are LKD and Novices KN9ALU and BUS. SXL is working on a bad case of bugs in his final but his emergency gear is in fine shape. FRP had a MARS traffic count of 140 in December. SML has moved to a new QTH and probably will be back on ILN by the time you read this. EHY, editor of *Short-Skip*, would like to exchange club papers with other club and net editors. BA is trying out his "pint-size" Windom of 68 feet. The St. Clair Amateur Radio Club, under the direction of RQR and TCX, put on a radio demonstration for the Lions Club, Chamber of Commerce, and other groups to stimulate interest in the hobby. QGO visited his son, 6IUT, recently. QAY sold his Viking and has gone out whole-hog for single sideband. Others in the section interested in this art are VQC and IBU. WEA and FXB, both recovered from sick spells, are back to work and FXB was heard on 10 meters again. Another old-time call heard was ZA, of 92N fame. BUK renewed his ORS certificate, now 33 years old. OVW is in Hines Hospital, Ward 50-A, and would like letters from his friends. Officials say that 2975 amateurs applied for license plates, but it is too late for you to do anything about it until next year. SKR's New Year resolutions include a new TVI-proof rig, he hopes. USU is on 220 Mc. with 10 watts and a 32-element beam. LL has a new antenna and gets out well. The new editor of the Tri-Town *Oscillator* is PCF, one of our hard-working OOs. Add to Silent Keys, KNA, reported by CTZ. JMIG got his 150-watt final on the air. VSX, the EC for Warren and Henderson Counties, and his AERC group is conducting a code and theory class for 4-H boys and girls. Traffic: (Dec.) W9DO 2160, OR 779, MAK 726, IDA 466, LRA 281, MRQ 268, FAW 209, MHC 175, VEY 134, CTZ 127, VET 113, LL 109, OKI 93, YIX 91, YYG 91, STZ 63, FCF 58, LXJ 51, EHY 41, C2B 29, LRV 28, FRP 22, YFO 20, CJS 17, BA 15, UVM 9, USI 6, VBV/9 6, KLD 4, GDI 2, K9AMD 1. (Nov.) W9SME 26.

INDIANA—SCM, Seth Lew Baker, W9NTA — Asst. SCM: George H. Graue, 9BKJ. SEC: QYQ. RMs: DGA, JBQ, WWT, and UQP. PAMs: CMT, EQO, and UXK. EQO reports 1P.N. evening traffic 343, morning 435, total 778. EHZ gives CAEN traffic as 470. UQP reports QIN as 422 and WWT reports RFN as 106. This is a record for this section. Those making BPL were DDK, DGA, EHZ, JOZ, JYO, NZZ, SVZ, TTT, UQP, UXK, and WLY. New appointments: ACW, HST, and ZHL as ECs; WAU and YB as QPSs; YB as QRS. New Novices from DUD's class at Martinsville. High are KN9BXE and KN9BFX. W9N9JIM is a Silent Key. Indiana amateurs holding A-1 Operator certificates are BEH, BHV, BKJ, DGA, DJH, EGG, EGV, ENS, EQO, FALJ, GRN, HQF, HUV, JBQ, JTX, JUI, KDY, NEH, NTA, NZZ, QLW, RCB, TTT, UKE, and WWT. ACN, LDB, and WIB have DX-100s. KDV is off on another trip around the world. AQR has a 1st-class radiotelephone ticket. The individual reports received for October traffic and published in Jan. QST were more than any other section, and total traffic was second only to Iowa. This is a wonderful record and I hope you will keep it up. KOY reports these Indiana stations reporting in to the Interstate S.S.B. Net: ASX, CLF, DQG, ELU, FJN, FJS, GDS, GZH, HBD, HUF, IHO, KQE, MKK, POS, and STH. KN9BLR has a 35-w.p.m. certificate. MPX and HYAM have a new harmonic, Sharlyn. New officers of the Indianapolis RC are AWN, pres.; SWD, vice-pres.; TKY, secy.; SUN, treas.; FZW, chief operator. The Hoosier Lakes elected CDW, pres.; BYT, vice-pres.; KN9APW, secy.; IMB, treas. LQJ dropped the "N." BAJ moved to Chesterton from Illinois. EHZ has an SX-100. QR has a 10-meter Hylite beam up. UTL is doing fine with a beam on 15 meters. OFD is building a dream receiver. We need ECs in many counties. Get in touch with the SEC, QYQ, at Orleans. This is very important as we are trying to build up an efficient AREC and RACES organization. DGA and UQP have qualified for the BPL medallion. Nominations for the Hoosier Courtesy Award must be signed by two amateurs and sent to CMT before the spring meeting of IREC. Traffic: (Dec.) W9NZZ 1377, EHZ 1015, JYO 686, JOZ 662, UQP 552, TT 549, UXK 523, EQO 374, SVZ 356, ZYK 354, SXL 277, DGA 201, DDK 154, WBA 134, WLY 120, KTX 109, DHJ 90, OFW 86, SWD 84, CMT 81, TCQ 77, QYQ 72, NTA 62, VNV 60, AZF 47, WUH 43, STC 41, EHE 38, ZSW 36, TG 35, ACW 33, BKJ 33, CC 33, DKR 33, CTF 31, HRY 30, APO 25, JBQ 24, AQR 20, LGD 16, QBD 15, AB 13, FHA 13, GDL 13, WAU 13, NSY 12, WHL 10, ZRP 9, KDV 8, YVS 8, ABW 7, QR 5, BDP 4, NH 3, DOK 2, QLX 2, UTL 2, PPS 1. (Nov.) W9OFW 26, ZRP 12.

WISCONSIN—SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAMs: AJU and ESJ. RMs: BVG and YZA. Nets: WIN, 3685 kc., 7 p.m. daily; BEN, 3950 kc. daily; WPN, 3950 kc., 1215 Mon.-Sat., 0930 Sun. Wisconsin mobile and c.d. frequency: 29,620 kc. OMT built a transistor radio with St. Louis as best DX! SQM is driving the 812-As with a new Viking Ranger which he received for

DELTA DIVISION

Christmas. More stations are needed to improve coverage of the c.w. net (WIN). Drop in on 3685 kc. for some real operating pleasure and experience. The G. Bay Mike and Key Club is now incorporated, with UCO, LEV, IKY, KIZ, and NUH as directors. With a Viking II on c.w. and a Globe King 500-A on a.m., GFL has 77 countries on 21 Mc. JEF has separate dipoles for all bands, 10 through 80 meters. GHT is now VFO. DIK's brother is KN9ABH (age 12). RQK was on white home for the holidays. GJK has a new DX-100. New officers of the Door County Radio Club are RTP, pres.; GJK, vice-pres.; and OVO, secy. YUB is using a cubical quad on 20 and a ground-plane vertical on 10 meters with FB results. JBF gave a talk and demonstration on etched wiring and printed circuits at the WVRA meeting. ZHE and FCF are active on 21 Mc. At its "Old Timers Nite" MRAC honored VD, who still is active today after 44 years of ham radio. He started with a "spark" in 1911 and was SCM of Wisconsin for 8 years up to 1930. AJU reports WPN had 602 stations active in 24 November sessions. A new OBS is TCJ, who is transmitting bulletins on RTTY, 3624 kc., Wed. at 2030 and 2230, and Sun. at 1500. OVO reports 552 AREC members and 198 mobile units registered as of the end of 1955. The M. & M. Club held its Charter Party Jan. 21st. Mark your calendar now and plan to attend the WVRA Hamfest at Wausau, Sat., May 12th. Traffic: W9SAA 399, OMT 75, YZA 61, JCL 59, RQM 27, AJU 21, NZR 21, AKY 20, SQM 17, BVG 15, IKY 14, GFL 12, JEF 8, GHT 5, DIK 4, RQK 4, OVO 3.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Elmer J. Gabel, W0KTZ — The 75-meter Phone Net, on 3845 kc. at 1800 Mon. through Sat., had 23 sessions, QTC 71, average QNI 28. The C.W. Net, on 3670 kc. at 1830 Mon., Wed., and Fri., had 13 sessions, QTC 49, average QNI 8. The c.w. boys are doing a fine job but need some more operators in the net. The 1956 Hamboree now is set for the 2nd Sun. in June at Fargo. New calls at Portal are K0DBE, formerly a W7, and KN0DID. This gives Portal four active hams, all in Uncle Sam's border services. W0JVP is now K6GXH and JLA is awaiting a W5 call in Louisiana. VCQ is back on the air with his new DX-100 and DHX is on from a new QTH at Sheldon. Servicemen home for the holidays were AUI, POT, and OWY. BQB is in California. EUQ has a new Ranger and an SX-96, OFH has a new SX-96, and DNJ (or was it OAB) found an NC-300 under the Christmas tree. Traffic: (Dec.) W8LHB 149, BFM 110, FVG 99, KTC 61, UBG 50, JBM 24, HVA 17, QOB 16, NPR 11, KLP 8, PHC 5, K0ATK 3, W0GQD 3. (Nov.) W0ZCM 6.

SOUTH DAKOTA — SCM, Les Price, W0FLP — SCM assistants: APL, YKY, HOH, GQH, FKE, RMK, TI, MZJ, and GDE. PAM: UVL, RM: SMV. The South Dakota Evening 75-meter Emergency Phone Net, UVL and GDE net controls, 32 sessions: QNI total 1460, high 62, low 16, average 45.9; traffic 89, high 10, low 0, average 2.78; informals 141, high 15, low 1, average 4.4. NJQ Noon Net, NEO net control, 25 sessions: 24 check-ins, average 7 formals, 6 informals. South Dakota C.W. Net, SMV net control, 13 sessions: QNI 95, low 5, high 10, average 7.3; QTC 59, low 1, high 7, average 4.5. 160-meter Phone Net, FKE net control: 701 check-ins, 21 per night; 14 formals, 41 informals. Traffic: (Dec.) W0ZWL 878, SCT 302, SMV 77, DVB 71, GDE 58, NEO 48, GWS 42, MZI 40, OII 30, UVL 30, BQH 21, DB 6, IOH 6, OFP 6, QKV 2, HDE 1. (Oct.) W0ZWL 621.

MINNESOTA — SCM, Charles M. Bove, W0MXC — Asst. SCM: Vince Smythe, 0GGQ, SEC: GTX. RMs: KLG and DQL. PAMs: JIE, LUX, and GGQ. Anyone who wants to move traffic out of this section to the East Coast on Wed. should contact BP. Boyd now has a closed circuit on teletype to the Coast at 1800 on Wed. HAH, OJH, QDR, and QDP visited at the St. Paul Radio Club. UGG is running the Twin City Ten-Meter Net on 29,400 kc. at 1930 CST on Wed. Everyone is urged to check into this net. IYP has been appointed as EC of Hennepin County. EAL could not find the necessary time to continue in that post. HEO has been ill but we hope that when you read this Drew will be up and around again. TKX, WDW, and DQL made a personal visit with KLG, OMC, and RLQ. CWB is back on the air with a Viking II and a VFO. BVL paid a visit with VEP, MSW and BCT of St. Paul are visiting in Florida. KNR is now on 75 meters with a Viking. ALL now has his General Class license. TCF was married in St. Louis and now is located in Minneapolis. The Minneapolis Radio Club, Inc., has elected a new group of officers. They are RQJ, pres.; VLZ, vice-pres.; IXR, secy.; and UYS, treas. New directors are ITQ, BSI, and TKX. VBS has put up a 44-ft. vertical and has been working plenty of rare ones on 40 and 20 meters. Bob is trying to make DXCC on 7-Mc. c.w. Traffic: W0WVO 668, WDW 518, KLG 339, KJZ 271, RLQ 233, VEP 214, IRJ 164, DQL 137, TKX 133, TUH 88, WMA 71, ALW 56, KFN 55, RVO 52, TJA 51, BZG 42, VOA 38, LUX 35, GTX 31, TCK 30, BUO 29, QVR 29, BOU 27, UBD 25, LST 18, TUA 16, FTP 15, UMJ 13, GGQ 10, QZR 9, AUK 8, ZMK 8, OPA 7, RXL 7, NTV 6, TCF 6, CVD 5, VEZ 3, RVO 2, VBS 1.

ARKANSAS — SCM, Owen G. Mahaffey, W5FMF — KN5DDA, a new ham in Magnolia, has just moved from New Orleans. We lost a good operator when VAN moved to Florida. We may hear him from there. We have a new ham in Booneville, KN5DKT, Pastor of the First Baptist Church. WEE has a new receiver now and is working 40-meter c.w. JAX reports he is a member of the Grave Yard Net; also the Saints of 75. He now has the call K5DMH, at Rose Bud. KN5DLY is a new ham in Bentonville. TIA is OES and has been making some interesting propagation observations. Traffic: W5VAA 92, JZL 23, CWC 16, FMF 15, LUX 10, ENZ 9, PX 4, KN5DKT 3.

LOUISIANA — SCM, Thomas J. Morgavi, W5FMO — K5AGJ, newly-appointed ORS, will be on the air soon with the DX-100 that PDP is helping him put together. GWC, FVS, and FVU pulled a 24-hour marathon racechew recently. The Ark-La-Tex Teenage Net is looking for new members on 3820 kc. Fri. at 1600 CST. NDV is active on NTS and MARS. KRX sent in reports covering activity for five months with a total of over 700 messages handled. JTO, JGY, and WCJ are active on 6 meters. K5BES, New Orleans EC, held a test drill with 18 AREC members participating. The GNOARC shortly will move to new quarters with space for a radio station complete with emergency power. The club will assume trusteeship of the radio equipment at the Red Cross Headquarters in New Orleans and will operate it as a club activity in case of disaster. KCH passed away on Jan. 2, 1956, after a short illness. IMU is on s.s.b. with a KW5S-1. DGB is pleased with his Eldico SSB-100. AXU is active on 75 meters with s.s.b. TFG now has remote handswitching, 75 and 40 meters, on his vertical. K5ABX passed the General Class exam. The Monroe hams met at Hollywood Restaurant on Dec. 8th. There was no business conducted but games by F3W were enjoyed by all. CYE is EC for Bonita and surrounding area. EA says that the ALN Net meets on 3695 kc. at 1900 CST Mon. through Fri. and wants support from Louisiana stations. EMO is going s.s.b. as soon as a rig can be put together. Monitor 3900 kc., the Louisiana monitoring frequency. Traffic: (Dec.) K5FFA 254, W5KRX 237, NDV 168, MXQ 162, EA 36, K5AGJ 16, W5BMD 5. (Nov.) W5KRX 112. (Oct.) W5KRX 166. (Sept.) W5KRX 180. (Aug.) W5KRX 77.

MISSISSIPPI — SCM, Julian G. Blakely, W5WZY — Mississippi is becoming a leader in s.s.b. operation. More and more stations are joining the ranks daily. Don't hesitate to break any Mississippi s.s.b. with a.m. for any information or just to see how they operate. Remember, though, that when you break an s.s.b. with a 250-watt a.m. signal that they receive only 75 watts of it — 125 watts is in your carrier and 75 watts in each sideband. It's food for thought. The Keesler Radio Club is putting the gilding to its new full-size 40-meter three-element beam 75 feet in the air. That's good material for a pilgrimage to the Coast. ACS is EC for the Biloxi-Gulphort Area and is whipping a nice organization into shape. Traffic: W5RIM 88, JHS 54, EWE 38, GDW 38, WZY 4.

TENNESSEE — SCM, Harry C. Simpson, W4SCF — Thanks, fellows, for the more than 200 Christmas cards received from Tennessee hams and the best of everything to you and yours during 1956. His many friends will be glad to note that PL is back in the traffic lists again. The Knoxville Club is building 6-meter converters, and TYU offers chassis and panel layouts, plus diagrams, to interested parties. TYU, now Extra Class, turned in a fine BPL total. PVD is now on 6 meters with a TBY-4 and a 3/4-watt signal! DMU reports 43 stations now are members of the Davidson County 10-meter net, with 12 mobiles. PFP reports that the Tennessee Phone Net is doing nicely. JVM reports that the Frye ARC of Chattanooga elected new officers. PQP reminds us of a 100 per cent ham family, the Bakers of Nashville. The OM is HHB. XYL is K4DIZ and YL is K4DHA, all General Class, and active on all bands. ZBQ is now monitoring 50.5 Mc. Sat., Sun., and week days after 1700 EST, with vertical polarization. A nice bulletin was received from the Bays Mountain RC and Secretary HEO, who reports other 1956 officers are TYV, pres.; K4AJN, vice-pres.; and PAH, act. mgr. Eight 6-meter stations now are on in Memphis. EC BAQ reports mobiles BAC, BAQ, CLQ, GHI, HUT, UDI, YMB, K4s BMC, and HSX, and KN4s BUA, BSR, EQQ, plus fixed stations JU, UDX, and K4CIA, participated in a Red Cross test alert with pleasing results. YMB never had TVI until WREC-TV came on the air recently. His TVI finally showed up, and on that channel only. (He is News Director for WREC-TV!) WQW sends in a fine report on TN, which averaged 16.44 QTC per session! UVU is working with transistors and plans to someday check into TPN with 50 milliwatts. Traffic: W4TYU 619, VNE 385, WQW 307, T2D 247, HIB 136, OGG 130, PL 125, ODR 119, PFP 118, VJ 81, IIB 71, K4BCV 70, W4HLR 48, SCF 47, PFP 43, UVL 40, K4ABE 35, W4YMB 31, HUT 27, UWA 23, PAH 19, TIE 18, JVM 16, BAQ 12, CLQ 10, UDR 8, UVU 7, ZBQ 6, FRB 5, DCH 4, HSX 3, DMU 2, K4GFL 2, W4NZP 1, PVD 1.

GREAT LAKES DIVISION

KENTUCKY—SCM, Robert E. Fields, W4SBI—SEC: CDA, PAM; YYI, RM; ZDB, Asst. RM; ZDA. The SEC requests that all ECs check their appointment dates and mail certificates in for renewal before expiration. SZL is operating portable 4 at Georgetown most of the time now, using an ARC-5 with about 75 watts. He also has up a new vest-pocket beam for 20 meters working FB. K4AGT says he is about to learn how to use his electronic keyer (part of the time anyway). HSI was honored by visitors, namely ZDA, ZDB, ZMP, and BZT. RPF says he has been kept pretty busy lately, and hasn't missed a MARS Net in over two months. He also is doing a lot of free-lance traffic-handling. WXL has been handling a lot of traffic during the heavy traffic season. RHZ now has his Extra Class amateur license, and a 350-watt rig with complete break-in, low-level speech clipping, etc. A lot of the fellows are getting back on 10 meters and having a lot of fun erecting beams, rotating motors, indicators, etc. Some of those known to be on are OBG, NGN, and SBL. SBI is not working a lot of DX, but here are a few worked: YN1, YN4, K77, VO, VES, KP4s, and plenty of State-side. Traffic: W4KKW 249, RHZ 208, QCD 157, RPH 137, ZDB 121, HSI 109, ZDA 102, SBI 92, WXL 88, K4AT 81, W4NIZ 68, CDA 60, K4AGT 53, W4MWX 43, JCN 25, WBD 17, SZB 14, W9BLO 9, W4OOS 7, SZL 6, IAY 2.

MICHIGAN—SCM, Thomas G. Mitchell, W8RAE—Asst. SCM (c.w.) Joe Beljan, 88CW; Asst. SCM (phone), Bob Cooper, 8AQA. SEC: GJH. The traffic list this month is headed by ELW with a BPL qualification. It is always a pleasure to issue BPL cards because they represent a lot of work on the part of the recipients. Those V-beams must be of help to Seth's 75 watts. TIN was awarded an OES appointment. WGU is keeping daily skeds on 6 meters. PHA had a MARS traffic total of 432 in addition to the total shown below. RTN is fighting old demon TVI on 21 Mc. in the local TV sets with the same L.F. strips. FX is involved in a do-it-yourself project of steamfitting at the new QTH. He also reports that there are pheasants in the back yard and wants to know "how do you make a snare?" PHM has a new 150-watt final on the air and is getting results. KOX is applying his OO efforts to the 7-Mc. band in hopes that he can help to clean up some of the rough signals that infest the region. Now that the doctor has allowed HSG to return to the air, he is having QRN troubles to buck. SCS is using a 65-foot TV tower as a 7-Mc. vertical. He hears some nice choice DX, but no results to date. OCC reports that SMS is back in his Marshall QTH from Toledo and is active on 2 meters. ESR has worked 86 countries on 40 and 15 meters since June 1955. Kathy, ODC, is working out well with a Heath VFO driving an 807. TIC has a new NC-300 and is working on antennas. MGQ also is working on antennas this winter. This seems to bear out the theory that good antennas have to be constructed under adverse conditions. FGB has added Virginia and South Carolina to his list of 160-meter mobile contacts. The South Carolina station was located just eight miles from a LORAN transmitter. Traffic: (Dec.) W8ELW 788, WXO 309, WGU 265, ILP 234, NUL 169, PHA 153, NTC 126, QQQ 100, IJY 92, RVZ 90, RTN 53, SCW 45, FX 43, SIB 40, PHM 36, KOX 34, QIX 34, MPD 33, FSZ 25, AUD 22, FWQ 20, JYF 20, RAE 20, HSG 15, SCS 14, DSE 10, HKT 10, NOH 10, TQP 10, OCC 8, SJF 8, DLZ 5, ODC 2, TIC 2, FGB 1. (Nov.) W8MPD 15.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCMs: J. C. Eason, 8DAE; J. E. Shringer, 8AJW; and E. F. Bonnet, 80VG. SEC: UPB. RMs: DAE and FYO. PAMs: EQN, HUX, and ALW. 1956 officers of the WARA, of Warren, are OKC, pres.; KCE, vice-pres.; and PBW, secy.-treas. The Trumbull ARC was formed with PKC, pres.; KCE, vice-pres.; OVI, secy.-treas. Cuyahoga Falls RC's 1956 officers are ANM, pres.; HQZ, vice-pres.; QYP, treas.; PAB, secy.; and YGQ, radio officer. The Massillon Club's new officers are BRN, pres.; OOS, vice-pres.; WNSGJO, secy.; FSM, treas.; and YHU, act. mgr. The Canton Club's officers are IKM, pres.; MZV, vice-pres.; and AL, secy.-treas. Columbus *Caracole* lists its 1956 officers as DVT, pres.; DYL, vice-pres.; RTF, secy.; and LKG, treas. JDN made Extra Class. Santa left SX-96s to RAS, OHP, and MZV; SX-100s to IKM and QMH; and a DX-100 to UJJ. The MYARA's 1956 officers are IOO, pres.; KZS, vice-pres.; DPK, treas.; and LND, secy. QYY had a slight heart attack. The ARF's have a new daughter. CGY has a new jr. operator. RZ rebuilt his ham shack. DHH passed his General Class exam. LM has a new Ranger. BKM and LM took an auto trip to New Hampshire. SSD and his XYL, SSF, are Technician Class. OYL moved to Magadore. IQT has a new NC-300 and NQR an SX-100. Because of the need for radiomen in the Navy, JIA enlisted. Lightning knocked MGC off the air. The West Park Radiops won a club award in the Cuyahoga County roundup, with AJW the individual winner, FKB mobile title, and FDC the c.w. award. The Indian Hills RC organized with ICS, pres.; and SZF, secy. PLQ is going on 2 meters. YCP is building a kw. rig. AJW left for a month in Europe. Tiffin mourns the passing on of ID. All Ohio amateurs should get their stations in readiness for the Ohio

County QSO Party, which will be announced soon. Let's have all Ohio counties entered. You know there is a WAOC (Worked All Ohio Counties). Traffic: (Dec.) W8VTP 645, DAE 446, FYO 240, HNP 210, IIR 166, AL 163, UPB 132, HDA 129, OPU 65, HUX 58, WAV 40, HPP 25, IJZJ 25, PLQ 25, LZE 24, CVZ 22, EQN 22, HQK 21, RO 20, BEW 17, ARO 16, HBX 16, PZS 13, SES 12, EEQ 11, QIE 10, IIRN 10, CGF 9, RN 9, STB 8, STR 8, VSA 7, BLS 5, LFO 4, LMB 4, QIY 4, SYD 4, WYU 4, ILE 3, BUM 2, VCD 2, SLD 1, USU 1. (Nov.) W8OPU 78, AMH 31.

HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Dannels, W2TUK—SEC: ADO, PAM; NJL, RM; WFL. Section nets: NLI, 3630 kc. nightly at 1930 EST and Sat. at 1915 EST. NYSPEPTN, 3925 kc. daily at 1800 EST. Holiday traffic enabled six stations to make BPL. They are W2s AEE, KEB, and KFV, and K2s CQP, DEM, and KXZ. KXZ now has made BPL three times and is eligible for the League's traffic medallion. WFL reports that NLI had a busy month. The Net still is in need of a Brooklyn outlet. EA, an old-timer and personal friend of many, including your SCM, joined Silent Keys. Otto's cartoon QSLs long will be remembered. K2CQP reports that Wis, 2s, 3s, and 4s are regularly reporting into TAN on 3630 kc. at 1830 EST. AEE has a special 30-watt rig for the Club's Novice operators. K2MFH received the General Class ticket. K2EQH is now using a vertical dipole on 10 meters. K2CUI has a new NC-183D as a companion for his Viking I. K2AMP finished a home-brew Z-match antenna coupler. TUK is now active on s.s.b. with a 20A and 458 VFO. New officers of the Lake Success RC are DMD, pres.; KDC, vice-pres.; YSI, secy.-treas. 1956 officers of the Tu-Boro RC are MBS, pres.; ZPQ, vice-pres.; K2JVQ, secy.; and LG, treas. K2HYK now has a phone patch working. NNX uses a Ranger and HRO at home and has installed a converter in his car for future mobile work. K2MNS dropped the "N." K2LDD put up a 20-meter ground plane. CSO writes from Washington, D. C., that he is planning a portable rig from that location. EEN received a certificate for being NYC-LI section winner in the W-VE Contest. K2KRH received his General Class ticket as a Christmas present. Ditto K2PFFH, who is off to KA-Land with the Air Force. LRU was made chief of communications for the Elmont C.D. BO has a new Elmac mobile receiver. KN2QNS, 8 years old, made his family 100 per cent licensed when he joined father K2EJZ, mother K2CFB, and brother K2GSI. K6PSI, ex-K2HID, sends regards to the NYC-LI section. New officers of the northern Nassau ARC are ADO, pres.; K2MWB, vice-pres.; YML, rec. secy.; DUO, corr. secy.; and UAL, treas. K2KES tied the knot and honeymooned in W4-Land. K2AED is using a converted TBW-4 on 40, 75, and 80 meters. K2OEE is on 6 meters. New officers of the Mid-Island RC are WFL, pres.; KTF, vice-pres.; WVU, secy.; and SMQ, treas. K2DDK added another six elements on 144 Mc. OME has returned to the air from his new West Islip location. K2PGP dropped the "N." As a Novice he has 35 states, KP1, and CO with 20 watts on 40 meters. New officers of the Five Towns RC are K2EWB, pres.; MNR, vice-pres.; K2CFE, secy.; and KRP, treas. K2AVB is experimenting on 420 Mc. 1956 officers of the Brooklyn Civic Center RC are MTD, pres.; K2IWC, vice-pres.; JFL, secy.; IUL, treas.; with IIGJ/2 assisting the latter two officers. New licensees in the Club are KN2s QHS and QNT. All appointees are requested to check their appointments for renewal. Remember that frequent reporting of activities is essential. Traffic: (Dec.) KEB 2224, KFV 2029, K2CQP 816, W2AEE 558, K2KXZ 519, W2WFL 374, K2DEM 273, CUI 231, AMP 153, W2VDT 141, K2GHS 113, W2IGV 91, TUK 84, K2ABW 75, W2GY 48, BO 46, EC 22, K2GMV 21, W2LGR 18, GXC 17, K2HYK 14, W2PF 8, OBU 7, IVS 4, NKK 4, K2DDK 2, LDD 2, MNS 2, PGP 2, W2YBT 2. (Nov.) W2VNJ 116, LJP 4.

NORTHERN NEW JERSEY—SCM, Lloyd H. Manam, W2VQR—SEC: IIN, PAM; CCS, RMs: NKD and CGG. The New Jersey City Radio Club has a new club in the section. Officers are K2KOS, pres.; K2ENW, secy.; ZAT, treas. The Club has ten members licensed in RACES. We wish the members the best of luck in their new venture. K2JOM is working good DX on 21 Mc. with a Viking II. EAS resumed as active RM of N.N.J. Many thanks for your excellent work over the past two years. KN2PSQ is a new ham in Teaneck. KN200J has built a completely new shack. K2JSP is working 14-Mc. phone with excellent DX. K2KLR is on 14-Mc. phone. K2GBB was home for the Christmas holidays sporting a new mobile rig. KN2PSL is eager to give 15 meters a try. KN2QCE received a new transmitter and receiver for Christmas. K2DOX was home for the holidays, but had little time for on-the-air activity. HXU still is hard at work clearing up TVI. NLY is spending most of his time just ragchewing these days. CQB is back in harness. The newly-formed North Hudson Radio Club holds monthly meetings on the first Mon. of each month. The meeting place is at North Hudson Red Cross Bldg., 212-37th St., Union City. The following officers were elected at the December meeting: K2IDN, pres.; K2KJU,

(Continued on page 80)

Tuning Mechanisms

PROBABLY THE AVERAGE amateur has no conception of the amount of mechanical engineering design that must precede the production of any good factory built equipment. When we hams put together a piece of gear for our own use, we quite naturally modify our ideas of what we would like to have in order to use parts and materials at hand. For this reason we cheerfully put up with makeshifts and inconveniences in operation which most of us regard as unavoidable in home made equipment. However, when a new factory built receiver or transmitter is bought we rightly expect it to be free of makeshift devices and to incorporate the best possible electrical and mechanical design.

THE DIFFERENCE between a properly engineered factory built unit and the average good home made device is nowhere more evident than in tuning mechanisms. As a rule, the amateur builder must employ a ready-made dial which almost never fits his exact needs. Or, he must improvise some sort of ingenious string or friction drive device more often than not unreliable and inaccurate. The factory engineer, on the other hand, creates a tuning mechanism to meet the specific requirements of the receiver on which it will be used.

FOR MANY YEARS Hallicrafters has been designing and manufacturing dial mechanisms. Some of them were simple and economical, others — particularly those intended for military use — highly complicated and sometimes very expensive. Altogether more than 100 models have been built with the objective of securing the greatest possible precision and smoothness of operation at the lowest possible cost.

AT YOUR FIRST OPPORTUNITY we suggest that you examine the dial mechanism on the new SX-100. This receiver, designed for single side band reception, demands absolute accuracy of reset. No friction devices capable of slippage could be used. Nothing but positive gear drive was acceptable. The solution lay in the use of gears made with rolled teeth, a process similar to knurling, which produces gears of exceptional accuracy at a cost no higher than for ordinary stamped gears. In this process, the edge of the gear blank is rolled against a hardened forming tool until the teeth are literally pressed into the rim of the blank. The trick is to come out even as the gear blank goes round and round, and this novel way of producing gears has proved so successful that Hallicrafters is now patenting the process.

BECAUSE there are no friction devices to slip, a 0-100 logging scale can be incorporated in each tuning knob, assuring absolute accuracy of reset. Spring loading gives complete freedom from backlash and the accurate rolled tooth gears provide tuning with a smoothness and precision that is a joy to use.

— Cy Read, W9AA

Bill Kelly Jr. W J. Haligan W9AC for **hallicrafters**

vice-pres.; K2IOX, secy.-treas. Trustees are TK and K2QGB. The club station call is SMX. VMX sends in an excellent 00 monthly report. K2MTL is getting on the air with an 813 final. The Avenel Radio Club is looking for new members. Contact K2MTL for details, Box 631, Port Reading. BRC has been taking over as NCS on N/JN Sat. evenings. A new bug key from the XYL for Christmas helps out in this chore. MLW reports in with a very healthy traffic count for December. News from TCRA members follows: MGF and PYK are experimenting with multi-element 2-meter quad antennas. JJ is on s.s.b. K2BHQ made the leading operator score of all TCRA members during the recent SS Contest. GMM and YMP are about to become active again after long layoffs. HOJ was host to the TCRA gang at the annual Christmas Party. AZL and TWC are keeping regular skeds on 14 Mc. with KHOUK, formerly W2UK of 144-Mc. fare. YJC has added a pair of 1-125As to his 144-Mc. rig. PLX has gone hi-fi on us with his Dixieland jazz recordings. Hudson Division Director Cooke and Vice-Director Ryan were guests at a recent TCRA meeting. Our thanks to FCC for keeping us so well informed on TCRA doings. BWZ is on 15-meter c.w. with 25 watts input. K2GAS is busy with school work and is studying hard for his entrance exams to the U. S. Naval Academy. K2ICE is having a hard time keeping his 64-element 144-Mc. array from becoming a first-class bird roost. NIF has a new NC-300 with a 144-Mc. converter. The Freshold RACES group entertained 80 guests at the American Hotel after a hidden transmitter hunt on Jan. 6th. K2GHP has moved his shack to the bedroom from the basement. K2DHE is back on the air from a new QTH. K2IPR is experimenting with weird-looking 144-Mc. antenna arrays. BTG is toying with the hi-fi idea, with the help of YLS. Traffic: (Dec.) W2MLW 710, EAS 266, K2GFX 128, W2BRC 70, K2EQP 55, BWQ 32, W2CQB 27, VMX 17, K2JOM 11, W2NIY 5, K2MTL 1. (Nov.) W2MLW 288.

MIDWEST DIVISION

IOWA — SCM, Russell B. Marquis, W0BDR — KN0DDA, an 8 year-old sightless operator from Lohrville, received his ticket recently. New appointments: CSP and MJH as ECs. Renewals: LAC and QVA as ECs. New officers of the ISC Radio Club are: GUVQ, pres.; UEJ, vice-pres.; DET, secy.; NSC, treas.; KN0AHC, pub. secy. The Club is doing some work on 420 Mc. New officers of the Sioux City Club are AF, pres.; GEN, vice-pres.; POJ, secy.; TNX, treas.; WWM, sgt. at arms. AEH went on his yearly vacation to Arizona. USQ reports increased v.h.f. activity in the Quad-City Area. He is building a 32-element beam for 144 Mc. and 64-element beam for 220 Mc. Iowa is losing its top 2-meter man as EMS is moving to Nebraska. HWU and KWT are starting classes for would-be hams. 6WLY, RO on the SS *Jean LaHite*, is working portable at Volga City. Congratulations are due CZ and SQE for their first BPL. SCA has earned his 60th BPL; he hasn't missed since July, 1953. Congratulations to the Iowa gang on our best report so far. Keep up the good work. Traffic: (Dec.) W0SCA 2564, BDR 2489, PZO 2264, SQE 583, CZ 543, I.CX 391, BJP 390, LJW 246, LGG 201, QVA 135, UEJ 123, BLH 111, WPM 93, NGS 43, NYX 33, PKT 30, EHH 27, KJN 27, TTT 27, PTL 26, ZAM 24, UTD 23, SEF 13, K0DBW 10, W0LY 10, TUU 10, CGY 9, FMZ 9, ADB 7, EFI 7, MJH 7, YUA 7, FNR 6, UWF 6, VWF 6, FDM 5, BWL 4, DPI 4, KGX 4, SLC 4, ZYC 4, K0AVZ 3, W0FSK 3, FWF 3, SRQ 3, YI 3, CSP 2, HNE 2, QQA 2, UEG 2. (Nov.) W0FDM 1.

KANSAS — SCM, Earl N. Johnston, W9ICV — SEC: PAH, RM: FEO, PAM; FNS: The CKRC, of Salina and vicinity, have the following new officers: DUG, pres.; HAJ, vice-pres.; PKD, secy.; and TSR, act. mgr. The Jayhawk Amateur Radio Society's new officers are OSD, pres.; SIJ, vice-pres.; and YPT, secy.-treas. The Kaw Valley Radio Club held its annual banquet and election of officers Jan. 6th at Lake Linge with LHX, pres.; BAU, vice-pres. and treas.; and BJE, secy. The Wheat Belt Radio Club heard EXU, of McCook, Nebr., give a talk on antennas Dec. 11th. ZJB wants to start an emergency net on 144 Mc. for the area in Central Kansas. Vince says he can work Newton, Larned, Lyons, Sterling, Salina, Abilene, Winfield, Coldwater, Ponca City, Tulsa, Watonga, Okla., Hutchinson, and Chanute. If interested, please contact or write Vince. TOL is back on the air with a Heathkit VFO and an AT-12. ATA is using an aircraft rig on 40 and 75 meters with a crystal-controlled converter under the dash. RXM reports an over-modulation indicator would have solved his distortion problems: a his phone rig four months ago if he had built it with his rig. FCL finished his DX-100, as did TRG of Topeka. Thanks, fellows, for the reports. Traffic: (Dec.) W0BLI 1523, OHJ 1113, NIY 342, FEO 332, QCG 269, FNS 238, FCE 177, MXG 158, YVM 146, SAF 138, LBJ 133, FDJ 110, ABJ 104, KSY 79, RXM 74, ZWN 59, FON 47, ECD 42, K0AHW 35, W0WWR 33, BET 19, VFC 17, WJB 13, LOW 12, TNA 11, LIX 10, LQX 10, ONF 10, POT 9, ICV 8, HL 7, FHT 6, PSL 6, VNL 6, GYK 5, JDX 5, RJL 5, TSR 5, FCL 3, DEL 2, VGE 2, ZUX 2, KN0AOK 1. (Nov.) W0MXG 153, SVE 19, PSL/0 6. (Sept.) W0UAT 31.

MISSOURI — SCM, James W. Hoover, W0GEP —

MINW was appointed EC for North St. Louis and North St. Louis County. TGC received an OES appointment. RTW received a commendation certificate from the U. S. Weather Bureau for keeping reliable schedules in reporting river stages. The Bandhoppers Radio Club has completed ten 6-meter transmitter-receiver units. WAP reports limited time for traffic because of work schedules. RTO has a new ground-plane antenna for 20 meters. New officers of the Northwest St. Louis Amateur Radio Club are PUJ, pres.; UJE, vice-pres.; NVJ, secy.; TDT, treas. WEQ works 200 miles consistently on 6 meters with a Viking. 1FL found a Viking II under the Christmas tree. The MO-REB Club sponsored a transmitter hunt on 10 and 6 meters. IJS has finished a new rig with an 813 final. OIV is employed at KTVO. The name, Mid-Mo. Amateur Radio Club, has been selected for a new club in Jefferson City. KN0CHE has worked 41 states in five months on 40-meter c.w. CIA has a new 15-meter cubical quad. Officers of the St. Louis Amateur Radio Club are QZI, pres.; EST, vice-pres.; AUB, secy.; CDA, treas. The Club has a new DX-100 transmitter and has filed incorporation papers. RACES application has been filed by WPS, Radio Officer for the St. Louis Area. Other officers are EOI, Alternate RO; QDF and FBJ, personnel and public relations; EOI and CAR, plans and training; ZJG and PMU equipment and maintenance. CPI reports Christmas traffic somewhat lighter because of restrictions on third-party traffic from Japan and Germany. Traffic: (Dec.) W0CPI 1880, GEJ 934, GAR 812, BVL 382, QMM 208, CKQ 180, IJS 175, SAK 146, WFF 91, RTW 72, WAF 65, YTF 62, OUD 61, KIK 51, RTO 46, BZK 45, IIR 34, VPQ 29, ECE 20, K0BBDT 15, W0HUI 15, CIA 13, EBE 11, VWZ 11, QMP 10, YFP 7, YVJ 6, BUL 5, KN0CHE 5, W0MFB 4, GEP 2, OIV 2, QFD 2. (Nov.) W0GAR 446, IIR 146, IJS 111, ICW 66, BUL 7, OIV 7, QFD 2. (Oct.) W0SAAK 90.

NEBRASKA — SCM, Floyd B. Campbell, W0CBH — Asst. SCM: Tom Boydston, 0VXK. SEC: JDJ, PAM; HIA. New officers of the Ak-Sar-Ben Radio Club for '56 are YZV, pres.; RMC, vice-pres.; K0AMM, secy.; IJZE, treas. QKR has a new Vibroplex and reports the Gering Christmas Party a howling success. Somebody better go over and help FQB erect that 33-foot 10-meter vertical. The time has arrived (past for some) to get those appointments renewed, fellows. DQN has raised his 15-meter beam from 30 to 50 feet with much better results. Nebraska City has a couple of new calls, K0BWW and KN0BVP, father and son. BWV now is active on 6 meters. A new call at Falls City is KN0BOY. ENS (active on 2 meters in Iowa) has moved from Adair, Iowa, to Falls City. The South Eastern Nebraska Radio Club (SENRC) meets on the 4th Wed. of each month at the home of different members. EZT is the secretary. The Norfolk Radio Club is setting up for 2 meters. Some of the members already have the equipment ready. The North East Nebraska Radio Club (NENRC) is now 100 per cent s.s.b with its 17 active members. There are now more than 60 active s.s.b stations on 75 meters. Another new call is K0DGB, in Danbury. NIS has a new 813 final. EFV will finish his 813 soon. FTQ has more power with an 829 final and is EC at Shickley. 0VV, YVY, and SXR, in Sutherland, are new AREC members. Traffic: (Dec.) W0ZJF 436, RDN 237, FTQ 179, AIN 131, FQB 59, K0WBF 56, W0KDW 54, ERM 45, DDT 30, K0FBD 14, W0DQN 12, QKR 12, KN0CDD 11, W0CBH 10, KFY 4, BSB 2. (Nov.) W0FMW 16.

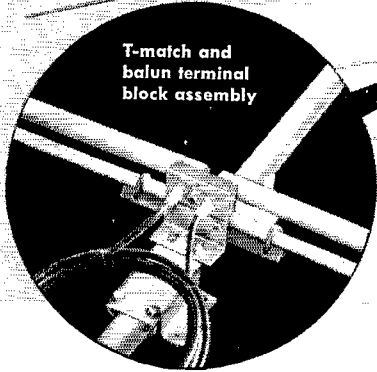
NEW ENGLAND DIVISION

CONNECTICUT — SCM, Milton E. Chaffee, W1EFV — SEC: LKF, PAM; LWV, RM: KYQ, MCN and CN, 3640 (0645 and 1845); CPN, 3880 (1800, Sun, 1000); CTN, 3640 (Sun, 0900); CEN, 29,580 kc. Traffic reported for CN was 268, averaging 9.9 in 27 sessions with 8.6 stations per session. QNI honors go to KYQ 24, RGB 23, LV and TYQ 20 each. CPN moved 151 and QNI top scores were made by YBH, VSH, and KGT. MCN accounted for 89 messages in 22 sessions with VVB, IBE, and RFJ as most active. The three nets handled a total of 508, which is indicative of good traffic activity. New Novices at Bristol are GNS and GNT. EFW has a new DX-100. The Tri-City Council has been recruiting and its secretary, TVN, lists 8 new members in October, 7 in November, and 4 in December. The Club has voted to meet at the Underwater Sound Labs from now on. APS sends along the only OES report, saying that school keeps him from progressing with v.h.f. plans. WHL is getting set for 2 and 6 meters with a Christmas VHF-152A to start. ODW sent a report for the Redding Club listing the new officers as DBM, pres.; KGT, vice-pres.; and treas.; and ODW, act. mgr. ODW has a new NC-300 and claims 158 worked and 139 confirmed in the DX department. RRE reports new Novices at Willimantic are HNA, HNX, and HOI. Steve says the club meets Mon. at 2100 on 28,782 kc. and welcomes outside callers. RAN got home for Christmas but now is back at K4WEE. Appointments: ZVM and FOA as ECs. RLN and EJJ renewed EC appointments. His ORS appointment was renewed by QJM, and AVC has been reinstated as ORS. Ex-ANC now is K4HEN at Key West, Fla., running low power 160 to 10 meters, according to TD. HYF reports overtime work and the gripe kept him low

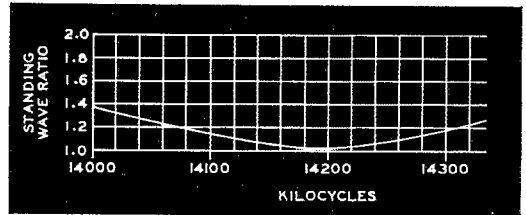
(Continued on page 86)

Just released!

Johnson Semi-Wide Spaced Beams...



**PRE-TUNED
20, 15 AND 10
METERS**



SWR plot for 20 meter antenna

Completely pre-tuned with balun matching sections, Johnson's new Semi-Wide Spaced Beams have shown in recent tests that they will outperform all other commercially available pre-tuned beams. No adjustments necessary... simply assemble, connect your coax feedline and you're ready to go!

- Greater than 9.0 db gain over dipole.
- Pattern is uni-directional, less than 55° beam width.
- Greater than 27 db front-to-back ratio.
- Covers entire 20 meter band with lower than 1.4 to 1 SWR.
- Extra rugged construction—beam clamps eliminate drilling and subsequent weakening of structural elements. Boom is galvanized steel—extra heavy element construction.
- No loading devices needed for flutter dampening or corona discharge.
- Mast arrangement permits stacking of up to three beams.

Boom lengths as follows: 20 meter beam—20'; 15 meter beam—13'7"; 10 meter beam—10'.

Cat. No.	(Complete with beam, boom and balun)	Amateur Net
138-420-3	3 elements, 20 meters.....	\$139.50
138-415-3	3 elements, 15 meters.....	110.00
138-410-3	3 elements, 10 meters.....	79.50

- *Higher Gain!*
- *Greater Bandwidth!
(Lower SWR)*
- *Higher Front-to-Back Ratio!*
- *More Rugged Construction!*



E. F. Johnson Company

2809 SECOND AVENUE S.W. • WASECA, MINNESOTA

CAPACITORS • INDUCTORS • KNOBS • DIALS • SOCKETS • INSULATORS • PLUGS • JACKS • PILOT LIGHTS

RAGING FLOODS HIT Radio Amateurs

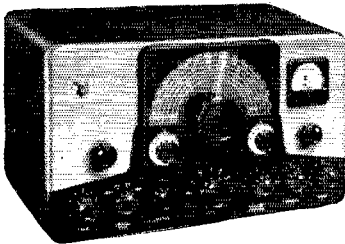
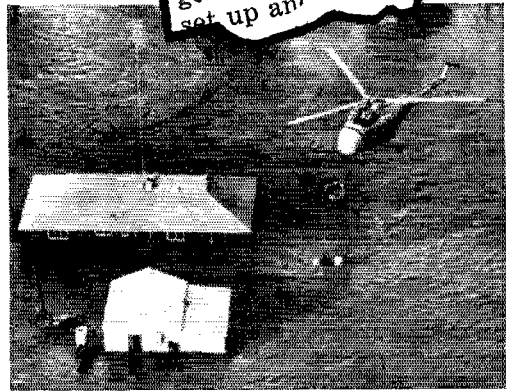


**FLOOD WATERS
RECEDE**

Yuba City, Calif.— Once again California's Radio Amateurs answered an emergency call to duty, as this area was inundated by its worst flood in one hundred years. Emergency traffic nets were set up and

"VIKING RANGER PERFORMANCE OUTSTANDING"...

Already reports are in on the outstanding performance of Viking amateur equipment during this emergency. One "Ranger" was on the air continually from Dec. 23 until Dec. 29 . . . operated by as many as 10 different operators, many of whom were unfamiliar with the unit. As one of these emergency operators put it, "In my opinion, dollar for dollar it can't be beat!"



VIKING "RANGER" TRANSMITTER

75 watts CW input . . . 65 watts phone. All amateur bands from 10 through 160 meters. TVI suppressed—built-in VFO or crystal control. Timed sequence (break-in) keying system. Available as a kit or completely wired and tested.

Cat. No. 240-161-1 Viking "Ranger" Kit, with tubes, less crystals, key, and mike. . . . Amateur Net \$214.50

Cat. No. 240-161-2 Viking "Ranger", wired and tested. Amateur Net \$293.00



E. F. JOHNSON COMPANY

2822 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

WRITE FOR YOUR FREE COPY

NORTHERN CALIFORNIA Aid Rescue Work

Tops for dependability under any conditions...
JOHNSON AMATEUR EQUIPMENT



VIKING II TRANSMITTER

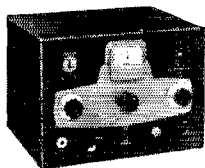
180 watts CW input . . . 135 watts phone. Bandswitching 10 through 160 meters—effectively TVI suppressed—completely self-contained.

Cat. No. 240-102-1 Viking II Transmitter Kit, with tubes, less crystals, key and mike. Amateur Net \$279.50
Cat. No. 240-102-2 Viking II Transmitter, wired and tested. Amateur Net \$337.00

FOR CIVIL DEFENSE . . . VIKING II-CDC

Continuous coverage 1.7 to 30 mc.; push-to-talk operation; modulation limiting.

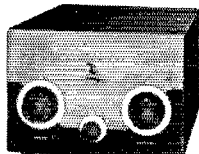
Cat. No. 240-102-16 Viking II-CDC Transmitter, assembled, wired and tested with tubes—less crystals, key and mike. Amateur Net \$430.00



VIKING "ADVENTURER" CW TRANSMITTER

Compact, completely self-contained 50 watt transmitter kit. Single knob bandswitching—effectively TVI suppressed. 80 through 10 meters. Easy to assemble. Full output of self-contained power supply available from rear receptacle to power auxiliary equipment when transmitter is not operating. Lightweight—easily portable.

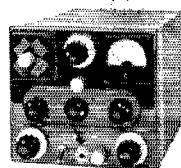
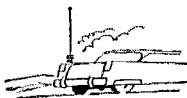
Cat. No. 240-181-1 Viking "Adventurer" Kit with tubes, less crystals and key Amateur Net \$54.95



250 WATT "MATCHBOX"

Matches output to virtually any emergency antenna. Performs all loading and switching functions required in medium power stations. Fully shielded. Covers 3.5 to 30 mc. Built-in transmit/receive relay.

Cat. No. 250-23 Viking 250 Watt "Matchbox", assembled, wired and tested. Amateur Net \$49.85
VIKING KILOWATT "MATCHBOX" Amateur Net \$124.50



VIKING MOBILE TRANSMITTER

Excellent for emergency service as well as regular use. Power-packed . . . rated 60 watts maximum PA input. Bandswitching 75 through 10 meters. Under-dash mounting. All controls readily accessible.

Cat. No. 240-141-1 Viking Mobile Transmitter Kit, less tubes. Amateur Net \$99.50
Cat. No. 240-141-2 Wired and tested, less tubes. Special order only.

MOBILE VFO KIT

Drives any straight pentode crystal stage. Vernier dial calibrated 75 through 10 meters. For steering post or under-dash mounting.

Cat. No. 250-152-1 Viking Mobile VFO Kit with all parts, cables and tubes. Amateur Net \$33.95
Cat. No. 250-152-2 Viking Mobile VFO, wired and tested, with tubes. Amateur Net \$49.95



"WHIPLoad-6"

For high efficiency base loading of mobile whips. Instant bandswitch selection 75 through 10 meters. Fibre glass housing. Cat. No. 250-26 "Whipload-6" Loading Coil. Amateur Net \$19.50

TELEGRAPH KEYS

Johnson makes a complete line of semi-automatic, high speed, standard, heavy duty and practice keys as well as code practice sets, cords and wedges for semi-automatic keys.



*See your
distributor*

Johnson Amateur Equipment is sold only through Authorized Johnson Distributors—most offer convenient time payment plans. For complete information see your distributor.

**HEATHKIT
DX-100
PHONE AND CW**

transmitter

KIT

FEATURES

Design proven through actual signal reports.



Only top-quality components used throughout.



5-point TVI suppression, and pi network output to match 50 to 600 ohms.



Detailed construction manual for simplified assembly.



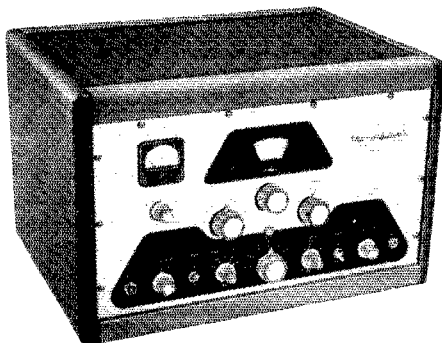
100 watts output on 160, 80, 40, 20, 15, 11, and 10 meters.



Attractive and functional physical design.

The Heathkit Model DX-100 Transmitter is rapidly becoming the "standard" ham rig in its power class. The high quality and outstanding performance it offers can be matched only in equipment costing many dollars more. It features a built-in VFO, modulator, and power supplies, and is bandswitching for phone or CW operation on 160, 80, 40, 20, 15, 11, and 10 meters. The kit includes a detailed construction manual, the cabinet, all tubes, pre-wound coils, and all other parts necessary for construction.

Push-pull 1625 tubes are used to modulate parallel 616-i tubes for RF output in excess of 100 watts on phone, and 120 watts on CW. May be excited from the built-in VFO or from crystals. Features pi network output circuit, illuminated VFO dial and meter face, and 5-point TVI suppression. High grade, well-rated parts supplied. Schematic diagram and technical specifications on request.



**MODEL
DX-100**

\$189⁵⁰

Shpg. Wt. 107 Lbs.

Shipped Motor Freight unless otherwise specified. \$50.00 deposit required on all C.O.D. orders.

HEATHKIT

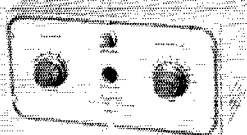
antenna coupler

KIT

**MODEL
AC-1**

\$14⁵⁰

Shpg. Wt. 4 Lbs.



In addition to matching a low power transmitter to an end-fed long wire antenna, this antenna coupler incorporates a 3-section low-pass filter, to attenuate output above 36 mc and reduce TVI. Handles up to 75 watts, 10 through 80 meters. 52 ohm coaxial input—tapped inductor and variable capacitor—neon RF indicator. Ideal for use with the Heathkit AT-1 Transmitter.

HEATHKIT

grid dip meter **KIT**

The Model GD-1B is a time-proven instrument. It will enable you to accomplish literally hundreds of jobs on all types of equipment. Frequency range is from 2 mc to 250 mc. A 500 ua meter is employed for indication, and a sensitivity control and headphone jack are provided. Includes pre-wound coils and rack. Indispensable for the ham, serviceman, and engineer. Extra coils available to extend frequency down to 350 kc.

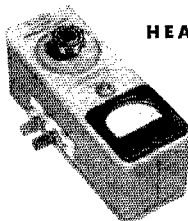


**MODEL
GD-1B** **\$19⁵⁰**

Shpg. Wt. 4 Lbs.

HEATHKIT

antenna impedance
meter **KIT**



MODEL AM-1

\$14⁵⁰

Shpg. Wt. 2 Lbs.

Used with an RF signal source, the AM-1 will enable you to match your antenna-receiver-transmitter system for optimum operation. Will double as a phone monitor or relative field strength meter. Uses 100 ua meter, and covers 0 to 600 ohms. Frequency to 150 mc.

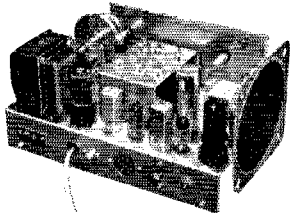
**HEATH
COMPANY**

*A Subsidiary
of Daystrom, Inc.*

BENTON HARBOR 9, MICHIGAN

HEATHKIT communications-type all band receiver KIT

Slide-rule dial
—electrical
bandsread—ham
bands marked.
Slug-tuned coils and
efficient IF trans-
formers for good
sensitivity and
selectivity.
Transformer-
operated power
supply for safety
and high efficiency.

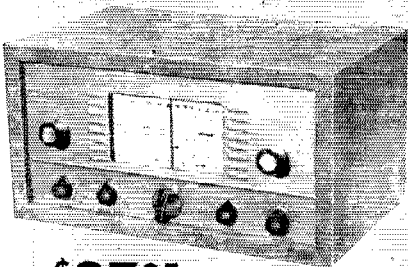


The Model AR-3 receiver features new high-Q slug-tuned coils, new layout, and new-type IF transformers. The result is high sensitivity and selectivity and better image rejection on all bands.

Transformer-type power supply, electrical bandsread, RF and AF gain controls, antenna trimmer, AGC, BFO, headphone jacks, socket for Q multiplier, 5½" PM speaker and illuminated dial.

SPECIFICATIONS:

Frequency Range—550 kc to 30 mc on four bands.
Tube Complement—1—12BE6 oscillator and mixer • 1—12BA6 IF amplifier • 1—12BA6 second detector, AVC, first audio amplifier and reflex BFO • 1—12A6 beam power output • 1—5Y3 full wave rectifier



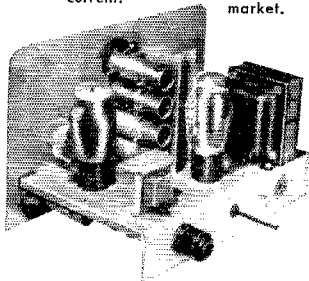
\$27⁹⁵ (Less Cabinet)
• MODEL AR-3
Shpg. Wt. 12 Lbs.

CABINET: Fabric-covered cabinet available. Includes aluminum panel, speaker grille, and protective rubber feet. Measures 12¼" W. x 6¾" H. x 7¼" D, No. 91-15. Shpg. Wt. 5 Lbs. **\$4.50.**

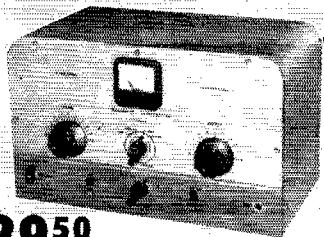
HEATHKIT CW amateur transmitter KIT

Single-knob
bandswitching
for 80, 40, 20, 15,
11, and 10 meters.
Panel meter monitors
final grid or plate
current.

Plate power
input
25-30 watts.
Best dollar-per-
watt buy on the
market.



The AT-1 is complete with its own power supply, and covers 80, 40, 20, 15, 11, and 10 meters with single-knob bandswitching. Designed for crystal or external VFO excitation. Incorporates key-click filter, line filter, copper plated chassis, pre-wound coils, 52-ohm coaxial output, panel meter, and high quality components throughout. Easy to build, even for the beginner. Employs 6AG7 oscillator and 6L6 final. Up to 30 watts power input.



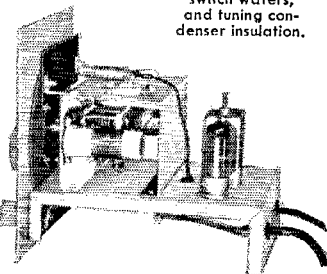
\$29⁵⁰
• MODEL AT-1
Shpg. Wt. 15 Lbs.

SPECIFICATIONS:

RF Amplifier Power Input . . . 25-30 watts
Output Connection 52 ohms
Band Coverage 80, 40, 20,
15, 11, 10 Meters
Tube Complement: Rectifier
5U4G Oscillator—Multiplier
6AG7 Amplifier—Doubling
6L6

OA2 voltage
regulator tube
for stability.
Covers 160-80-40-
20-15-11-10 meters.
Smooth-acting,
illuminated and pre-
calibrated dial.

6AU6 electron-
coupled Clapp
oscillator.
Copper plated
chassis—aluminum
case—profuse
shielding—cer-
amic coil forms,
switch wafers,
and tuning con-
denser insulation.

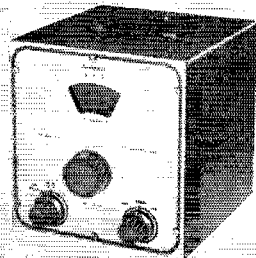


HEATHKIT vfo KIT

The Model VF-1 features illuminated and pre-calibrated dial scale. Cable and plug provided to fit the crystal socket of any modern transmitter. Covers 160-80-40-20-15-11 and 10 meters with 3 basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Derives operating power from transmitter power supply. Has VR tube for stability. Go VFO for more operating enjoyment.

MODEL
VF-1

\$19⁵⁰
Shpg. Wt.
7 Lbs.



SPECIFICATIONS:

Output Frequencies—1750-2000 kc, 7000-7425 kc, 6740-6808 kc. Calibrated Bands—160-80-40-20-15-11-10 meters. Tube Complement—6AU6 Oscillator OA2 Voltage Regulator. Power Requirements—250-350 VDC @ 15-20 ma. and 6.3 VAC @ .45A.

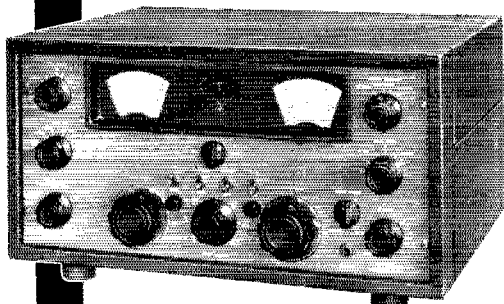
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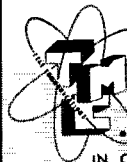
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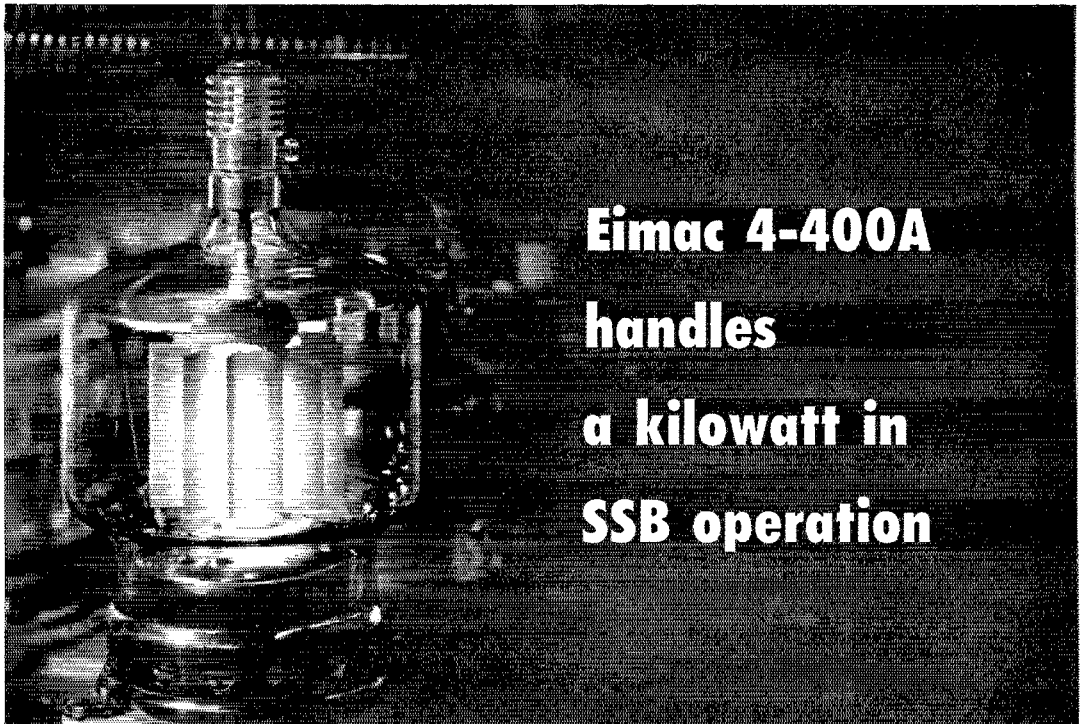
(Continued from page 80)

for a month. WPO made top score in the Connecticut QSO Party and EWS was on top among the Novices. YNC extends thanks for participation in this annual event by the Connecticut Wireless Assn. YBH made BPL this month on originations plus deliveries. Traffic: (Dec.) W1YBH 397, AYC 308, AW 199, KYQ 189, RGB 137, YNC 105, BYB 92, LV 71, EFW 45, BDI 42, RFJ 36, RRE 35, CUH 28, KV 26, HAN/4 22, UED 10, HYF 1. (Nov.) W1RAN/4 16.

MAINE — SCN, Allan D. Duntley, W1VYA/BPI — SEC. YVB. PAM: WTG. RM: EFR. The Barn Yard Net meets Mon. through Sat. on 3960 kc. at 0800-0930; the Sea Gull Net meets Mon. through Sat. on 3940 kc. at 1700-1800; the Pine Tree Net meets Mon. through Sat. on 3595 kc. at 1900. HOU in Manchester, N. H., now is net mgr. has been selected from outside the State of Maine. The selection is a fine one and we are glad to see someone out of the State handling this net. The Sea Gull Net goal of 100 stations per night is gaining momentum. Let's all call in and give the boys and gals a lift. WNIGYY, First-Class Boy Scout from Freeport, is sweating out waiting for his "General." ISJ, a stranger on 75 meters, has been heard on s.s.b. KTT also has joined the "Progressives." How about a little net on s.s.b.? SNE-PVY still is in the Sunny South. ZAG keeps the "Twin Cities" represented on the Sea Gull Net. Some of the boys are working TWR/7 on 15 meters. UZR is going mobile with a T-90, 2 meters is gaining in the southern part of the State. Why fight the QRM on the lower frequencies? CMO is busy designing a portable rig for 6 meters. Good luck on your venture, Clyde, you can do it if anyone can. What is the trouble with the State C.D. Net? "The County" is 100 per cent on the Sea Gull Net. How about you other counties? Traffic: W1WTG 187, LKP 137, QUA 38, UED 32, NXX 31, FNT 26, DTK 21, BDP 6, BBS 5, BAD 4, DMV 4, WNIHTD 3.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, Jr., W1ALP — New appointments: ADAM as EC for Canton, TWG as OBS, GDJ as OQ, AUQ as ORS. Appointments endorsed: KWD, Weymouth, RCJ Marlboro, SII Dedham, PYT Ipswich, RSE Whitman, HRY Wellestey, TVZ Hopkinton, OSS Townsend, MF Salem, IBE Rockport, MOJ Millis, MD Hingham as ECs; TVZ, BB, LAL, CAM and AAR as ORS; BB, RP, and AAR as OPSs; VMD, CLF, and AAR as OBSs; CLF and VTT as OOs. MMQ is Radio Officer for Milton, with PID his alternate. EPW is Radio Officer for Westwood, with KZW his alternate. IVI visited TWG. KJD has a 32-V transmitter. Heard on 2 meters: LIU, EJU, AOG, QF, KDF, LLZ, ALX, IIB, HTX and K6HEC/1. Heard on 10 meters: WTY, PRR, TYZ, VUO, OAL, HO, TIV, and BMD. Heard on 75 meters: UFJ, JPL, IJL, PO, ZSJ, AWD, SSG, YCR, NNS, ZTL, and FZU. ZGD, mobile in Connecticut, saw and reported a car and train accident to the State Police via ALS on 10 meters. The following took part in ARRL's Nov. F.M.T.: PXH, TVZ, CLF, HURF/1, and AYG. RACES plans have gone in for Braintree, Holbrook, and Milton. TVC is pres. of the Boston College Radio Club, PR. AUQ has applied for ORS appointment. MPT and QPH are Alternate Radio Officers for EKG in Braintree. JLQ is Alternate RO for ISU in Holbrook. OSS has a Gonsset for c.d. work bought by the town. The T-9 Radio Club held a Christmas party at HMC's QTH. A new net, the Minute Man Net, on 3912 kc., is on from 0730 to 0830 daily Mon. through Sat., writes CLF. ZQO is RO for Harwich, with OAQ his alternate. AQN has signed up. BCN is Sector 2C RO and AYN Area 2 RO. EGZ is act. mgr. for Cape Cod & Islands ARA. KIUSA makes BPL again. BPW got a Viking Adventurer for Christmas. BPW is QSL Mgr. for the NNTA for WN1 District. RP joined the Quarter Century Wireless Assn., which has a net on Sun. at 9 A.M. on 3810 kc. SRG was in the hospital. SON is on 10 through 80 meters. New officers of the Framingham Radio Club: HJP, pres.; OKK, vice-pres.; ZEN, treas.; QVK, secy.; MEG, act. mgr. The Braintree Radio Club had Mr. Lancaster speak on "Turbines." Radio Amateur Open House held two regular meetings. UKO says his 15-meter cubical quad is working fine with some DX. AKN has an antenna farm for all bands. CFQ is Asst. EC and Alternate RO for Dennis. MKW, ZSJ and DPO are on 15 meters. SU is on 20 meters with a cubical quad. ZQO has a kw. on 75 meters. CMT has a DX-100. WHC is on 6 meters with 100 watts. WN1EUE is on 80-meter c.w. and has a new Gonsset linear amplifier on 2 meters. EGZ is on 11 meters. PMC has a ground plane on 10 meters. SGL made skeds with Operation Deepfreeze. SLW is now 4PCZ and is on 15 meters daily. CLF has a new GA750. 2IRK/1 is going to M.I.T. VTT has a Gonsset Super 6. AQS is new in New Bedford. AEN has an s.s.b. rig. WBM, FOA and AVY are on in the Minute Man Net. News on 6 meters from THO: PR is on with URT as operator. HOL has a brand-new Lincoln for his Gonsset 6. RMF is building mobile for 6 and 10 meters. SNR had his 3rd child. CAX has a new rotator. CSH and DWL have Gonsset 6s. ELP is back on. VYS has his General Class license. Sorry to have to report the death of BZQ. GQL is mobile in Malden. AQH has a TBS-50D and will be on 6 meters. CAS, of Whitman, will be on 6 meters soon. The Newton c.d. group ran an area field strength test with mobiles and

(Continued on page 88)



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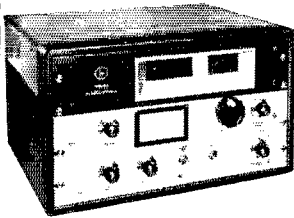
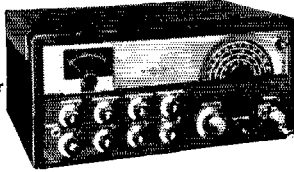
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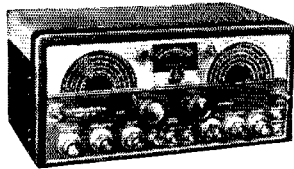
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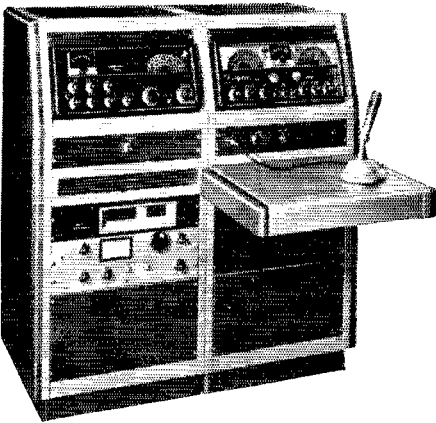


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the results were excellent. More on 6 meters: AWA, AFE, BSY, BEY, BQP, DZE, GPV, ILLF, JLX, MHC, and TUT. BU is NCS for the New England Municipal & Interurban Wireless Assn. Net on 146 Mc. PSG is Radio Officer for Gloucester. The South Shore Club held a meeting with ICP and Mr. Hallenstein in a panel discussion. CUW has a Ranger and an S-76 receiver. ABJ has a BC-610, an NC-300, and a three-element beam on 10 meters. A new group, the Dim Light Boys, on 28,560 kc. has a certificate for working nine of the following members: YKB, ZSZ, VTH, GFO, SSA, RES, ZPL, VMU, YMV, KJD, ACB, ZHX, CNG, TAA, ZSX, ZSU, DXQ, Winthrop drill had 18 stations on: DLY, DQF, OIR, DJ, MQB, CMW, UOC, DRP, AGB, DGY, DPN, GBI, FHE, EAJ, DUV, TEO, and ORV. ORV lives at EAJ's QTH. BKR is busy in the Navy Reserve. The Seacoast Amateur Radio Club elected WCT, pres.; AFE, secy.; YVB, treas. ALP attended the meeting. MMQ is EC for Milton. Traffic: (Dec.) KIUSA 1109, WIEMG 435, BOA 307, UKO 300, EPE 250, AVY 120, SSZ 63, IBE 39, DFY 29, TY 26, BY 21, CUW 18, BOA 12, NUP 12, ABJ 9, ZNQ 8, VTT 7, AHP 6, LLY 6, TY 6, AKN 5, DPO 4, MKW 4, QLT 2, BPW 1. (Nov.) WIIBE 138, WU 8.

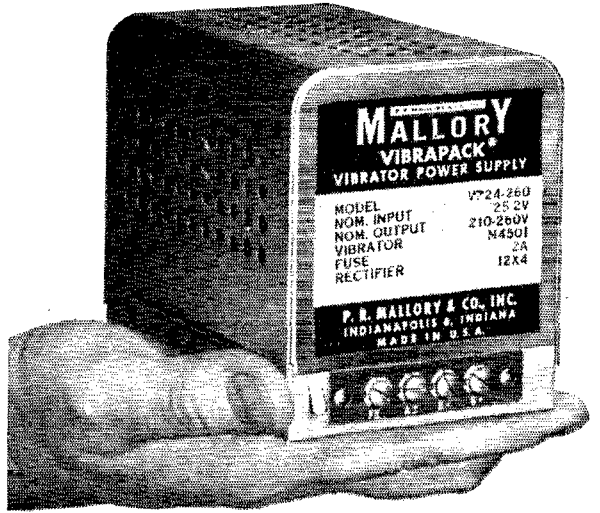
WESTERN MASSACHUSETTS — SCML, Osborne R. McKeraghan, WIHRV — SEC: RRR. RM: BVR. PAM: QWJ. The WAMC Net is going strong on 3560 kc. Mon. through Sat. at 1900 EST. An OO appointment went to JYH. EC and OES endorsements went to RFU, AIUN, RLQ, EFQ, and BKG participated in the November F.M.T., with MUN right on top of the list. PIU is Asst. RO for E. Longmeadow C.D. UAN has received his General Class ticket. A new Novice in Northampton is Conrad Chrystal, WN1HUN. GLO is getting back on the air. DGL needs Wyoming for WAS. STR, formerly EC of Fitchburg, is now living in Springfield and teaching in the public school system. He recently joined the HCRA. Old-timer Frank Cushing, AWW, also joined the HCRA. UBD recruited half a dozen HCRA members to help him get up a 40-foot tower in time for the V.H.F. Contest. The Northampton C.D. radio group has received an award for outstanding c.d. work and is holding code and theory classes for about 12 regulars. Sector 4A has some 6-meter gear on loan from the State and is running coverage tests. The HCRA sponsors a radio school and is starting the second semester with 25 regulars attending and doing fine. STR reports on activity in the Fitchburg Area. The Massachusetts Club members are very active with about 12 mobiles holding 6-meter drills every Wed. night. The Club has members from Leominster, Gardner, Ayer, Shirley, Templeton, and other towns in the area. Meetings are held the last Fri. of the month at C.A.P. Hq., Fitchburg Airport. RFU, net control of the 6-meter Horsebraders, reports that the Net meets every Tue. at 1930 on 50 to 51 Mc. About 12 regular members report in from W. Mass., E. Mass., Conn., and W. N. Y. Others have reported in from N. N. J., E. N. Y., R. I. and N. H. RFU is trying out a 64-element 2-meter beam which gets out very well. Traffic: WIZUU 519, DWA 132, UKR 125, HRV 111, BVR 70, TAY 30, BYH 17, DVW 10, WEF 10, TVJ 6, AGM 5, WPW 2.

NEW HAMPSHIRE — SCML, Harold J. Preble, WIHS — SEC: BXU. RM: CRW and COC. PAM: CDX. The holidays brought a considerable increase in traffic for the month of December, with ARR, DYE and CDX making BPL 2123 pieces of traffic were handled, compared with 822 for the same period in 1954. DYE has been appointed ORS. Officers of the Concord Brassoppers for 1956 are RVQ, pres.; ZFP, vice-pres.; LVG, secy.-treas. The New Hampshire Novice Net meets Sun. at 1000 on 3731 kc. ARR completed WAS with a card from 7PGA in Nevada on 15 meters. DAE skeds TNO/4 on 80 meters. YJW is building a new modulator. AIJ was the first ham in Concord with an NC-300. The Turkey River Radio Club has been organized in Bow, with the call GOM. Officers are RVQ, pres.; RMH, vice-pres.; ULU, secy.; LVG, trustee. WBM enjoyed the holidays visiting hams in New Jersey, Connecticut, and Massachusetts and reports many FB contacts on 2 meters. RVQ has started code classes on 11 and 2 meters Mon., Wed., and Sat. from 2030 to 2130. The former IVB now is 3DXW at Reading, Pa., and the former RZD is now K4EGH. Welcome to Novices GPP, GXZ, GYR, GSC, GVG, GZN, GZO, ICC, HCD, HCM, and HFB. DYE expects to have a new rig soon. Traffic: W1ARR 879, DYE 281, GMH 246, 1P 170, CDX 163, COC 138, HOU 64, FZ 59, WBM 37, PFU 33, ASZ 22, DYJ 18, BYS 8.

VERMONT — SCML, Robert L. Scott, WIRNA — SEC: SIO. PAM: RFR. RAI: OAK. VTN meets on 3520 kc. Mon. through Sat. at 1830; VTPN on 3860 kc. Sun. only at 0930; GMN on 3860 kc. daily Mon. through Sat. at 1200-1300. The Middlebury Mike & Key Club sponsored a social hour Dec. 4th. About sixty Vermont hams heard writer Murray Hoyt describe his experience with a short story, "Lovely Neighbor," which appeared in the Nov. 20, 1954, issue of the *Saturday Evening Post*, and described the romance of a pretty (of course!) YL with a woman-hating neighbor whose TV reception she was accused of ruining. AC was the oldest ham at the meeting. BJP has been confined to his bed since Dec. 20th. At this writing he expects to begin to sit up for a few minutes each day. He's active as an SWL and keeps an ear on various Vermont nets. Traffic:

(Continued on page 90)

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NORTHWESTERN DIVISION

ALASKA — SCM, Dave A. Fulton, KL7AGU — At a recent meeting the Anchorage Amateur Radio Club elected officers for the coming year as follows: ANO, pres.; CF, vice-pres.; BJD, secy.; CP, treas.; and AMS, act. mgr. AMS has purchased a new home with some room for antennas, he says a 90-ft. tower with a ten-over-twenty beam plus a long wire. We shall see. We think he already has missed the boat as there has been some real cold windy weather just ideal for erecting antennas. AKW found a new NC-300 under the Christmas tree and is trying to break it in. Anchorage has had more than its share of high winds this winter and it also has taken its toll in antennas, with BCH, CC, SLF, and AJA being among the losers. How about some news from other parts of the territory?

IDAHO — SCM, Alan K. Ross, W7TWU — Bonners Ferry: A new active station is KN2ZGF with a Viking Adventurer. Lewiston: GMC is going to town with traffic. He checks into four different nets and has a new NC-300 receiver. Caldwell: ZMM and EYR are active, with the latter on 2 meters (8100 kc. crystal). St. Anthony: ZLO meets with the FARM Net, Grangeville: RSP applied for RACES license. Twin Falls: NH is handling gobs of traffic and wishing Idaho had a c.w. net going again. Smelterville: WHZ meets with three nets and reports RQG, HXN, and HIQ active up that way. Boise: The Boise Valley Two-Meter Net now is active on established frequencies. The mobiles are on 145.44 Mc. f.m. (8080 crystal). The general "talk" frequency is 145.80-Mc. a.m. (8100 crystal). The civil defense "link" frequency is 146.88-Mc. a.m. (8160 crystal). Traffic: W7GMC 287, NH 228, RSP 16, ZLO 15, WHZ 5.

MONTANA — SCM, Leslie E. Crouter, W7CT — Montana State Net (c.w.) is showing some activity on 3920 kc. at 1900 MST after nearly a year of silence. KGGJ is to be congratulated for doing a swell job as Asst. SCM during the time your SCM was building and moving to Helena. We have only four reports from the Montana section this month to work on for this column. Most activity reports show only traffic handled and leave the other spaces blank. How about a few words in those blank spaces, fellows? The Yellowstone Valley AREC was alerted for a possible flood emergency. FSK is pinch-hitting for W7NCS as NCS Montana. Phone net. JRG finds v.h.f. activity slow because of s.s.b. c.w., and ragchewing, and 6-meter work discouraging because of ITV from Channel 2. FTO is living in new quarters in Lewistown. TVX is active on 10 meters. PMN has been remodeling the basement. YPM is rebuilding the rig and has a new SX-100 receiver. NZJ is looking for more activity on MSN. SMY and RDM made use of a mobile unit on the recent Elk hunt. ZEK has a new YL. Recent endorsements: NZJ as ORS, FTO as 8C and OBS, JRG as OES, FTO and NSJ as OPS. Traffic: W7SFK 72, TVX 28, MIQ 25, NZJ 9, LBK 8.

OREGON — SCM, Edward F. Conyngham, W7ESJ — AWT's traffic was all of an emergency nature. OMO missed his scheduled OBS because of flood traffic. AQK has been appointed NCS of OSN. BDU reports AREC nets are going on 145.8 Mc. and 3885 kc. WLL is restricted to 40 meters pending material changes. QYS has been appointed SEC, relieving WAT, who is going East for a new job. HDN, BLN, and QYS are compiling an emergency report. FQJ is back on his feet after an illness. New General Class licensees are ZBP and ZXC. The OARS assembled at Barnes (Vets) Hospital to take Christmas traffic. Among those at Barnes were RQG, OUS, QWE, JGJ, UGI, TOJ, and WWG. Those clearing traffic from them were PRU, OGI, WHN, WGR, and PRU's XYL. The work was on 2 meters with equipment supplied by United Radio and Portland Radio. In his excitement to get going during the flood UZU burned out the receiver antenna coils when a relay failed. SHA, OHK, SGV, SGW, and OUS participated in a spectacular bit of emergency work when an entire hillside slipped down and crushed a home, killing 5 and injuring 3, and cutting off all power and communications. ESJ blew a modulator in the Viking II. ONM was in Portland for eye-ball QSOs and to purchase a new transmitter. WHE is installing a mobile. VLE, up on Mt. Hood, is having power trouble and antenna problems. UVD rebuilt all antenna systems to get away from the heavy QRM. AJN is getting parts for the new shack. SEZ is working on a v.h.f. article and equipment. RET is supervising new high-power installation in the Armory. Traffic: (Dec.) W7QKU 746, APF 708, AWI 184, HDN 170, QYS 149, BLN 117, BDU 101, OMO 55, BVH 37, TIR 29, LT 26, AQK 12, WLL 4, (Nov.) W7APF 130.

WASHINGTON — SCM, Victor S. Gish, W7FIX — There were eight BPL winners this month, BA, PGY, VAZ, FRU, OE, WOK, AHV, and DK, the last three on originations and deliveries. The North Seattle Amateur Radio Club officers for 1956 are OEX, pres.; CBE, vice-pres.; WKH, secy.; YQS, treas.; TFJ, sgt. at arms; LWB and WAM, trustees. The Radio Club of Tacoma officers are OS, pres.; RGD, vice-pres.; W LX, secy.; AZI, treas.; AEA and RXS, board members. Club station DK made the BPL by originating 113 messages at the local USO during the holi-

(Continued on page 98)

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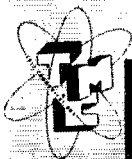
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days. The West Seattle Amateur Radio Club news: ITV is on 20-meter mobile and 15-meter fixed; TWU is back in Mississippi; LCS got a trip to KH6-Land for Christmas; WOQ is putting up a 15-meter beam; GUW is building a 60-watt rig; YGN has a Heathkit VFO. AZI, WLX, and their YLs visited the SCM. KTL is moving to West Virginia in May or June. High winds wrecked masts at AIB and VCF. HDT reports 2-meter building in Clarkston. TIQ has his transmitter ready for the new MARS and ham traffic frequencies. VAZ threatens to taper off on traffic. It's no use making resolutions. AI, it will slow down by itself. FZB is on WSN whenever possible. APS is looking for a receiver that won't get ITV. You and 100,000 others, Lew. AIB still is experimenting with antennas—this time a 136-foot Windom. AVM finally got out on 2 meters and worked LHL in Seattle. GVV is running low power from a new QTH in Port Angeles. CWN reports projects there still are on the bench while he works 20-meter DX and RN7 traffic. BXH is a new WSN member in Lynnwood, an ex-CG operator. K7WAT submitted a traffic report but failed to separate MARS and the ham band. Traffic totaled 388 but there was no break-down. BA sent in a picture of his shack — HRO, 75A-4, 32V-3, and KWS-1, and Gonset 2-meter rig. Traffic: W7BA 3065, PGY 2556, VAZ 1637, FRU 1237, OE 629, WOK 174, AHV 122, DK 113, UYL 69, EHH 57, NYJ 43, USO 37, FWD 35, AMC 22, APS 22, AIB 21, VCF 11, PZB 7, GVV 7, JBY 6, LVB 6, CWN 5, EVW 5, TIQ 5, AVM 3, HDT 2, GAT 1.

PACIFIC DIVISION

NEVADA — SCM, Ray T. Warner, W7JU — SAJW received certificate No. 36 for the "Worked 25 Nevada" award. TKV received his endorsement for 35-w.p.m. code speed proficiency. MAH, of Reno, completed his new 60-foot steel tower, which now supports his 40-, 20-, and 10-meter beams. MVP was active in the recent SS Contest. WN7YNO, jr. operator of VII, is anxiously awaiting his Conditional Class ticket. VIU is enjoying his new NC183-D, which is helping him on his European DX on 15 meters. ANR, of Tungsten, is active on the Mission Trail Net. KXG, also of Tungsten, was active with flood traffic out of Yuba City. ACW is the radio club station at the U. of Nev. at Reno. This station is active on 40-meter c.w./phone with a 33-ft. vertical on top of a 2½-story building, using a convenient tin roof for ground. The operators are ZKZ, UXL, YEX, RBB, and trustee TQL.

SANTA CLARA VALLEY — SCM, R. Paul Tibbs, W6WGO — Asst. SCM: Roy E. Pinkham, 6BPT. SEC: NVO. The PAARA of Palo Alto had CH as speaker at its January meeting. His talk was on getting the most out of your antenna. Many of the old-timers know Hugo and his contributions to amateur radio. TTB is conducting a code class for the PAARA. Anyone wishing to increase his speed is welcome to attend. KQK, of Palo Alto, had two inches of water in his house during the recent floods in Santa Clara Valley. PBX has the bugs chased out of his s.s.b. exciter. QWX won a 10-B s.s.b. exciter at a recent SARO meeting. K6JTG, 13 years old, has a General Class license now. Officers of the SARO residing in the Santa Clara Valley section are VCG, vice-pres.; WLL, secy.; and EFT, comm. mgr. WLI was ordered out of his house during the flood. On his return the next day he found the water had come to within two inches of entering the house. K6DYX sent in a nice clipping from the Monterey paper in which the writer gave amateur radio and operators a nice write-up, telling of their work during the floods by furnishing communications while the commercials were out of service. Also received was a first copy of the Monterey Bay Club's paper. K6KRK has his General Class license and is getting into traffic work. The Monterey Bay Club was shown colored slides taken by ZLO during his travels as a marine radio operator. YHM lost his 20-meter antenna in the wind during the recent rains and was without a.c. power for eighteen hours but operated with emergency battery power. Traffic: W6YHM 579, VZT 382, HC 316, ZRJ 282, BPT 258, YL 254, K6DYX 160, W6UTV 136, AIT 86, CAZ 15.

EAST BAY — SCM, Roger L. Wixson, W6FDJ — Asst. SCMs: Harry T. Cameron, 6RVC; and Oliver A. Nelson, jr., 6MXQ. PAM: LL, RMS: EFD, JOH, and IPW. I would like to offer my congratulations to those hams in the East Bay section who did such a wonderful job during the recent flood disaster. On Thurs. morning, Dec. 22nd, I received a phone call from South West Airways, which was desperate for information regarding conditions at Arcadia Air Field. VPC got on the job with the Sixth Army, San Francisco, which was in contact with GQY in Fortuna. Information was given to South West Airways within the hour. The events that followed are a matter of record and I will venture to say that this was one of the best demonstrations of what amateur radio can do during a disaster. According to my reports, and they are by no means complete, the following stations took an active part in the emergency: VPC, FDJ, CGS, K6GK, RUC, HOF, QFE, DEX, TCU, LGW, K6IMV, VNI, OT, K6IRE, K6HEX, K6CCQ, K6LRF, W6YDP, who was managing W6OT, the Oakland Red Cross station, and Bob Melvin, who kept K6GWE, the 2-meter repeater station, on the air. CXO, the Red Cross station, San Francisco, made good use of K6GWE repeater.

(Continued on page 94)

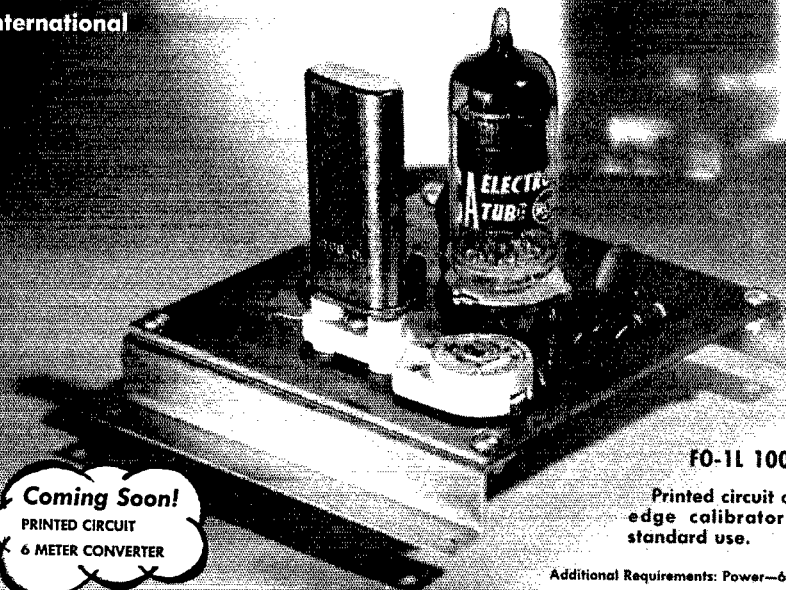
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establishing good contact between San Francisco and Marysville, on 2 meters, a distance of almost 150 miles. The traffic count from K6WAY reads 1118. CBF, EY, and FZC are battling it out on what looks like a private Frequency Measuring Contest. ITH is in KH6-Land enjoying business and pleasure. SXK was home with the family during the holiday season. The MARS RTTY Net has been busy with a 443 traffic count. Ten more modulator 2Bs have been released to us. To get on the list, contact VPC. Two-meter RTTY activity is on the increase with JZ, ASJ, WOC, RLB, VPC, and others active. Two new OBS appointments are in from PZC and VPC. ARRL Official Bulletins will be put out on RTTY, 80 and 40 meters. Traffic: K6WAY 1118, W6VPC 443, K6GK 174, W6IPW 145, K6EPC 122, W6ASJ 56, CBF 9, ITH 5.

SAN FRANCISCO—SCM, Walter A. Buckley, W6GGC—The San Francisco Radio Club held its annual Christmas Party in December. The club meeting night has been changed to the 4th Wed. instead of the 4th Fri. of each month because of a change of policy of the new management and owners of the property where meetings take place. The San Francisco Club now gives amateur license examinations prior to its meeting. A Notary Public who is a member of club notarizes the papers and thus saves time. KN6LHD, WOPL, W6BZT, K4BNK, KN6JEE, KN6JHO, and W4CNL are new members of the Tamalpais Radio Club. K6LCE, pres. of the Marin Amateur Club, got together many pieces of radio gear and the Northwestern Pacific shipped some gratis to the disaster area in appreciation of the work which the fellows did in handling communications for the Railroad during the flood disaster. CBE also handled messages to and from the North Western Pacific R.R. QMO put in two nights' work handling traffic for CXO after her regular hours at USA. Navy personnel amateurs at Treasure Island put in 24 hours a day from Dec. 23rd to Dec. 30th, inc., handling emergency messages. They relayed over three hundred messages during this time and had direct teletype into the stricken area in the North. On the morning of Dec. 22nd the SEC of San Francisco, NL, telephoned to say that rain water had shorted out the final on his set and he didn't think he was getting into Eureka, where SLX was on the air trying to get word out about the disastrous flood. DCH was contacted at USA and asked to tune in on 7100 kc. DCH got the fellows on the job and shortly after CXO, the San Francisco Red Cross station, tuned in. JWF, trustee of the station, put in many hours at the rig without rest. K6PSI, formerly K2HID/2, was active on the c.w. and phone nets. It would be almost impossible to list everyone active in this emergency but with the aid of the SCMs IC is compiling calls at this time to send to ARRL Headquarters. With CXO, USA, and K6NCG in San Francisco, UW in San Jose, OPL at Marin Red Cross, the American Legion, the Mission Trail Net and other nets, along with the stations in the Northern and Southern Divisions working together, it proved to the public in general that amateurs are prepared to handle communications when regular means of same are unavailable because of disaster. RXX, mentioned on 75 meters that he had handled over one thousand messages from his own QTH. He was the only amateur getting through from stricken Yuba City. Governor Knight, while on TV talking about the Pacific Flood conditions, took time out twice in his speech to note that the public should be very grateful to the hams for handling communications. I would like to take this opportunity to thank the amateurs in my section for the hours of work they put in to help out. Mr. Landry, new San Francisco FCC man, is now a member of the Central California Radio Council. GQA has qualified as 1st-class Observer on 11 consecutive Frequency Measuring Tests. SWP's XYL requested that I thank the amateurs who sent Pat Christmas cards and said that SWP would express his own appreciation if in a position to do so. His condition is unchanged. Traffic: K6NCG 600, W6FEA 212, K6PSI 118, W6GGC 110, BIP 55, QMO 32, GQA 28, CBE 15, WJF 7, GHI 6.

SACRAMENTO VALLEY—SCM, Harold L. Lucero, W6JDN—This month's report is in the nature of a call along with a partial report on the Christmas Flood of Northern California. I have been receiving reports from a large number of amateurs as to their part in the flood communication, but the report is not complete. Let's all take a look at our logs and come up with a good count on traffic. I would like to know how the station was operated and the liaison with c.d. or other nets. Make a separation between emergency or welfare traffic. In the long run give me as complete as possible a run-down on the part you played in this emergency. Thanks for your cooperation, fellows. There are several amateurs who should be held high in the esteem of the general public and the amateur fraternity and I would have made mention of them, but even though they did a remarkable job they are yet too proud to permit use of their calls, so as they read this they will know that the entire country is with them. Had it not been for the radio amateurs, things would have been very different, so hats off to the amateurs of America for a job well done. The next emergency, and we hope that it never comes, will be handled with the same efficiency by a like number of amateurs and their associates. Again, thanks fellows and gals for a job well done. Traffic: W6RXX 1000, K6ORT

(Continued on page 96)

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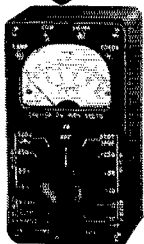
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SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The local radio amateurs were given public recognition through the local newspapers for their immediate response during the recent flood emergency. During this emergency in the Fresno Area we were tied into the State of California Region 3 Net, the American Legion Net, and the local 2-meter Net, which was very effective. Bouquets to Rosemary, PJF, who acted as net control station on the Region 3 Net. BNP is stationed at Lackland Field, Tex. GFV is building a 10-meter rig. JXY has a signal slicer. OWL's mobile receiver went sour. SNF is rebuilding. EBL was part time NC on the Region 3 Net. BAN is the new president of the Fresno Amateur Radio Club. DJUD is back on 75-meter mobile. SUV has more power mobilizing. QOS is thinking about s.s.b. PDD and NTK, who are with Ma Bell, are being transferred to San Francisco. K6LFF is on 75-meter mobile. UJU is rebuilding his mobile gear. LOS was very active with the National Guard during the flood in the North. PFO was home during the holidays. He also is going to s.s.b. K6GHC has a new s.s.b. final. JPU is using grounded grid RK65 in parallel. Don't forget your monthly reports, fellows. See you next month. Traffic: (Dec.) W6ADB 220, K6EVM 83, W6EBL 34, K6CLK 29. (Nov.) K6EVM 38.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Charles H. Brydges, W4WXZ—SEC: ZG, RM: VIII, PAM: ONM, OBSs: RRR, SOD, and CZR. IHF has a new Lettine 240 rig and a Heath VFO. HFI is back with four elements on 10 meters. SWR is burning up 15 meters. EC has a full gallon on all bands, s.s.b. BBJ is on 40-meter c.w. and 75-meter phone. YHY is giving his Ranger a workout on all bands. SXX has his beam on an 82-foot tower. LWS still is fighting Channel 2 TVI from his 10-meter rig. All this information came via MDA, in Wilmington, along with a fine OES report. HKB is working the Early Bird Phone Net on 3845 kc., 0545 until 0700. 9QNI is ex-WN9QNI and KA7MB, and is operating from a temporary location in Roanoke Rapids and also is at the Roanoke Rapids Air Force Station. The NCN is active once more on 3554 kc. with K4BTN acting as NCS and W4IEL as asst. NCS. Let's try to keep this net active. Congratulations to those who helped get NCN started. A nice card was received from the Scarborough family—K2LDP, KN2MVU, and KN2MYJ. All are looking for a North Carolina contact. Can you help? The Charlotte C.D. Net is going strong and holding weekly drills with good participation. ZQB, the EC, has been running this net for a year and a half and it now is a part of the city e.d. plan. This is my last monthly report as SCM for this section. I am going to serve with Uncle Sam for three years. It has been a pleasure to serve as SCM for this section and I want to say thanks for the wonderful help you have given me. Traffic: W9QNI/4 18.

SOUTH CAROLINA—SCM, B. L. McGraw, W4HMG—VJ finally cracked the 2-meter curtain from Columbia to Charleston for the first time in history. Now, how about a 2-meter signal back to Columbia fellows? FFH (PAM) reports 690 check-ins to the South Carolina Phone Net for the month of December. Nice going, gang. The South Carolina Mobile Net is steadily gaining, with more than 20 reporting in each net drill. Congrats to K4EGI on that new FB mobile rig. Santa Claus was real nice to FFH with a truckload of new gear. Those full-gallon signals from ZGP and DYP sure emit with a boom. AKC (RM) reports good activity on the South Carolina C.W. Net and it is steadily growing. Hats off and thanks to ANK, your former SCM, on a wonderful job. We hope to have a long report next month, fellows, after we get our feet on the ground and get your activity report. Traffic: W4FFH 103, ZIZ 88, ANK 32.

VIRGINIA—SCM, John Carl Morgan, W4KX—VN may have been slow during the fall, but things are rolling now. Five Virginians made the BPL in December, old faithful PFC and SHJ, plus new ORS CXQ, K4DWP, and K4BAQ. K4CDK is the new PAM, adult manager of YON, succeeding LW, now on sea duty. VFN keeps on a-rolling 7 nights a week so smoothly we almost take 'em for granted. KFC gradually is dismantling for move to a new QTH. Vic also is baby-sitting, following the birth of a new YL, No. 5. YZC has DXCC confirmed, and reports a mobile rig in his '29 Buick! IA has 88 confirmed and his jr. operator, TFX, has 68. CZB, HMK, FKY, AWZ, and K4DBC demonstrated ham radio to the Glass HS Science Club in Roanoke. BLR says she and her OM, BVB, had to sacrifice break-in to de-chirp the rig. K4BCT is at Brementon, Wash., where his ship is refitting. K4AET reports ex-3DAD, now 40VI at Ft. Meade, ex-ZNQ, now 3CGU in Md., and K4BUY made General Class, according to APM. The Falls Church HS station, BRN, is on 40 meters at 0815 weekdays. BPLR 3QQE, of PFC, is on leave from Quantico. DYY now is in Alexandria. The Richmond ARC celebrated "Old Timers Night" in December. FJ measured 10 and CVO to 10.8 p.p.m. in the F.M.T. Re: The many inquiries as to the Virginia Bulletin, I'm in the dark, but

(Continued on page 98)

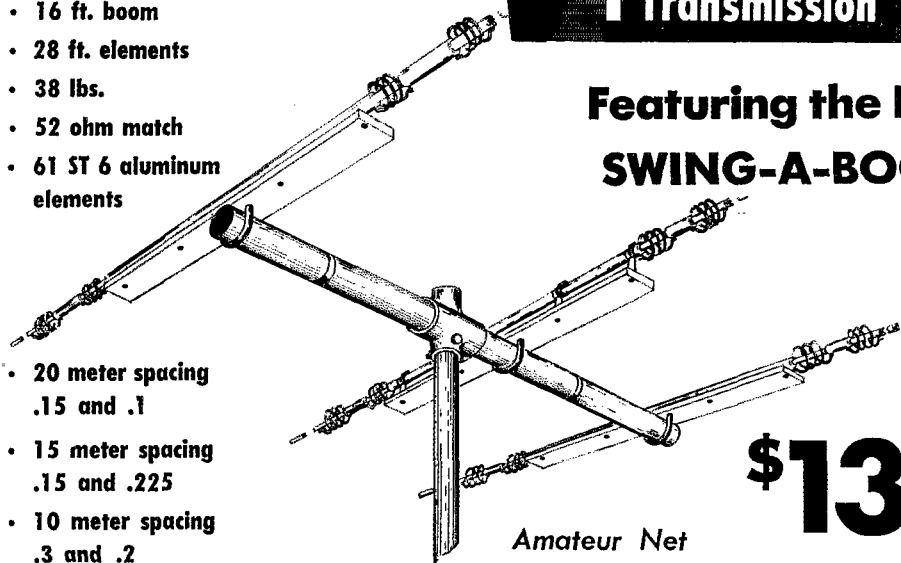
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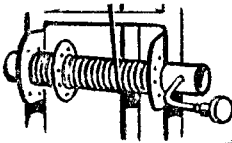
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checking. BZE bemoans the fact that cold weather makes his attic shack untenable. Since we have space, let's urge all to check in frequently on all nets. You don't have to be a dyed-in-the-wool traffic hound, and you will meet a lot of fine guys and gals. Traffic: W4PFC 1150, SHJ 337, K4BBR 320, W4IA 265, YZC 228, FV 208, CXQ 166, K4DWP 155, EAQ 148, ASU 118, DBC 118, W4CZB 106, BLR 78, FKP 65, AAD 40, CGE 28, K4AET 26, W4AQA 21, IF 13, APM 9, K4CDK 9, W4KRR 8, FLX 6, CVO 5, ZM 4, KX 3, TFX 2.

WEST VIRGINIA—SCM, Albert H. Hix, W8PQQ—SEC: GEP, PAMS; GCZ and FGL. RMs: DFC, GBF, HZA, and JWX. HZA has been appointed Radio Officer for West Virginia by the civil defense authorities. I am sure that a more qualified person could not have been chosen for this important assignment. Amateurs are requested to submit applications for RACES licenses and to prepare for emergency operation. The State Capitol station will be in operation before too long. VCT has moved to California. A new ham in Sinks Grove is WN8IFL. The Monroe Amateur Radio Club has three AREC members out of a total membership of nine. In the November Frequency Measuring Test GBF had an average error of only 4.1 parts per million, which is extremely accurate. During two measurements his error was zero. PZT also did exceptionally well in the same test. Both are to be congratulated. PBO has a new VFO in operation and does a very good traffic job. DFC renewed his RM appointment. PJI is very active and desires to participate more often on WVN. WN8BZY, of Chapmanville, has 30 states and an XE1 and VE2 to his credit. Traffic: (Dec.) W8HZA 132, PZT 111, GBF 94, PBO 50, PJI 49, DFC 27, BWK 23, UYR 19, PQQ 2, WNSVMM 2, (Nov.) W8GBF 49, DFC 22, (Oct.) W8GBF 68, (Sept.) W8GBF 28.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, James B. Simpson, W0HEM—SEC: NIT. RMs: KQD and MYX. PAM: IUF. To start, apologies to the Denver Radio Club for losing their newswy *Bulletin* (my dog chewed it up). Please don't let the reports stop, I need them very much to help me get on the beam. TVI is gunning for all TV calls. Ex-LMO, ex-K2GGM, now is LMO. HHR worked a mobile schedule with CVG all the way to San Diego on 75 meters with 25 watts. MMT resigned as SEC to become national secretary for the YLs. Interesting things are coming to light in the El Paso Radio Club's junk-box auction, held the 2nd Wed. of every month. MEY took office as president of the El Paso Radio Club, and also is a brand-new policeman. HEM will meet the net every 3rd Sun. at least for those who are too tired to send in their reports by card or tvl. BPLs for December: K0WBB, W0KQD, and W0TVI. Traffic: K0WBB 1631, W0KQB 954, EKQ 226, NVU 189, TVI 164, TNK 67, TVB 38, DRY 31, DXM 30, HOP 27, LNH 27, QOT 20, W5WDK/Ø 2, W0JES 2.

UTAH—SCM, Floyd L. Hinshaw, W7UTM—ZJJ has completed a modulator for his Adventurer and has a good signal on 3865 kc. QDJ's v.h.f. antennas are down again because of a windstorm. They seem to be emulating a jack-in-the-box. TVL has the parts mounted for his new rig but hasn't found the time to get it wired. C.d. drills were suspended during the Christmas holidays, but have been resumed. Traffic: W7UTM 28.

WYOMING—SCM, Wallace J. Ritter, W7PKX—The Weather Net has been using an alternate frequency of 3830 kc. b-ause of QRM on 3925 kc. EUZ has an emergency 75-watt 6146 rig about in operation. Frank and Lizette received holiday QSLs from six foreign countries. VMT is operating on 40-meter phone. KUB is ORX for a 20-A exciter and more s.s.b. MNW is the Cheyenne Club's acting secy. as JJO is leaving for the Air Corps. YWV transferred to Japan. YWW is about to get on 75 meters with 100 watts. HDS received a Public Service award from ARRL. PKX received three Public Service awards. AXG has a new modulator going. YSF advises he would like to start a State MARS Net. All interested contact him. We expect to have two OO stations certified in the near future. We still would like a volunteer or two for RM appointment. More club activity news, etc., is needed. Traffic: W7HDS 322, PKX 160, YSF 70, TZK 43, ZUC 30, ZOS 11, HX 10.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Joe A. Shannon, W4MI—Section Nets: AENB, 3575 kc.; AENP, 3955 kc.; AENT, 3910 kc. SEC: TKL. PAM: WOG. RM: KIX. The Birmingham Club announces the following new officers: UEL, pres.; NZZ, 1st vice-pres.; K4AOZ, 2nd vice-pres.; YXX, secy.-treas.; PXN, rec. secy. YXX reports that the club training program is bringing results and the 2-meter c.d. mobile net now has 28 members. Congratulations to the three BPLs of December: UHA, K4FDY, and WOG! K4CFD is working his new General and Globe Scout. K4GRA is new in Tuscaloosa. K4AOZ is the new net manager for AENP. The Mobile Club's new officers are URW, pres.; WHW, vice-pres.; AYM, secy.; AMH, asst. secy.; GOT, treas. WOG and GJW are struggling for DXCC! KIX says that AENB had three big nights during December, trafficwise.

(Continued on page 100)

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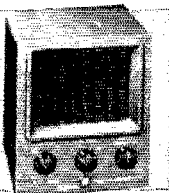
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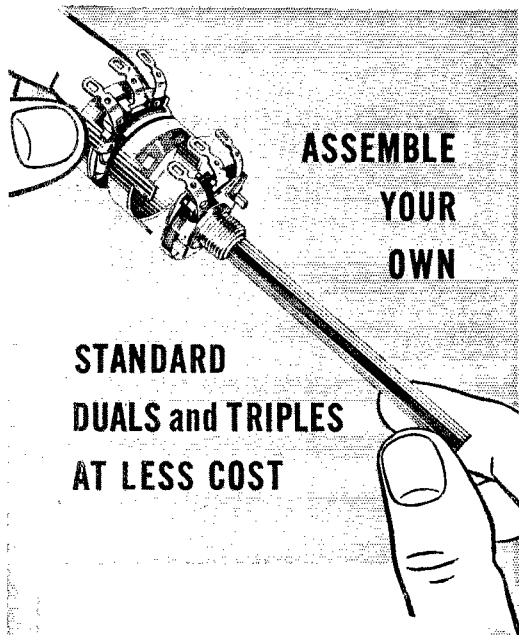
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RLG has completed building a signal generator. K4BSV has moved from the section and will be a W5. K4AAQ is now Elmac mobile and working out well. WHW worked YN1CAA on 75 meters. HKK sold out his mobile gear and upped the power to 600 watts fixed. Traffic: WAUHA 1804, K4FDY 1077, W4WOG 544, K1X 218, HKK 162, EVD 126, YRO 117, RLG 100, DTT 94, K4AOZ 83, W4ZSH 70, EJZ 28, K4ACO 27, W4BJL 24, RYT 20, AVX 19, K4BFF 19, W4WAZ 15, DGH 10, RTQ 8, TXO 8, K4BSV 4, AAQ 3, W4SXS 2, WHW 2.

EASTERN FLORIDA—SCM, Arthur H. Benzee, W4FE—SEC: IYT. Jacksonville: New officers of the Jacksonville Amateur Radio Society are WEO, pres.; TRN, vice-pres.; K4BGU, secy.; HRC, treas.; UHY, act. mgr. The Gator Novice Net meets at 0830 with KN4DSN as net control. Lake County: Two additional stations now on 50 Mc. are YBZ and HTA. AYW and DQT are looking for 2- and 6-meter skeds in the State. Contact them if interested. St. Petersburg: SPARC officers for 1956 are K4BUM, pres.; UFR, vice-pres.; ANH, secy-treas.; TZW, BAV, and TDK, directors; WME, trustee. Dade County: KQC is looking for a 2-meter sked (see Lake Co. above). The DEN is going strong the 1st Mon. (29,044 kc.). The Inter-county Net meets the 3rd Mon. FAJ is NCS of the Coral Gables station. The Novice Rebel Net meets Sat. at 0800 on 7170 kc. with KN4EVY, net mgr., KN4EUV, NCS. Write EVY for details. ERK is working the world on s.s.b. with KWS-1 and beam. KGJ vacationed in Mississippi. GFQ is NCS of the Graveyard Net which begins Sat. at midnight EST on 28,600 kc. IYT, the SEC, gave a talk before the Ft. Lauderdale Radio Club. Broward County: PPR is RACES Radio Officer and is setting up net stations in the C.D. Bldg. He needs help and more members. K4AHW is net control station for Hialeah Police to the Inter-county Net. He has a new DX-100 and a three-element 10-meter beam, with ground plane for local and emergency work. HSJ (W9AND, ex-Director Central Division) is on the air at Sulphur Springs. ZIR has overhauled his rig. The Floridora Girls, new YL/XYL informal net, meets Mon. at 0800 on 3850 kc. with 6 members. YLs/XYLs are urged to call in when they can. St. Augustine: The Ancient City Amateur Radio Club has an emergency net on 3875 kc. Club rooms were donated by b.c. station WST on the third floor of the building. Traffic: (Dec.) W4PJU 665, IYT 220, WEO 174, ZIR 89, LAF 82, GOG 73, RWM 36, EGY 34, YNM 31, FE 22, BWR 20, K4AHW 17, W4HSJ 3, WEM 2. (Nov.) W4FPC 378.

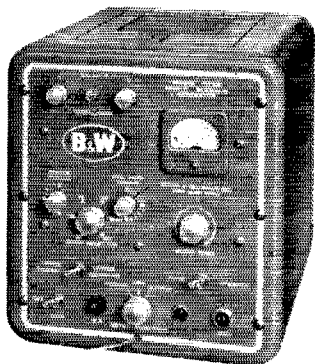
WESTERN FLORIDA—SCM, Edward J. Collins, W4MS/RE—SEC: PLE. ECs: MFY and HIZ. UFUF and ART are keeping interest in 144 Mc. going in the Pensy Area. YUU edits the Leon High School Radio Club's paper, *The Bug*. NJB is about set up in the new radio room. HBK has a nice new beam for 15 meters. GMS has a 10B exciter and is working on a GQ amplifier. ZUN and KN4AEP are working on a Q multiplier. ZPN is giving 40-meter phone a fit. K4AKP turns in an FB traffic total. UCY has 10-meter DX at his finger tips. COY was grabbed by the high voltage but is getting along fine. K4AH is getting a real bang out of ham radio after the long layoff. HJA has moved over to Milton and reports real activity at Whiting Field. BGG built a dual ground plane. ZFL has a nice four-element on 10 meters. YES has an FB tower and beam. K4DDD was heard mobile with low power. QK moves as Hurricane Net traffic. DXQ, ACP, VR, and PHQ stick with the 40-meter c.w. gang. JPD keeps the rig dried out. W4UC still rustles parts for the gang. EQZ is teaching his harmonic code. DAO/DEF was QRL the Christmas rush. EAR lets us know he is still kicking. MS is busy building a GQ 1-kw. all-band final for the s.s.b. rig. PAA is busy calling "QO Dog Xray." K4AGM is dusting off the 6-meter rig in hopes of raising her traffic total. WKQ reports over 107,000 points in the SS. Traffic: K4AKP 1101.

GEORGIA—SCM, George W. Parker, W4NS—SEC: YTO. PAMs: ACH and LXE. RM: MTS and PIM. Nets: Georgia Cracker Emergency Net meets on 3995 kc. Sun. at 0800 Tues. and Thurs. at 1830 EST. Georgia State Net (GSN) meets Mon. through Fri. on 3500 kc. at 1900 EST. New appointments: DDY and BXV as ORSs. HBO has entered a project (antenna radiation characteristics at u.h.f.) in the Westinghouse Science Talent Search. A new club has been started at Savannah High School. Officers are IBD, trustee; K4BWW, pres.; WEA, vice-pres.; KN4GHR, secy-treas. 1956 officers of the Taccoa Club are BEQ, pres.; K4EEY, vice-pres.; GCY, secy-treas. K4EAB, act. mgr. CFJ and his XYL, K4CZR, now are active on 40 meters. FGH, in South Georgia, now is active on 2 meters and is looking for Atlanta contacts. KN4DKM now has 42 states confirmed. BXV has a new 40-meter vertical. ZWD reports that his uncle and aunt in Pittsburgh, Pa., are new WN3s ERJ and ERK. BWD now is on 40-meter c.w. FYH has a new rig on an 813 final at about 200 watts. There are new Jr. operators in the shacks of FMC and YKK. K4GVJ is new in Jackson, and FZO has a new Q5-er to go with his almost-new receiver. KN4CNO is going great guns with Globe Scout. A new General Class license in Savannah is K4CRQ. The Atlanta Hamfest will be held Sun., June 17th, at a location to be decided upon. Other than the date the only thing sure is a

(Continued on page 104)

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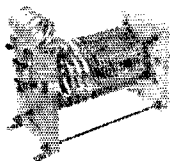


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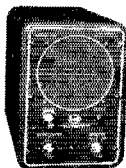


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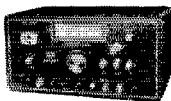
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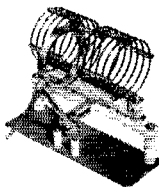
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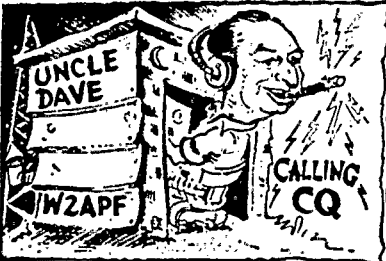
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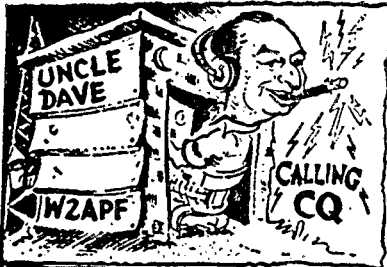
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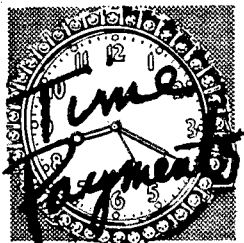


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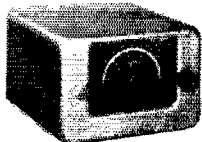
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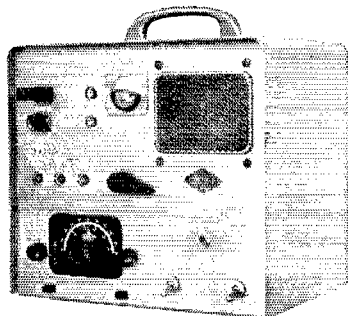
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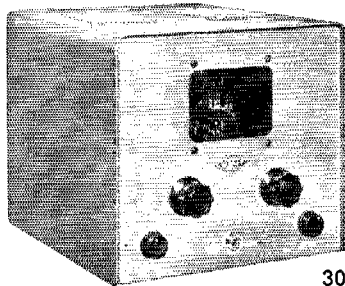
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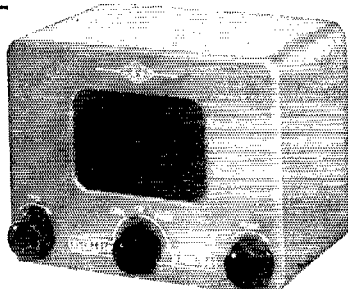
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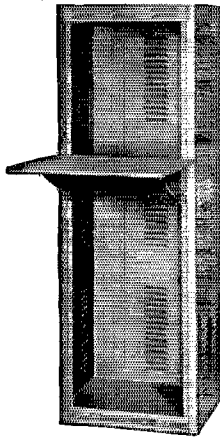
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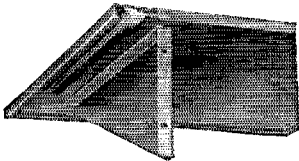
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Besides being low in cost, an outstanding feature is that no panel is required for support. Two supporting brackets slide into tracks welded to the shelf. These brackets are punched to fit standard panel mounting strips. However, the shelf may be attached over a rack panel if so desired.



The shelf is available in two sizes. It is formed from 16 gauge steel, flanged on four sides for greater strength and rigidity. The supporting brackets are made from 1/8" steel, capable of supporting any reasonable load. Over-all height of assembly is 7". Furnished complete with necessary mounting screws.

Catalog Number	Depth	Width	Amateur Net
SA-1719	16"	22"	\$10.40
SA-1720	20"	22"	\$10.55



BUD RADIO, INC.

2118 East 55th St., Cleveland 3, Ohio
Dept. Q

(Continued from page 100)

lot of good food, a good time, and the big white truck. Traffic: K4WAR 1058, BAI 370, W4DDY 366, PIM 231, FYC 197, ZUF 98, CFJ 52, MTS 34, BXV 26, BCR 24, BYJ 24, BWD 22, PBK 22, FYH 20, NXS 20, YTO 18, IMQ 6, FZO 4, KN4GNQ 4, W4RTY 4.

CANAL ZONE — SCM, Roger M. Howe, KZ5RM — The CZARA held its annual election of officers and CF was elected pres.; GF, vice-pres.; HA, secy.; MN, treas.; and JJ, wct. mgr. After the meeting the out-going officers treated the gang at the Diablo Clubhouse. K4AEE, ex-KZ5BL, was among the visitors at the meeting. GF has resigned as QSL Manager and KA, Kay, is the new manager. There is no change in the mailing address. BR is leaving for Key West, Fla., where he will be operator under the call ITNX/4. We'll be looking for you, Barney. JJ is back with a bang and 10 meters sounds normal once more. LB is planning a beam-raising party soon. New licenses issued during the month: KZ5AY to Albert A. Stern and KZ5WK to William L. Kelly; also Novice ticket KZ5ANN to R. H. Bookhamer. Traffic: KZ5VR 98, BR 9, RM 8.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, William J. Schuch, W6CMN — Asst. SCM: Albert F. Hill, Jr., 6JQB. PAMs: PIB and MEP. RM's: BHG and K6DQA. This month's report shows the section members having done a tremendous job of traffic-handling during the flood. CBA is the proud "maw" of a 7 lb. jr. operator. K6HMB is QSL building a new p.p. 807 rig. Among many others MLZ and BLU worked their heads off during the flood. K6LKG is breaking into traffic. K6GHU is on 28 Mc. K6KCI sends a nice traffic report and made BPL. MBA has a new jr. YL and also a new DX-100. WPF and GYH also did a big job on flood traffic. K6EJT is moving to Arizona. USY made BPL three times in a row. K6GUZ has a new 3.5-Mc. skyhook. KN6MON is doing a swell job of traffic-handling. TDO is building a new shack. K6EXQ has a new tower and beam. The Lockheed RC members soon will have special QSLs. K6OZ has a new 14-Mc. beam. AM is putting up a new rhombic. K6JHR has a new VFO. KN6PLW has dropped the "N." AM now has 260 countries. MJA is home from the hospital again. Rio Hondo is making big plans for Field Day. CAU is president of the Whittier 50 Club. UED has a new rotator. BHG, RNY, TDO, TTX, USY, K6DQA, K6GUZ, and K6LYF all get Section Net certificates. QWN and K6AIF are moving to new posts. K6CHN and K6MXR are building a TV camera. GJP has his kw. working again. K6GVI has a 7-Mc. beam. Traffic: W6DDE 1456, MLZ 966, GYH 945, K6EJT 860, FCY 749, W6BHG 577, K6HOV 550, W6USY 390, K6KCI 262, GUZ 231, W6BLU 215, K6COP 139, DDO 139, KN6MON 139, W6TDO 119, WPF 114, CK 108, JQB 101, K6BWD 89, W6CMN 80, K6DQA 74, W6ORS 49, CAK 44, KTZ 35, K6GHU 29, W6WRT 24, K6BEQ 16, IYF 15, W6CBO 9, LPV 8, AM 6, K6EJX 6, IQF 6, JHR 6, OIZ 6, BFC 4, KJN 2, W6LKG 2, KN6PLW 2.

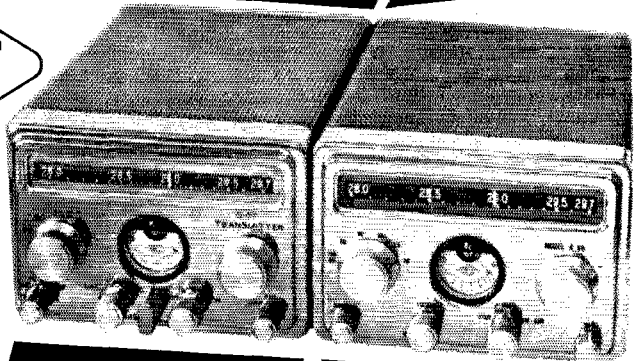
SAN DIEGO — SCM, Don Stansifer, W6LRU — 4UOA/6 is now an ORS in San Diego. BAM started the New Year by adding two countries, FB8BR and FB8ZZ. The Orange County gang donated 13 pints of blood for K6BGX after an operation. 5UEI has applied for a W6 call. K6DCF is a new staff member at the Santa Ana monitoring station. FSP sports a new KWS-1. JVA is now an OBS and puts out Official Bulletins on 3650-, 7100-, and 14,100-cc. c.w. five nights a week. New officers of the Helix Club are MGT, pres., LFD, vice-pres.; OGY, secy-treas. EPZ got his new final on the air, and then got orders to leave the area for two years. KSM worked DX for seven months from San Diego in '55 and worked 152 countries with 111 confirmed. KYG is now in the DX business from his Poway Rancho with assorted "V" beams and long wires. EHV, ex-KG1AG, now in Malibu, is a frequent visitor in the area. WNN is reported needing three cards for DXCC on phone. K6DVF is now on 80 through 10 meters, c.w. only, with a home-built 25-watt rig with p.p. 616's. Eight members of the San Diego DX Club went to Los Angeles for the January meeting of the So. California DX Club. LRU was elected vice-pres., representing the San Diego Area, for this organization. The February meeting of the Helix Club featured a ladies' night dinner with one-inch-thick steaks. CAE has completed a new pi-net kw. final for all bands. BKZ was active from San Diego handling traffic during the recent No. California floods. WNN is now an OO in the La Mesa Area. CRT now has 75 countries confirmed toward a DXCC. IAB has a new chief operator but still is in the traffic business. A number of the San Diego DX gang went to Fresno in January to the joint Northern-Southern California DX Club annual get-together. Among those going were BZE, KSM, KYG, OME, BGB, and BGX. BZE needs four more cards to have 200 countries confirmed. Traffic: W6BKZ 100, K6DBG 50, CRT 11.

SANTA BARBARA — SCM, William B. Farwell, W6QIW — New appointments: REF, Betty Wilson of Oxnard, as Asst. SCM; PWK, Lompoc, as OBS; ENR, San Luis Obispo, as OO. A new Ventura ham is KN6PKD.

(Continued on page 106)



MOBILE TWIN

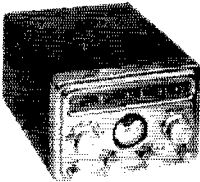


G-77
MOBILE
TRANSMITTER

G-66
MOBILE
RECEIVER

Gonset's new Mobile Twins, G-66 Receiver and G-77 transmitter, represent the perfect mobile combination. Outstanding multi-band performance—beauty of appearance—finger-tip control—6 and 12 volt operation—compactness without compromise! Typical Gonset dollar-for-dollar value—real "owner satisfaction".

G-66 RECEIVER



6 BANDS: 540-2000 kcs. 3500-4000 kcs. 7000-7300 kcs. 14,000,14,350 kcs. 21,000-21,450 kcs. 28,000-29,700 kcs.

AM, CW, SSB RECEPTION. Highly stabilized HF and BF oscillators and xtl controlled 2nd conversion oscillator.

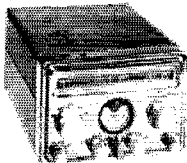
STEEP SKIRT SELECTIVITY: 265 kc 2nd I.F. 8 high Q tuned circuits. 3.5 kc I.F. bandwidth at 6 db down.

DOUBLE CONVERSION ALL BANDS: 2050 kc 1st I.F. Double input tuning (3 tuned circuits) on high bands for high image rejection.

AVC—Noise limiter—Panel S meter—antenna trimmer—BFO pitch—Audio-RF gain control—slide rule dial—3 watts audio.

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"3 way" (6V-12V-115V AC) Universal power supply/speaker..net 39.95

G-77 TRANSMITTER



FREQUENCY RANGE: 80-40-20-15-10 meters. VFO or xtal, switchable. Highly stable VFO, each band spread over most of slide rule dial.

FULL BANDSWITCHING: Exciter ganged with VFO, pi network output.

POWER INPUT: 50-60 watts, modulated. CW provisions, 6146 tube in output. New modulator has integral speech clipping. High gain speech for PA-type dynamic, reluctance, ceramic or xtl mikes.

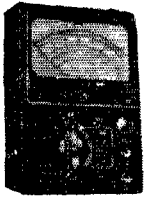
POWER SUPPLY: Heavy-duty, vibrator, 6 and 12V DC. Output voltage 500-600V full load, Selenium rectifier, low drain both on standby and transmit. Power supply is a separate compact unit.

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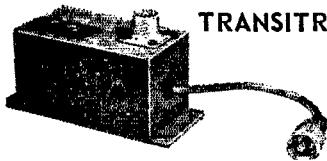
ARROW's Own Pocket AC-DC VOM MULTITESTER 2,000 ohms-per-volt



Extremely accurate and sensitive. Single selector switch for all ranges. 3" rectangular meter with easy to read scale. 1% precision resistors; jeweled D'Arsonval microamp meter movement, completely plastic-shielded against magnetizing. Rugged metal case.

Ranges: AC-DC and output voltage: 0-5, 0-25, 0-100, 0-500, 0-1000 volts. DC current: 0-500 μ a, 0-25 MA, 0-500 MA. Resistance: 0-20K ohms, 0-2 megohms. Decibels: 0-20 db to +16 db. Size: 3 1/2" x 5" x 1 1/2". Shipping weight 3 lbs. Complete with test lead and batteries.

Net Price\$11.95



TRANSITRON TR-1000

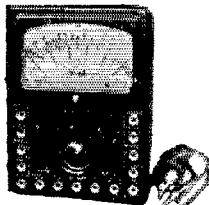
TR Switch

Automatic change-over from receiver to transmitter without coils, variable capacitors, or tuning adjustments. Peak power handling capacity of 1000 watts completely eliminates the difficulties encountered with heavy-duty antenna change-over relays. Range of 1.7 thru 32 megacycles. Insertion loss to receiver never exceeds one S-Unit.

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ARROW's Own Pocket AC-DC VOM MULTITESTER 1,000 ohms-per-volt

Rugged and compact. Large, easy to read scale on full 3" rectangular meter. 1% precision resistors; jeweled D'Arsonval microamp meter movement. Ranges: AC-DC and output volts: 0-10, 0-50, 0-250, 0-500, 0-1000 volts. DC current: 0-1, 0-250 MA. Resistance: 0-10K and 0-100K ohms. Size: 4 3/4" x 3 3/4" x 1 1/2". Complete with test lead and batteries.



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KN6MGV and KN6LUV pooled their equipment to make one good station. They are after WAS. BJB and EGQ got married during the Christmas holidays. MSG and TOP were active during the recent flood. NKT is becoming active on traffic nets. KCD now is active in ALN. FYW and K6CDL, both ECs, are conducting monthly AREC drills. ULS has made the DX Century Club. K6ATX has resigned as editor of *Key-Klix*, the Santa Barbara Club paper. You have done a swell job, Tommy. Good luck to the new editor. KP6AK checked into ALN on Jan. 5th and almost caused a riot. There is DX on 75-meter phone when you least expect it. Traffic: K6NBI 161, W6ENR 128, K6KPU 21, W6QIW 16, YCF 16, NKT 13, HUT 10, K6CVR 7, GYO 3, W6FYW 3.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, Cecil C. Carmack, W5RRM — SEC: PYI, PAMs: TFP and IWQ. RM: PCN. The Kilocycle Club of Ft. Worth now has 100 per cent ARL membership. FEH worked JASAQ as his first DX with an AT-1 and ground-plane antenna. Dates for the West Gulf Division Convention to be held in Galveston are June 15, 16, and 17. NVJ and OSV are experimenting with amateur TV. ANL is proud of a new SX-100 receiver. TKL and TMC are a new father-son team in Bonham. The Brownfield Club is conducting code classes with the National Guard. ZTB/5 operated and handled traffic at the Explorer Scout Winter Camp on Brady Creek. Santa dropped a 10B exciter for FNV. ZTG completed WAS. The new jr. operator of BXA and SFW arrived in time for Christmas. K5AUL received a citation for assisting with East Coast hurricane disaster traffic. The new call of K5JVN-W6FWB is K5DEB. New officers of the Texas YL Roundup Net are HCE, vice-pres.; and LGY, secy.-treas. YRT and her OM YTM have a new brick home in Tyler. VDQ improved his signal with a new antenna. KUP has a new Ranger. AQD visited a sister in Liberia and a brother in Peru during January. ATG has a new amplifier. RIM's son, ex-W5OBS, was home from Japan for Christmas. Other Christmas visitors: ISK and JRM to Commerce, LGY and mother to the ATGs, PTZ to Kansas. YPI, PYI, and TNW assisted with California flood traffic. K5BCX got his General Class license and entered the Navy the same day. CF has a new 10-20-meter V-P beam on a 40-ft. tower. YGE is raising a 55-ft. pole with 10- and 20-meter hats. YIJ now has a 5-kv. a.c. generator. The Early-bird Teen-age Traffic Net meets on 3980 kc. at 0700-0730. December NTX: 25 sessions, 394 messages, 190 check-ins. Traffic: W5KPB 497, AHC 444, FNV 427, CF 217, UBW 147, BKH 146, SMK 119, FJB 102, YPI 82, JFX 38, JYS 33, RP 28, RRM 27, QJY 26, ZTG 26, DYU 21, PAK 21, ASA 18, OCV 17, TFP 16, K5DEB 5.

OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GIQ. SEC: KY. RM: GVS. PAMs: PML, SVR, and ROZ. The newly-elected officers of the Bartlesville Amateur Radio Club are YLH pres.; YKB, vice-pres.; and EKA, secy.-treas. The annual training school for prospective hams offered by the BARC began in January. K5AOV is director of the school. The New Year's Day Hamfest and Dinner at Enid was a very good meeting with about 100 attending. A good dinner, a few brief talks and many prizes, in addition to meeting many old and some new friends, makes a good hamfest. We were glad to get our first traffic report from a Novice, KN5CBA. Congratulations to K5AOV on making BPL on the fourth traffic report he has sent in. The Aeronautical Center ARC station, PAA, has sent in confirmation QSLs for a WAS certificate. Your SCM attended a regular meeting of the ACARC and found good attendance, good fellowship, and a good technical talk, with doughnuts and coffee as a bonus. Traffic for December was doubled because of the Holiday Greetings. Notice that the high-score traffic-handlers are either straight c.w. or combined c.w.-phone operators. Traffic: K5AOV 669, W5MRK 248, FEC 80, PNG 46, ADC 42, QAC 29, SJJ 28, TNW 25, EHC 22, MQI 20, CBY 18, JXM 18, RST 15, LXH 13, PML 8, KN5CBA 3.

SOUTHERN TEXAS — SCM, Morley Bartholomew, W5QDX — SEC: QEM. The El Paso gang entertained the Las Cruces-New Mexico group Dec. 11th with an FB transmitter hunt, mobile rig contest, and picnic. QEZ has a new QTH. DIR has moved to Austin and is attending Texas U. FQA has an SX-100. FND has completed his mobile installation. BUV is on 2 meters. RSD is on 40 meters with a kw. LFG and his XYL, TSE, spent the Christmas holidays in San Antonio. CTL is the proud papa of twin boys. KQG has 4 watts mobile on 75 meters and an Elmac receiver. AMI, AXV, DCV, DJO, DMX, FBT, FEK, FSC, HFF, IRT, IVU, JLY, LEK, MMO, MXV, PMM, QIO, RAS, RIH, SVB, TAF, TEU, UUM, UVB, VDA, WZF, YCA, QKV, and KN5ATW attended the 144 and Up Club gathering near Deanville. IRP was winner of the second V.H.F. Activity Contest. ZKV is converting a 522 for use in the Houston ARC and HPJ donated a twelve-element beam. The Austin ARC held its annual banquet Jan. 11th at El Toro. HQR spent the Christmas holidays in California. PPC also enjoyed a trip to that State. QGN has his General Class license. BOY is going high-power mobile.

(Continued on page 108)

NEW MULTIPHASE "Q" MULTIPLIER

- Peaks Desired Fone or CW Signal
- Nulls Out Interfering Carrier up to 50 DB. No Loss in Speech Intelligibility

- No Insertion Loss — New Two Tube Circuit
- Special High "Q" Pot Core Inductor



MODEL AQ



MODEL DQ



MODEL B SLICER

CONVERTS MODEL A SLICER

Plugs into Model A accessory socket, converting it into a Model B. New front panel and controls provided. Enjoy all the advantages of "Q" Multiplier selectivity on CW, AM & SSB with your present Model A Slicer.

Wired.....\$29.50
Kit.....\$22.50

FOR AM, CW, SSB OPS

Desk Model "Q" Multiplier for use with any receiver having 450 to 500 KC IF. In attractive, compact case with connecting power-IF cable. Power supplied by receiver. Also provides added selectivity and BFO for mobile SSB or CW reception.

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- New band-pass couplers provide high linear efficiency: 60%.
- Designed for 50-70 ohm coaxial input and output.
- Built-in power supply. Bias and screen regulation. Automatic relay protection.
- Exclusive metering circuit reads grid current, watts input, RF output, reflected power from mismatched load —switch to any position while on the air!

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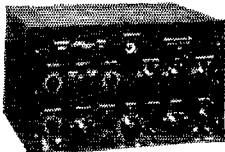
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Wired, with tubes.....\$397.50*

* All orders received prior to March 1, 1956, will be filled at the old price.



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- Bandswitched 160 — 10 Meters
- Magic Eye Carrier Null and Peak Modulation Indicator

Choice of grey table model, grey or black wrinkle finish rack model.

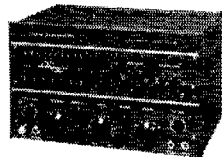
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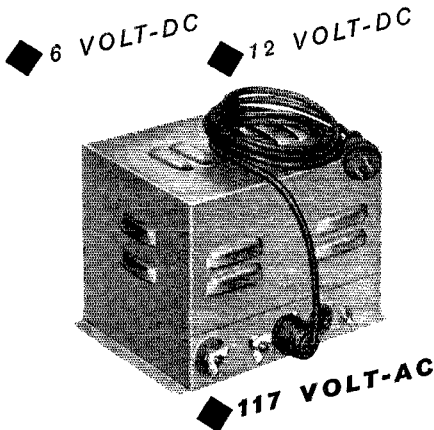
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Here is the complete power and control unit for your mobile and fixed installation both compact and economical.

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LOW is Radio Officer and HQR is Communications Officer in the Corpus Christi c.d. organization. NFC visited in Austin and Harlingen. Zeke was enjoying a short vacation from the cool climate of Alaska. QZZ is sporting a '56 Pontiac. CKW is on 20 meters with s.s.b. and a vertical. Traffic: (Dec.) W5TFY 124, ZWR 95, (Nov.) W5TFY 59.

NEW MEXICO — SCM, Einar H. Morterud, W5FPB — PAM: GQA. The NMEPN meets on 3838 kc. Tue. and Thurs. at 1800 MST, Sun. at 0730; the NM Breakfast Club meets on 3838 kc. daily except Sun. at 0700-0800 MST. New officers of the Sandia Base Radio Club are DWI, pres.; MSG, vice-pres.; LFT, secy.; ZFS, treas. POI has rebuilt his Johnson mobile for his truck and is operating all bands, and worked a KL7 on 15 meters. ZLF was home for the holidays from the Air Force and expects to get on from San Antonio. JWC is on with a homemade all-band rig. GYN has a Viking II. NSV is building a mobile rig. WN5KNU is studying hard for his General Class license. Ninety persons attended the Christmas banquet, held jointly by the Sandia Base Radio Club, Albuquerque Chapter of the Caravan Club, and the Albuquerque V.H.F.-U.H.F. Club. WRF has moved to Arizona. Traffic: (Dec.) K5FHU 188, WUAR 39, ETF 28, BZB 15, DMG 15, DWI 14, ARD 9, FPB 6, BIH 5, ZU 3. (Nov.) K5FHU 225.

CANADIAN DIVISION

MARITIME — SCM, Douglas C. Johnson, VE1OM — Asst. SCMs: Fritz A. Webb, 1DB; and Aaron D. Solomon, 1OC. SEC: RR. ZM is the new EC for Charlottetown. Congrats to PD and his XYL on the new jr. operator. ABT has been giving 21-Mc. c.w. a whirl. PF is getting S9-plus reports with the new 14-Mc. quad. WR is active on 14-Mc. c.w. and has worked six new countries. UB is the call of the Fredericton High School ARC. Congrats to ND, FRAC station, for leading the section in Field Day scores. WK is active again from his new QTH. UR is the new Saint John call. EE has his 14-Mc. beam erected. VS is on 14-Mc. c.w. looking for 8SP and 8PF. GU has moved to Saint John. AEB built up a memory-timer that will automatically pre-heat the receiver and transmitter filaments previous to a net, sked, or ragchew. ABZ is mobile on 75 meters. SI is putting out a good signal with the DX-100. DB has been a regular attendant on the TRN on 3535 kc. LY is active on 28 Mc. with a three-element beam. WL and OM were in VE3-Land for a three-week trip. ADM is the proud owner of a Viking II. YV and his XYL moved their QTH to Dartmouth. PX is back in Ellershouse after a recent trip across the pond. FQ makes BPL on December traffic. Traffic: (Dec.) VE1FQ 376, V06AH 137, VE1AV 81, UT 79, VO6U 77, VE1FH 61, WK 61, AO 27, DB 26, OC 26, OM 18, UY 17, ME 16, YB 14, GA 10, WB 10, BN 6, JP 3. (Nov.) VE1UY 38, PF 5.

ONTARIO — SCM, G. Eric Farquhar, VE3IA — It seems to us that the Ottawa Club has the right idea in program arrangement. At last month's meeting Gord Grant, DY, gave a talk on the noble art of telescope-making, which proved very interesting and educational. Several clubs already have formed Field Day committees. This is a wise move, we think, and one that should eliminate those last-minute panics which seem to prevail in June. BCL presented a very timely and interesting constructional talk on "Broad-Band Couplers and Multi-Band Tuning Circuits" at the London ARC meeting. Cornel Milivoi, a new-comer from Romania, is welcomed to ham radio up London way. The new president of the Nortown Club is DSG. Glad to report IL now is in tip-top shape after being hospitalized. DQQ is teaching school at Potter, Northern Ontario. BWH is going great guns with a 15-meter beam. Congrats to BMH and his XYL. The Quinte Club has a library which includes a nice array of QST's. RR is having much pleasure with the new rig. TO is forming a 50-mc. AREC Net. AJR mobilized on 10 meters and added Uruguay and Southern Rhodesia to the list. APL has moved to Minden. AVS attended the Ottawa Club meeting. DN edits *Nortown News* and solicits contributions. Congrats to BXF on winning the Montreal ARC WVE Contest for the Ontario section. WA now is located in Scarborough. HE, who is a projectionist, is a good man to know. His showing of educational films at Nortown recently were superb and appreciated. DMU hammers away for WAS, specializing in Novices exclusively. That's a very nice gesture. OM. It's a boy! Congrats to Ron and Marion. AXV. Traffic: VE3VZ 233, GI 124, NO 108, BUR 104, TM 96, DQX 49, AJR 47, DPO 41, PH 41, KM 39, DH 36, AUU 24, AVS 18, TO 7, APL 4.

QUEBEC — SCM, Gordon A. Lynn, VE2GL — FL reports again that conditions continue poor during daylight hours and that attendance on the Northern Net likewise is poor. YU has completed WAC and has the rig on 10 meters with a two-element beam, and reports conditions improving on that band. OB again took part in the Frequency Measuring Test with creditable results. UB is now on phone with a 6L6 final. ANK and AUH are reported as skillful DX hunters. AGP is heard occasionally on 3740-ke. phone. AAE is back on the air with a dandy DX-100. ASM, formerly VE1ADS, is on 80 and 40 meters with a VFO and a 6L6 final. II has relocated in Drummondville and is heard on 80 meters occasionally since joining the benedicts. UM has acquired an NC-183D receiver and feels proud. Traffic:

(Continued on page 110)

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Only Two Ways To Judge!
Don't Guess! Don't Be Fooled!

The only true measure of value is (a) performance and (b) amount of aluminum per dollar cost. Study these specifications—compare them—and you too will agree, along with thousands of hams, that GOTHAM beams are best!

TYPE OF BEAM. All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

STRENGTH. All Gotham beams are exceptionally strong and will last a lifetime. Our beams have withstood the severest winds and even hurricanes without damage.

GAIN. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db.); our 3-element beams give a power gain of seven (8.1 db.); and our 4-element beams give a power gain of nine (9.6 db.)

FRONT-TO-BACK RATIO. We guarantee a minimum F/B Ratio of 19 db. for any of our 2-element beams; 29 db. for any of our 3-element beams; 35 db. for 4-element beams.

MATCHING. Matching of the transmission line to the beam is extremely simple and quick. Everything is furnished and the matching is automatic. No electronic equipment or measuring devices are required.

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

MAST. Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between 3/4" and 1 3/8".

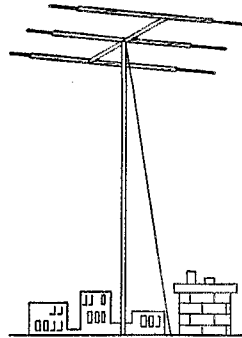
STANDING WAVE RATIO. A very low SWR of approximately 1.5 to 1 will result from following the instruction sheet, depending on the height above ground and the surrounding area. If an SWR indicator is available, Gotham beams can be quickly and easily adjusted to 1.1.

STACKING VS. INTER-LACING. We recommend that beams be stacked on a pipe or tower, rather than interlaced. At least three feet separation should be provided to prevent interaction.

WEIGHT. Gotham beams combine high strength with light weight. Weights vary from five pounds for a small 6-meter beam to 35 pounds for our largest 20 meter beam.

STANDARD AND DELUXE BEAMS. Standard beams in the 6, 10 and 15 meter bands use 5/8" and 3/4" tubing elements; the deluxe models for these bands use 7/8" and 1". In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

WHAT WILL A GOTHAM BEAM DO? A Gotham beam will amplify the transmitted and received signal tremendously and will greatly reduce noise and QRM.



This Full Size Gotham Cost Only \$21.95 And Brought In 87 Foreign Countries, All Continents And 30 Zones On 35 Watts!

**MAIL THIS COUPON TODAY!
10-DAY MONEY BACK GUARANTEE**

GOTHAM HOBBY CORPORATION 107 E. 126th ST. NEW YORK 35, N. Y.

Enclosed find check or money-order for:

2 METER BEAMS

- Deluxe 6-Element \$9.95 12-El \$16.95

6 METER BEAMS

- Std. 3-El Gamma match 12.95 T match 14.95
 Deluxe 3-El Gamma match 21.95 T match 24.95
 Std. 4-El Gamma match 16.95 T match 19.95
 Deluxe 4-El Gamma match 25.95 T match 28.95

10 METER BEAMS

- Std. 2-El Gamma match 11.95 T match 14.95
 Deluxe 2-El Gamma match 18.95 T match 21.95
 Std. 3-El Gamma match 16.95 T match 18.95
 Deluxe 3-El Gamma match 22.95 T match 25.95
 Std. 4-El Gamma match 21.95 T match 24.95
 Deluxe 4-El Gamma match 27.95 T match 30.95

15 METER BEAMS

- Std. 2-El Gamma match 19.95 T match 22.95
 Deluxe 2-El Gamma match 29.95 T match 32.95
 Std. 3-El Gamma match 26.95 T match 29.95
 Deluxe 3-El Gamma match 36.95 T match 39.95

20 METER BEAMS

- Std. 2-El Gamma match 21.95 T match 24.95
 Deluxe 2-El Gamma match 31.95 T match 34.95
 Std. 3-El Gamma match 34.95 T match 37.95
 Deluxe 3-El Gamma match 46.95 T match 49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

NEW! RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

- Beam #R6 (6 Meters, 4-El) \$38.95
 Beam #R10 (10 Meters, 4-El) 40.95
 Beam #R15 (15 Meters, 3-El) 47.95

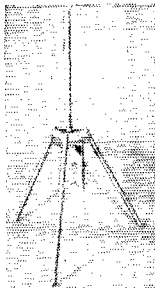
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Address

City.....Zone.....State.....



HOW TO ORDER: Send coupon with check or money order directly to GOTHAM or visit your local distributor. Immediate shipment by Railway Express, charges collect. Foreign orders accepted. Some leading distributors who handle GOTHAM beams: Offenbach & Reimus, Curle, M. N. Duffy, Alltronic, Purchase Radio, Lew Bonn Co., Henry Radio, Evans, Gib's Ham Gear, Hobe's Radio, Western Electronics, Harris Radio, Capitol Radio, Kinkade, Johannsen, W. H. Edwards Co., World Radio Labs, Graham Electronics, Geo D. Barbey Co., Hudson Radio, Selectronic, Radio Electric Service, Ken-Els Radio.



MAKE USE OF FULL TRANSMITTER POWER!

with Western Gear's

DELTA-TENNA

1. Reduces standing wave ratio to minimum; helps minimize TVI problems; matches RG8U 52 ohm coax without resorting to any impedance matching device.
2. Extra large elements for uniformly excellent loading over the entire band.
3. Attractive gold anodized elements assure extra long life in any climate.
4. Occupies a minimum of space; low wind loading, light weight.
5. Built-in coax fitting; U bolts for installation to any type vertical support.
6. Meets or exceeds all FCDA requirements for Civil Defense use.
7. Models for all ham or commercial frequencies from 25 to 465 mcs.

PRICES: 2-meter—\$19.95, 6-meter—\$24.95,
10-11 meter—\$29.95, 220 megacycles—\$18.95,
432 megacycles—\$16.95

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VE2DR 180, LM 71, EC 50, CP 37, GL 32, ATQ 18, FL 16.
ALBERTA — SCM, Sydney T. Jones, VE6MJ — PAM:
OD, RM: XG. The new officers of the Calgary Amateur
Radio Club are HY, pres.; XB, vice-pres.; QS, treas.; WL,
act. mgr. PV reports that the Lethbridge gang is having
trouble with "ITV." FA, KF, AS, WO, and MJ are pro-
gressing with 144-Mc. equipment. JP is working on a mobile
rig. SS has overcome the difficulties in the rig and is heard
regularly on 3.8-Mc. phone. KX is building a heterodyne
exciter. HM upheld his usual standard in the November
Frequency Measuring Test. YE and CE are heard checking
the B.C. Net regularly. NX is the new EC for Edmonton.
KL has qualified for phone operation. UK is on the lookout
for a 3765-ke. crystal. Traffic: VE6HM 321, OD 78, YE 46,
PS 10, VE7HD 10, VE6MJ 5, WL 3.

BRITISH COLUMBIA — SCM, Peter M. McIntyre,
VE7JT — SEC: DH, Your SEC, Wm. Emerson, VE7DH,
of Nanaimo, would welcome applications from ARRL
members for EC appointments. With only a minimum of
your time being involved and with just a little interest, he
could have active ECs in all parts of British Columbia.
Hope some of you heeded ASR's request to join RN7 and
put British Columbia on the map again. Incidentally, ASR
is the new Route Manager for B.C. The boys in Dawson
Creek acquired new mobile emergency equipment for the
club and still have money in the treasury. Most of the
activity from Nanaimo seems to be on 2 meters with every-
one building gear and antennas, even to GR's receiver that
has no noise. Locally AQW has acquired a car, so needless
to say there will be a new mobile on soon. AFP is moving
his QTH to Victoria and ZF, ZV, and HC are going East.
We wish them all well in their new ventures. Now is the time
to get all the stuff ready for all the new antennas as spring
is close at hand and the rigors of winter weather have taken
their toll. Yours truly would like to thank the BCARA for
the honor bestowed on me in giving me the BCARA Cup
Award for this year. Traffic: VE7ASP 216, CQ 128, ACS
89, AUF 59, XY 50, ZV 45, JT 31, AIO 21, DH 14, FS 14,
AG 8, ABL 4.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR
— BZ has changed his OBS frequency and is now heard on
3795 kc. at 1815 hours Tue., Thurs., and Sat. WW has a new
ground plane and works out well with it and a new PBS-50.
LT is now all-band phone and uses voice-controlled carrier.
JO is now at Kerrobert. BD has a new Viking Ranger and
works 21-Mc. mostly. JA now is on phone and does well
with 20 watts. BV and GX were heard talking over the
best fishing spots and making plans for the coming season.
BI puts out a nice signal with a DX-100 after being silent
for a few years. LT and WW are new phone net members
on 3780 kc. OC has a modified cubical quad for 14 Mc. The
Saskatoon Club officers are BD, pres.; TH, vice-pres.; and
DU, secy. Moose Jaw officers are WA, pres.; WA, vice-
pres.; AV, secy.; and KG, treas. VL has a new 20-meter
beam up 70 feet. Has your appointment been sent in for
endorsement? If not, please do so right away. Traffic:
VE5CW 39, BZ 32, LM 32, RE 30, CI 18, VL 16, DS 15,
QL 12, GX 5, HR 5, DD 4, LJ 4, BF 2, BI 2, EQ 2, GO 2,
LT 2.

Easy S.S.B.

(Continued from page 20)

When the wiring has been completed and you have determined that the tube heaters light up when 12.6 volts has been applied, remove V_8 and V_9 from their sockets and connect the 250-volt source. Check the oscillation of the VFO by listening on the receiver tuned to 5.3 Mc. If a 9.1-Mc. crystal is to be used, the VFO must tune 5.1 to 5.3 Mc. to cover 3.8 to 4.0 Mc. and 1.2 to 14.4 Mc. The tuning range of the VFO can be shifted with the trimmer capacitor and the tuning slug. If the transmitter is to be built for one-band operation, a crystal frequency can be selected that will require no modification of the BC-458 range.

With the VFO working, plug in the crystal and check for oscillation by listening on the receiver. Some adjustment of the slug in L_2 may be required before the stage oscillates.

Next feed in a 1200-cycle signal at the microphone jack, using a very low-level signal. Peak

(Continued on page 112)

NEW

Invest in Dependability.... get a Bonus in Performance!

Oscillator employs standard Type FT 243 8 MC crystals in Pierce circuit, thus avoiding the use of tricky overtone circuits.

Audio gain for either Dynamic or Crystal microphone.

Provisions for metering all stages.

R.F. Bridge circuit and rectifier to allow monitoring of R.F. output.

Antenna tuning system to match either 52 or 72 ohm feed line, terminating in standard co-axial output connector.

High level Plate Modulation.

Class A, distortion free, modulators.

Each RF stage separately tuned. NO broad banded circuits.

Highly efficient Class C RF amplifier stage operating straight through on output frequency. NO frequency multiplication in final stage.

May be used as exciter to drive high powered transmitter, and the Class A modulators will handle the drive requirements for typical Class B modulators.

Each transmitter is tuned and air-tested, with crystal and tubes supplied and shipped ready for operation.

Model TR 20/50—(6 meter band) 6AU6 Osc.—5763 buf/dblr.—

6360 Power Amplifier. 20–25 Watts input.

Model TR 20/144—(2 meter band, or CAP) 6AU6 Osc.—5763 buf/dblr.

5763 buf/mult.—6360 Final Amplifier. 20 Watts input.

Model TR 20/220—(1¼ meter band) 6AU6 Osc.—5763 buf/mult.—

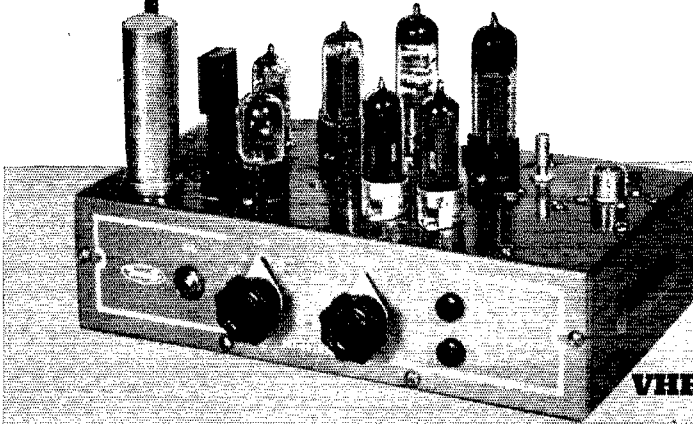
6360 buf/mult.—6360 Power Amplifier. 20 Watts input.

All models employ 12AX7 as speech amplifier/driver, and 2 6AQ5 tubes as Cl. A Modulators. Modulation transformer permits use of audio for external accessory equipment.

Requires 6.3 V AC or DC @ 3.89 amps for filaments. 250 V DC at 250 ma. for full input. May be operated at lower plate current levels, to permit use of inexpensive power supplies, in mobile service. Filament circuitry is arranged so that either 6 or 12 volts may be used.

Small and compact, ideal for Mobile as well as fixed station use. Only 9½" L. x 5½" W. x 5" H. Shipping weight 5 lbs.

Complete with
Crystal & Tubes. **AMATEUR NET**
\$59.95



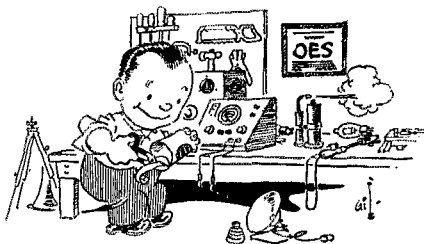
VHF TRANSMITTERS

For 50-Mc.—144-Mc. or 220-Mc. Band
and for CAP and Airport frequencies including 122.8 mc and 148.14 mc

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**THE AMERICAN
RADIO RELAY LEAGUE
WEST HARTFORD 7, CONNECTICUT**

L_3 , L_4 and L_5 for maximum signal. This can be checked with a small pick-up loop connected to the receiver through a length of shielded wire. The tuning of L_6 and L_7 and the output amplifier tuning controls can now be checked after the high-voltage supply is connected and the 1625s are plugged in. The correct operating bias must also be added, and it is hardly necessary to point out that the tubes should be plugged in while the power supplies are turned off, if you want to get on with your s.s.b. career. A 60-watt lamp can be used for a dummy load during initial tests, and the pick-up loop for the receiver can be placed near the lamp.

Now turn off the audio signal and adjust the two carrier-balance potentiometers for minimum output.

Next turn on the audio and adjust the ratio and audio-balance controls for minimum ripple on the scope pattern. If you aren't familiar with these "ripple" patterns and the correct way to couple a 'scope for r.f., the information is in the *Handbook*. It will undoubtedly be necessary to adjust L_1 before the ripple can be reduced to a small value, and you will find that you have to go through these adjustments several times before you can get the ripple down. Be sure to keep the audio at a low level so as not to saturate a stage somewhere along the line. The initial sideband alignment checks are best made at 9 Mc., using the output of V_6 link-coupled to a 9-Mc. tuned circuit connected to the vertical plates of the oscilloscope.

Check each sideband position, because in an ideal exciter they should both give the same minimum-ripple pattern. If you have an r.f. probe for your v.t.v.m., you can measure the r.f. voltages at the arms of the carrier balance controls and try to get the values within 10 or 15 per cent of each other. This is done by the tuning of L_1 and L_2 which will, of course, require further monitoring on the 'scope for minimum ripple.

Your objective is to minimize the ripple on the 'scope pattern and to have it similar for either position of the sideband selector switch. Once that has been done, you can connect the microphone and, whenever you need a single tone for tuning C_2 and C_3 , you can unbalance one of the carrier balance controls temporarily. If you want to run two-tone test patterns for checking the output-amplifier performance, remove V_4 or V_5 from its socket and use a low-level audio tone into J_1 . The two-tone test procedure is outlined in the *Handbook* and the s.s.b. book.⁴

The 1625 bias will depend upon the plate and screen voltage. A fair rule of thumb is to adjust the bias so that the idling plate current (no signal) for the two tubes gives around 35 to 40 watts input for the two tubes. With 750 volts on the plates and 250 on the screens, you can start at a bias of -30 and work down. With higher plate and screen voltages, it will be necessary to start proportionately higher.

(Continued on page 114)

⁴ *Single Sideband for the Radio Amateur*, published by the A.R.R.L.

AVAILABLE NOW...



SSB-100A EXCITER/TRANSMITTER

Specifications

100 Watts PEP output SSB
25 Watts AM carrier output
Frequency Range: 80 meters 3.500- 4.000
40 meters 7.000- 7.300
20 meters 14.000-14.350
15 meters 21.000-21.450
10 meters 28.500-29.000*

* Other 500 kc. ranges available by inserting proper crystal.

TYPE OF EMISSION: CW, AM, LSB, HSB
DIAL ACCURACY: ± 2 kc. after calibration
FREQUENCY STABILITY: 500 cps after warm up
OUTPUT IMPEDANCE: Pi-network output with 52- Ω -75- Ω normal load impedance
FINISH: Black wrinkle enamel
CABINET: Receiver type table model with hinge cover

Amateur Net \$745.

SSB-500 LINEAR AMPLIFIER

Specifications

FREQUENCY RANGE: 80, 40, 20, 15, 10 meters
TUBE LINE UP: 8 tubes; two 866, two OA-2, one OB-2, one 6AU6, one 1CP1, one 4X250B
POWER RATING: 500 Watts PEP input
300 Watts AM input
FINISH: Black wrinkle enamel
CABINET: Receiver type table model with inter-locked hinge cover

Amateur Net \$495.



AVAILABLE NOW — the improved model of Eldico's famous SSB-100. Retaining those features which made it tops in SSB, AM and CW, it now has the added advantages of full amateur band coverage — 500 kc. VFO — and a smaller, receiver-type cabinet.

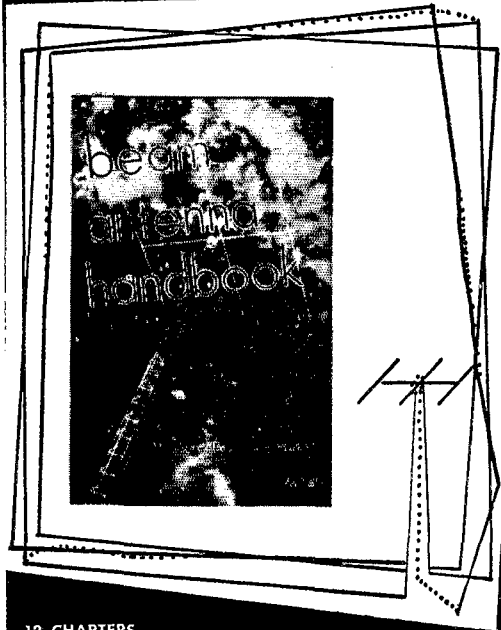
The REAL proof of any transmitter is its operation on the air. PROVE the outstanding operation of the SSB-100A by listening on any amateur band (80 through 10 meters) — you will have no difficulty in picking out the far superior quality of the SSB-100A signals. CONVINCE YOURSELF!

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DX-MINDED?



12 CHAPTERS

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BEAM ANTENNA HANDBOOK

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The first complete text entirely devoted to construction, installation and evaluation of rotary beam antennas. Eliminate "guesswork" in antenna construction and adjustment. New matching systems. Dimensional charts for beam design for 6, 10, 11, 15, 20 and 40 meter bands.

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Please rush _____ copies of BEAM ANTENNA
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Mobile Operation

While the unit is an excellent one for home-station use and "getting your feet wet" in s.s.b., it was designed for mobile operation. The most common question you run into about mobile operation is "What do you use for a receiver," and "Isn't it hard to tune in s.s.b. in motion?" The answer to the first question is "Use a crystal-controlled converter into a BC-453 (190 to 550 kc.)." The answer to the second question is "No, not with a good tuning rate in the receiver," (which the converter/BC-453 combination has). "Voice-controlled! break-in? Who needs it in mobile work? The push-to-talk switch is plenty good enough.

6.3-Volt Operation

The tubes specified in the schematic are for 12-volt heater operation, and the unit has been operated in a car with a 12-volt battery. For 6-volt mobile operation, it is suggested that one or two 6146s be substituted for the two 1625 output tubes. The other parts of the circuit remain the same, except that the heater wiring must be revised. A 6BA6 would be used at V_6 and a 6V6 at V_7 .

The author expresses his gratitude to Willie Sayer, W2NYY, and Dick Johnson, W2BDL, for their help in compiling information for this article.

Multiband Phone

(Continued from page 38)

Adjustment

The bands can be centered on the VFO dial by varying L_1 for the two lowest-frequency ranges, and by varying C_2 on the other ranges. If both ends of any band cannot be covered, C_2 (or C_3) must be decreased, and L_1 increased slightly. On the other hand, if a band is not spread out enough over the dial, C_2 (or C_3) must be increased L_1 decreased.

It should be possible to obtain at least 5 ma. of amplifier grid current on all bands. If the grid current exceeds this value, it can be reduced by detuning the 6AG7 output circuit. Although the 5894 has a rating of 150 ma. at 450 volts for phone operation, this is a CCS rating. The ICAS ratings of the Philips QQE06/40 are 600 volts, 180 ma. It is assumed that the 5894 or AX9903 could be safely operated at these ratings in amateur service.

The modulator tube is operated with 250 volts on the screen and 27.5 volts of bias. Idling plate current is 40 ma. rising to 125 ma. on peaks.

In TV areas, the customary practice of using shielded power wiring, power-lead filtering and a shielding enclosure should be followed as described in the ARRL Handbook.

— ED

Eliminate those unwanted audio frequencies...

with a new
R. L. Drake
**AUDIO
BAND PASS
FILTER**

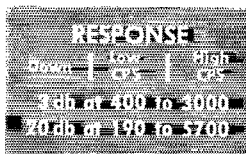


Model 587
\$12.95
AMATEUR NET

The new R. L. Drake Audio Filter is an effective, easily attached accessory that connects between crystal mike and transmitter. Carefully designed for correct low and high frequency cut-off, this new Audio Filter will not change natural voice quality.

Model 587-3 with push-to-talk connectors for Collins, WRL and B&W transmitters . . . **\$15.95**

no insertion loss
no controls
no power required



- Effectively limits audio range to keep your signal confined to the proper channel.
- Better side band suppression on SSB.
- On SSB phasing transmitters, it enables the use of smaller capacitors in the power supply.
- Only 4" long x 1 3/8" diameter.
- No wiring. Fitted with mike connectors and 5 1/2" cable.
- Reduces acoustic feedback in PA systems.

See page 64 - July '55 QST

Improves the selectivity of your present receiver:

QXer
Improved Q-Multiplier

Provides either a sharp peaked IF curve or deep rejection notch. Easily attached. For 455 kc. IF.

Model 583 **\$24.95 Amateur Net**

Also available for 915, 500 and 262 kc. IF.

Available from your distributor who handles Drake Filters. Ask him about other R. L. Drake amateur gear.

R. L. Drake Co. Miamisburg, Ohio

Switch To Safety

(Continued from page 21)

"Pull the plug!" I yelled when the XYL reached the cellar.

"Which plug?" she begged. Darkness was closing in, and I knew that there wasn't time to explain the six plugs on the operating table.

I couldn't speak again, but I remember thinking during the seeming eternity in which she worked frantically, "I can't stand this much longer".

Then it seemed that I was looking through a long cone of fog, and I remember thinking, "What a hell of a way to die!"

Everything faded. There was great stillness. Then there was perfect peace. And I slowly realized that I was wholly conscious and free.

By the time I had recovered my faculties, Virginia had run across the room to me. "I'm all right", I assured her.

And then we went up the cellar stairs together. . . .

As I write, my hands are still stiff and sore, and the XYL is still suffering from shock. She never found the right plug. Miraculously, the RG8/U jammed between the window and the window-screen, and when I lost consciousness and fell, my hands relaxed and my weight pulled my left hand free.

The first contact on the vertical brought an S9 from Goose Bay, Labrador. The next four contacts were with VE7, KP4, VK3, and DL4. Then I tore it down.

The station is now back in the breakfast room. The transmitter is grounded³. Every plug is polarized. There is a master plug for the entire station, and every member of the family has been shown how to pull it in an emergency. We have been warned.

Death is Permanent.

³ Not to the a.c. line, but to a separate earth ground. See Mix. "How to Live Longer", p 18, June 1953 QST.

SWITCH TO SAFETY!



Answer to "What Value Resistor" Question,
Page 31

- R₁ — 125,000 ohms, 0.5 watt.
- R₂ — 87,500 ohms, 1.4 watts.
- R₃ — 11,250 ohms, 4.5 watts.
- R₄ — 68,666 ohms, 2.4 watts.
- R₅ — 769 ohms, 13 watts.

In figuring the value of R₂, the screen current of 0.002 ma. and the current drawn by R₁ are added together (0.004 ma.). The voltage drop across R₁ is 250 volts because the grounded end of the resistor is at zero potential (voltage). Incidentally, the purpose of R₁ is to keep the voltage on the screen of the oscillator from soaring when the stage is keyed. This is one simple method of reducing chirp in an oscillator.

If you were to go to the store to buy resistors of the values given in the answer, you would choose the closest 10 per cent value available.



HIGH PERFORMANCE DEMANDS QUALITY...

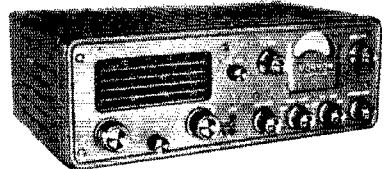
YOU'LL FIND BOTH IN MORROW COMMUNICATIONS EQUIPMENT



MBR-5

Exceptional stability and sensitivity characterize this 13 tube dual conversion amateur receiver. 100KC crystal standard and squelch control are built-in features. Designed for mobile or fixed station use. Not including speaker and power supply, Amateur net, \$224.50

65 watts to a 6146. Built-in VFO covers 80, 40, 20, 15 and 10 meters. Exciter completely shielded. Tuned circuits in all low level stages are gang-tuned for operating convenience. Pi-network in final amplifier is tuned separately. Speech limiting for more 'talk power' per watt. Amateur net, \$214.50.



MB560



The MORROW 5BR2
Recognized for years as the outstanding mobile converter. Amateur net, \$79.95.



GC, 6, 10, 15 or 20
Generator choke designed to reduce whine from generator. Amateur net, \$3.95.



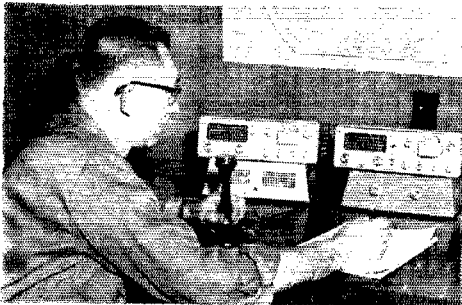
RAP-250-S
Tilt base with built-in A.C. power supply and dual speakers for MBR5 receiver. Amateur net, \$41.50.



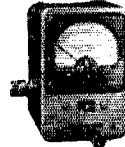
MK-N1
Handy push to talk carbon mike in modern cylindrical case. Amateur net, \$16.95



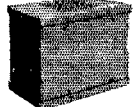
MLV-50
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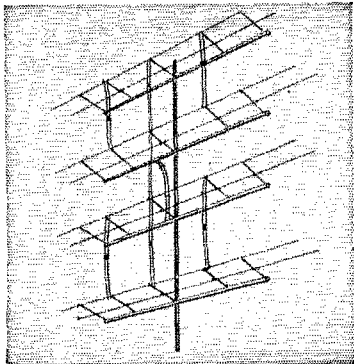
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10-Meter Station

(Continued from page 34)

and the sensitivity are controlled by R_1 . When the g.d.o. is tuned to the receiver frequency, all noise should disappear.

With the change-over switch in the receiving position, the unit draws 45 ma. at 200 volts. When transmitting, the current increases to 55 ma. with a supply voltage of 175. Filament drain is 2 amperes.

Although primarily intended to operate from a fixed location, utilizing a ground-plane or similar antenna, the unit has been tested and operated for extended periods as a portable unit employing dynamotor supply and whip antenna. Reliable communication with a comparable unit was maintained over distances of ten to fifteen miles in favorable terrain.

While the selective characteristics of the super-regenerative detector leave much to be desired, when compared with a superhet, its simplicity and remarkable sensitivity provide the basic and entirely adequate characteristics needed in this type of service.

Nine-Tube Receiver

(Continued from page 41)

that alignment be attempted without one. The 85-kc. i.f. amplifiers are aligned first by introducing a 1600-kc. signal at the grid of the 6BE6 second converter. The coupling on the transformers should be first loosened by pulling out the center fiber pin about $\frac{1}{4}$ inch. The signal generator is then moved to the grid of the 6BE6 first mixer and the 1600-kc. i.f. transformer peaked.

Preliminary adjustment of the r.f. coils can be made with a grid-dip meter. With a set of coils in the front end, the tuning dial is set to the high-frequency end of the band. The signal generator is set to this frequency and coupled to the grid of the first 6BE6. The trimmer in the oscillator coil is then adjusted until the signal is heard, and the r.f. and mixer coils peaked with the antenna trimmer set at about half capacitance.

Tracking of the r.f. and mixer coils is checked by tuning to the low-frequency end of the band and repeaking the trimmers. The coil turns should be spread apart or compressed until the signal is uniform at both ends of the band without any further adjustment of the trimmers. With the coil dimensions given the 40-meter band covers 71 (out of 100) divisions on the dial while the 15-meter band covers 46 divisions.

Power Supply

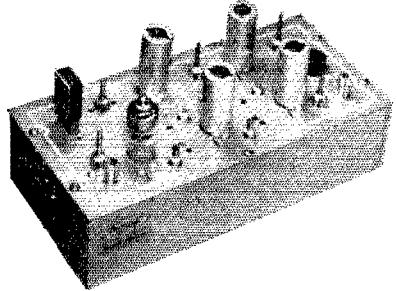
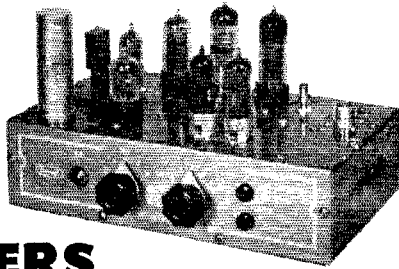
The receiver is used with a choke-input power supply which delivers 200 volts and 105 volts regulated. A 90-ma. transformer is more than adequate. Hum in the audio stage was quite noticeable until additional capacitance was added to the power-supply filter to lower the calculated ripple voltage below 0.1 per cent.

(Continued on page 120)

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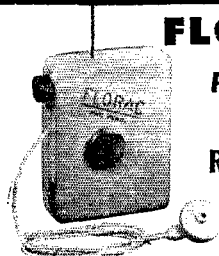
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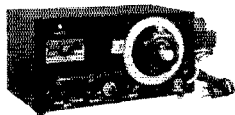
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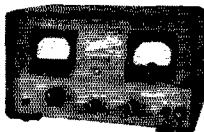
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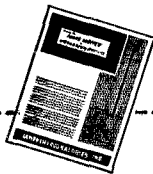


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Performance

We have been more than pleased with the performance of the completed receiver. On 40 meters the usual phone signal occupies about 4 kc. Tuning is, of course, more critical than with a broad-band receiver but with practice becomes second nature. Particularly gratifying is the fact that the foreign commercial stations have been reduced to the point where they no longer seem to occupy the entire phone band.

Performance on 15 meters is good but can probably be improved with better-designed coils. Work is now under way using "Miniductors" in the coil forms. These should be more efficient than coils with few turns, widely spaced.

Scatter Propagation

(Continued from page 47)

sees in the ionosphere a signal source of much lower power than does the distant receiver, R₂. This distance gain, which is really a scattering angle dependence, is shown in Fig. 7. The reference signal level has been taken at the 800-mile point so that the figures can be directly applied to Fig. 2 as a correction in signal-to-noise ratio.

Whenever amateurs talk about v.h.f. propagation the subject of polarization is brought up. Scattering losses are somewhat less for horizontal than for vertical polarization. Horizontal polarization is also preferred for reasons connected with the antennas. Both were tried.⁶ Only one is now used on existing ionosphere scatter circuits. 'Nuff said? Cross-polarization, however, does not seem to be a serious problem. Simultaneous recordings⁷ made on a pair of five-element Yagis showed the average ratio of levels to be 6 db. in favor of the horizontal when the transmitting antenna was horizontal. Incidentally, the short time correlation coefficient was of the order of 0.1 between the two Yagis. This indicates that cross-polarization might provide good diversity reception, and it is now being so used on some circuits.

Some Conclusions

From the above discussion of the characteristics and problems of scatter communications one can see that it is not the sort of thing that can be done by just throwing on a kilowatt, calling CQ, and then tuning the band. It will require a bit of thought and some planning before the first amateur scatter circuits are set up. Angle dependence, frequency dependence, information rate, receiver bandwidth, antenna height and realized gain; all have their own special effects on the final signal-to-noise ratio. The amateur must decide, as usual, where to spend his limited budget to secure the maximum return. Which will be better—a bigger beam, a bigger rig, or possibly a change from two- to six-meter band operation? A.m. phone is nice, sideband even better, but c.w. can put 20 db. in your pocket.

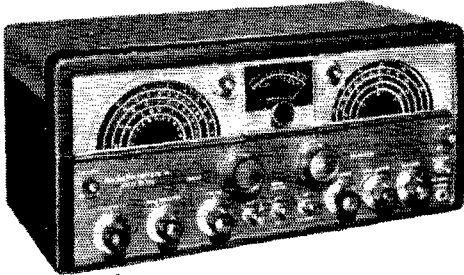
More important than any of these considerations is that of why amateurs should be interested

(Continued on page 122)

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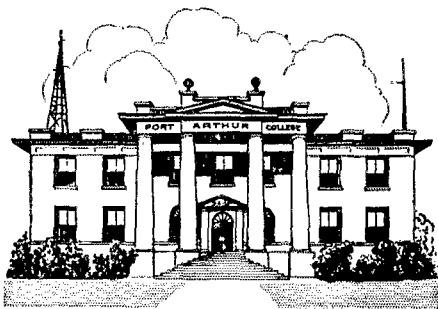
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in scatter propagation at all. There are a number of good answers to this which reach to the basic interests of hams; rag-chewing, DXing, traffic handling, and most of all, that wonderful urge to do something just to see if it really works. This last one will probably be the driving force behind the first amateur scatter circuits. In this connection the author would like to point out that all his fancy charts and tables are only to be considered as guides, not as restrictions. Scatter propagation is a brand-new field. Try anything!

Traffic-handling organizations should seriously consider the possibility of a coast-to-coast scatter relay on 51 megacycles. Over thirty stations were required to send a message across the country on two meters; with ionosphere-scatter it can be done in three hops. A dream of traffic men has always been to get away from the QRM-ridden lower frequencies while still maintaining the long-haul circuits. Now this can be done, and with a reliability far superior to the best of the commercial circuits now using any other form of over-the-horizon radio, including the big rigs down around 20 and 30 kc. Once a coast-to-coast v.h.f. scatter circuit is established it will never go out for propagation reasons.

Scatter DX will probably be pursued with the same gusto that has been applied to other means of extending the range on the v.h.f. bands. Who ever heard of a signal that gets stronger as the distance increases? Remember, though, it is not a scatter signal unless it is there every day without fail. But a station designed for scatter work will have a terrific advantage when the band does open up. In this respect, the sudden upswing of the curve of Fig. 2 below the 2 per cent time is due to sporadic-E propagation. When sporadic-E hits the midpoint of a scatter path be careful not to get your fingers across the receiving antenna!

By far the most fascinating sideline to ionosphere-scatter communication is listening to the effects of meteors arriving from outer space. If a steady carrier is being received each incoming meteor will cause a screaming Doppler beat that drops from a couple of kilocycles to a low rumble in a few seconds. It ends in a loud thump as the carrier strength jumps 30 db. or so and saturates the receiver. Every meteor has a different characteristic. Some come tearing in with the greatest of noise and hardly move the S meter. Others, with only a trace of a whistle, push the signal up 60 db., where it may remain for half a minute or more. Once in a long while a Doppler beat will be heard that starts near zero and ascends in frequency.

The author has spent many long hours listening to the meteors on some of our Arctic circuits. He can recall times when large sums of money changed hands according to the total of rising whistles heard in an evening. When amateurs start using scatter propagation there will probably be many kilowatt-hours of r.f. expended while Joe Sparks shows off the cosmic reaches of amateur radio to groups of awestruck relatives.



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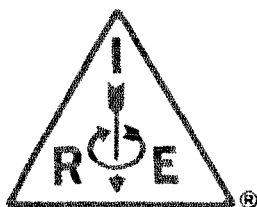
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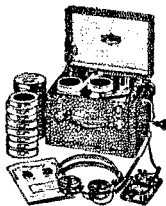
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Feedline

(Continued from page 51)

That's about it. If you've learned that the s.w.r. is determined by the load and not by the line length, and if you've learned that the antenna resonant frequency isn't important when you're using a tuned line, you've come a long way. Of course, the latter doesn't mean you can use a very short (less than ¼ wavelength) antenna and get out just as well as with a full-sized one. In this latter case the ohmic resistance of the antenna and loading devices may be greater than the radiation resistance of the antenna, and most of your power goes into heating the loading devices and the feedline.

Other Considerations

To keep this discussion simple, we have of necessity left out a number of points that often must be considered. For example, a piece of open-wire transmission line and a piece of Twin-Lead (or coaxial line) of the same physical length do not have the same electrical length. The reason for this is that the radio waves travel slower through the solid dielectric of the Twin-Lead than they do through the air dielectric of the open line, so a wavelength in air (for a given frequency) is longer than a wavelength in solid dielectric. The "velocity of propagation" in air is considered to be 1.0, and the "V.P." in a solid dielectric will be something less, depending upon the material. V.P. values for various lines are given in any good antenna book, and they must be considered when you compute the electrical length of a line.

Another aspect that was not considered was the loss in a transmission line. If the line itself had no loss, then the s.w.r. would make no difference where losses are concerned. However, any practical line does have some loss, and this loss increases with the s.w.r. and the inherent loss of the line. This is a consideration in any antenna system requiring a long run of line, and is the reason that one shoots for a low s.w.r. with coax or Twin-Lead but doesn't worry too much about it (from a loss standpoint) with open-wire line, where the inherent loss is much lower than in solid-dielectric line.

World Above 50 Mc.

(Continued from page 57)

OES Notes

W1HDQ, Canton, Conn. — Ionospheric scatter tests on 50 Mc. have been heard by W4s IKK, Rome, Ga., LNG, Atlanta, OLO, Bristol, Tenn., RFR, Nashville, and HHK, Collierville. Distances are 850 miles to Rome and Atlanta, 625 to Bristol, 850 to Nashville, and 1040 to Collierville. Reception at the nearer points is mainly bursts, but these are of much longer duration and occur more frequently than in 144-Mc. tests over similar paths. At Nashville and Collierville there is enough residual signal to indicate that only slightly more antenna gain is needed to make c.w. communication quite a satisfactory matter. The bursts heard at all points reporting have been of sufficient duration and intelligibility to permit two-way work, if carefully-timed repeating transmissions are used. Tests interrupted by antenna work at W1HDQ, but hope to resume before

(Continued on page 126)



Richard J. Curzon, K9AIS, works his World Radio 500A Globe King in his shack at 4545 North 38th Street, Omaha, Nebraska! Other equipment used by Dick includes a Collins 75-A1 receiver, Q-Multiplier, WRL's new VFO, and a 6 element, Mosley 10-20 beam.

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It has been about three months now since we purchased our 500-A Globe King Transmitter. We thought that we would take this opportunity to write you and let you know how pleased we are with our rig.

Since putting the Globe King into operation, we have had a wonderful experience in Ham radio. The Globe King really performs for us and the VFO that you recently put on the market is a natural companion piece to the 500-A. We have found the stability of the WRL VFO to be of the highest caliber.

It is quite a thrill for us when the D-X stations come back to us and compliment us on our modulation. The rig is a gem-dandy and needless to say, we are very, very happy with our installation. Of major importance to us in the purchase of the transmitter with the power in-put of the Globe King was the matter of TVI. Leo, we have yet to experience any TV eye and in our living room, directly above the Ham shack, we have our TV set and there is absolutely no interference of any kind, even though we do not utilize the TV antenna on our set.

Words cannot describe how happy we are with our Globe King and we never hesitate to recommend this wonderful piece of equipment to the many Hams with whom we talk throughout the world.

Very sincerely yours,

Richard Curzon

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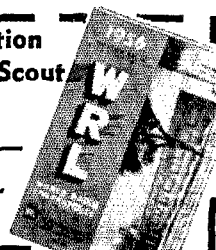
VFO

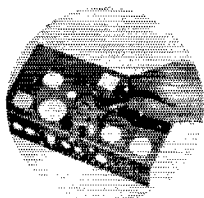


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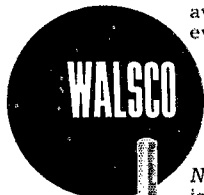
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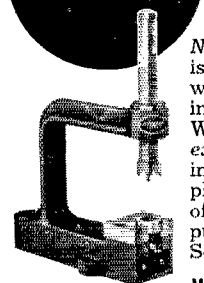
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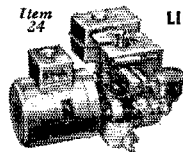
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this appears in print. Schedule will continue then as reported heretofore.

K2LRN, Liverpool, N. Y. — Much discussion locally regarding the function of the series coil in the cascade circuit now commonly used. Opinion is that this is not true neutralization. Would welcome explanation of the neutralization role of this coil, if such it be.

W2UTH, Victor, N. Y. — Activity in Finger Lakes Net. Friday at 2000 EST, 145.35 Mc. holding up well, with 12 to 18 stations reporting in. Sunday morning CD drill averages 7 to 10 stations.

W4CFI, Atlanta, Ga. — Two-meter propagation very good during December, permitting many contacts in the 150- to 250-mile range. Made first contacts into Alabama and Tennessee. Now about 25 stations reporting into Atlanta net on 145.35 Mc.

W4KKK, Rome, Ga. — Noting that some of the early QST articles on the subject mention detuning the crystal oscillator where phase modulation is used, it was tried on the 50-Mc. p.m. rig here. Found that tuning to exact resonance certainly does not give the best p.m. Tuning to the low-frequency (high-capacitance) side gives more deviation and better quality. Tuning to the high-frequency side nearly erases the phase modulation. Oscillator plate is now detuned to the low side until drive to the following stage drops 10 to 15 per cent. This results in no loss in drive to the final stage. Crystals are in the 8-Mc. range.

Found that the 815 final can be driven by inductively coupling to one side of the balanced grid coil, with no unbalance resulting. Driver is a 12AU7 running at 250 volts or less on plates. 815 grid circuit is fed through 1000-ohm resistor, with no by-pass at the center tap. Circuit is tuned with 3-30 trimmer, connected grid to grid.

Have cleared Channel 2 trouble, but it makes little difference when 50-Mc. band is open, as Channel 2 is no good anyway, due to co-channel interference that is almost always present in fringe areas when 6 is open for sporadic-E skip. Maybe others stay off the air unnecessarily at such times. Curing the Channel 2 TVI, however, was accomplished as follows: Transmitter line-up includes 6AG7 oscillator at 8.4 Mc., phase modulated, 6AG7 tripler to 25 Mc., with half-wave filter and coaxial-link coupling to 12AU7 push-push doubler, driving 815 as described above. Elimination of unwanted harmonics of oscillator is accomplished through loosest possible coupling at the 6AG7 tripler stage. Tight coupling (even with link, filter and complete shielding) will ruin Channels 2 and 11. Properly adjusted, rig causes no TVI in Channels 2, 5, 7, 9, 11, or 12, all used more or less locally.

W6PIV, Sacramento, Cal. — Floods in Sacramento Valley brought out value of 144 Mc. for mobile and emergency work. Mobiles on lower bands knocked themselves out fighting QRM and skip for two days before calling in the 2-meter gang to provide communication to Yuba City and Marysville. This was established by W6LSB and W6MLN, with W6PIV at Sacramento Red Cross, and K6CKH and KN6KDU serving as relays in the hills at Auburn. With low power and small antennas the system functioned perfectly, handling nearly 400 messages in a 14-hour period.

W7JHX, Gig Harbor, Wash. — Moved into new location, open over Puget Sound from northeast to southwest, in easterly direction. Noise level very low; now to work on lower noise figure for 50 and 144 Mc.!

W7PUA, Eatonville, Wash. — Quite a few stations now set up for f.m. operation on 53.29 Mc., both fixed and mobile. Receivers are squelch-equipped, making possible continuous monitoring of the channel.

W9DRN, Des Plaines, Ill. — On 432 Mc. Thursdays 2100 CST, working W9s ZQT, AGM and BOD. Several stations using ASB-series receiver r.f. amplifiers ahead of crystal-controlled converters.

W9HPO, Marion, Ind. — Many WIs heard during Jan. 16th opening on 50 Mc., 2230 to after 2330 EST.

W0MOX, Overland Park, Kan. — Would like nightly skeds on 144 Mc., to check effects of local weather on signal strength. Suggest logs be kept in duplicate at each end, to permit exchange of information monthly with minimum of delay and a maximum of accuracy.

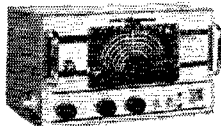
W0QMF, Perryville, Mo. — Converting TV tuners to get new prospects on 114 Mc.

W0USQ, Davenport, Iowa. — V.h.f. meeting held Jan. 6th for purpose of organizing for more 6- and 2-meter activity in Davenport-Rock Island-Moline area. Local and intercity nets to be organized on both bands. There are now about 20 active stations on 6 in the area, with the Technician licensees using the band to good advantage.

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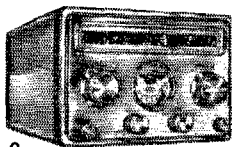
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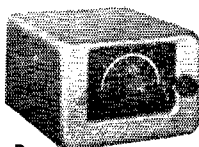
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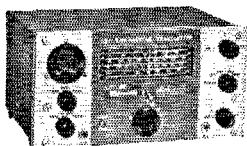
B



C



D



E



F

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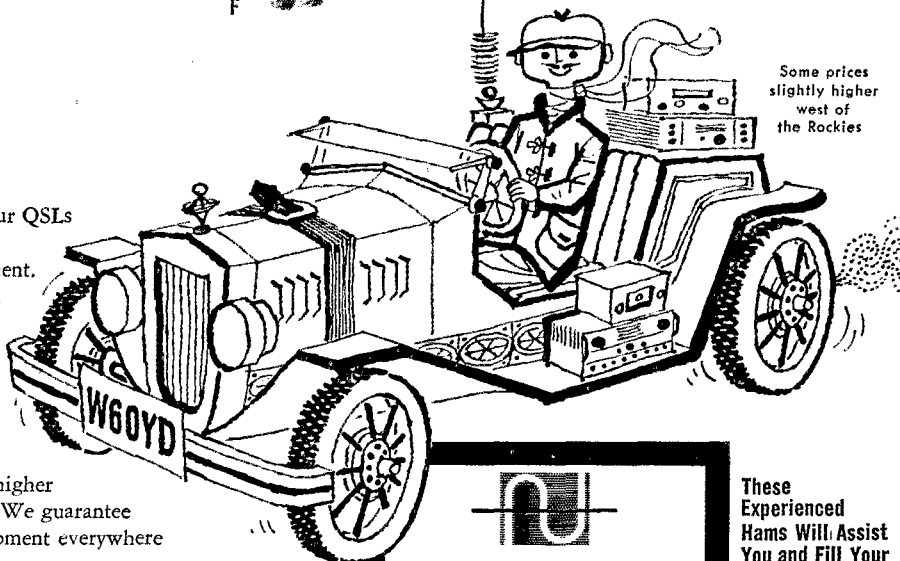
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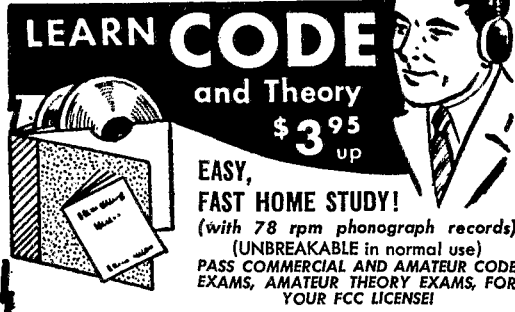
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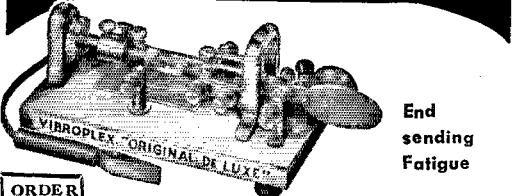
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YL News & Views

(Continued from page 54)

10:00 P.M. CST on 29,640 kc. . . . W7QKU, Donna, and W7ENU, Mary, originated and relayed Christmas messages for patients at Barnes Hospital, Portland, Ore. . . . Forty YLs and 11 harmonics enjoyed the Los Angeles YLRC annual Christmas party, a luncheon held at the home of W6MFP, Agnes. . . . W4VDL, Eileen, is president of the Alabama Federation for the Blind. . . . The new QSL manager for the Canal Zone is KZ5KA, Kay Howe, P.O. Box 462, Balboa Heights. . . . K6KKF, Selma, now of La Mirada, Calif., is ex-W2PUY. . . . Taking a soldering iron in hand for the first time, K2CUQ, Evelyn, wired herself a Johnson keyer for her 10, 15, and 80 c.w. operation. . . . W5LGY, Helen, wonders if any YL can top her record of almost nine years as an Emergency Coördinator. . . . Delivering her fifth jr. op. in between weekly net sessions of the Los Angeles YLRC's two meter net allowed KN6LIIH, Helen, to maintain her 100% check-in record. . . . W7ZKY Marguerite, and W8YKU, Lura, are both busy with Civil Air Patrol work. . . . W8SPU, Helen, is on SSB with a KWS-1. . . . Putting aside a bug that has served her well for the past 16 years, W6NAZ, Lenore, is determined to master a new electronic keyer. . . . OM G3IDG writes that G2HNB, Miss C. A. Marshall, was listed as a Silent Key in the December, '55 R.S.G.B. Bringing his list of British and African YLs up-to-date, G3IDG totals 23 G-YLs and 88 VQ2, ZE, ZL, and ZS girls. . . . W2KEB, Georgie, has an A-1 operator's certificate. . . . Congratulations to YLRL Secretary W3VLX, Lolly, upon the birth of a son on December 30th; to W6CBA Violet, for a boy, December 16th; and to W4WYY, Myrtle, who is looking forward to getting back on the air after the birth of her eleventh child, a daughter on November 4th (see December, '55 column). . . . W4VTO, Suzanne, is secretary of the Gator ARC at the University of Florida. . . . Using her OM's call, W6MBD, W6QOG has 180 countries confirmed on phone for DXCC. During the last year Helene worked 113 countries as W6QOG. . . . W6MFP's OM gifted her handsomely at Christmas — a Collins 75A-4, a KWS-1, and a Telrex tri-band beam should make any YL happy. . . . Chairman for the past two years of the All Woman Transcontinental Air Race, W6QPI, Betty, is off on a trip around the world. . . . Officers elected at the Christmas party of the San Francisco YLRC were W6PCN, president; W6FEA, vice-president; Myrtle Brown, secretary; K6CEE, treasurer; and W6QMO, K6CUV, and ex-KN6HIW, board of governors. . . . W9SPI, Marguerite, is using her new Viking on 21 mc. c.w. . . . While her OM attends a government school, W6QYL, Martha, has been operating portable from Broad Run, Virginia. . . . A list of members of the YLRL can be obtained by sending 25 cents to YLRL Secretary Lolly Keller, W3VLX, 3316 Unionville Pike, Hatfield, Penna.

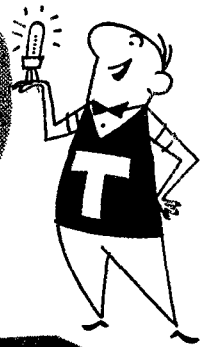
Strays

A small gathering of some 45,000 engineers and scientists is expected for the 1956 IRE National Convention to be held on March 19-22 at the Waldorf-Astoria Hotel and the Kingsbridge Armory in New York City. The program will include 55 technical sessions and 714 engineering exhibits. The exhibits alone take up more than four acres! For information on registration and attendance, see page 123, this issue.

The Armed Forces Communications and Electronics Association is holding its 10th national convention in Boston on May 24-26.

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Says MR. T**

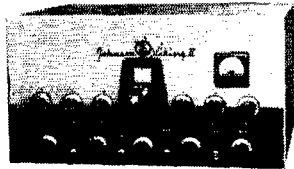
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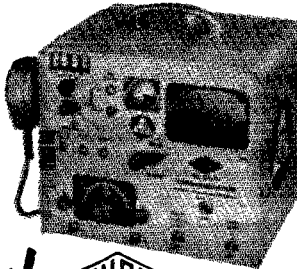


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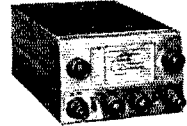
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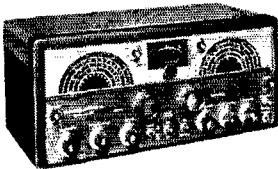
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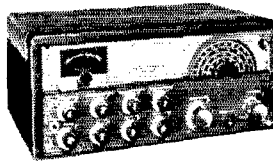
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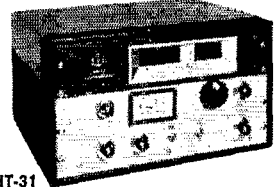
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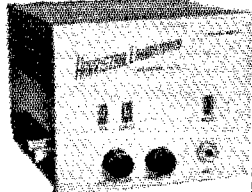
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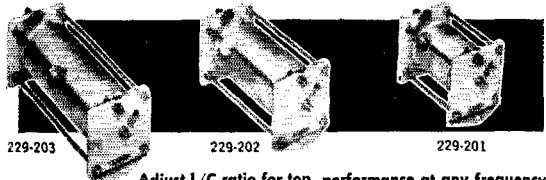


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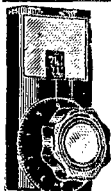
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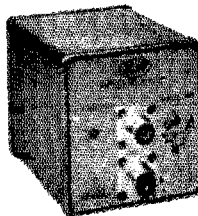
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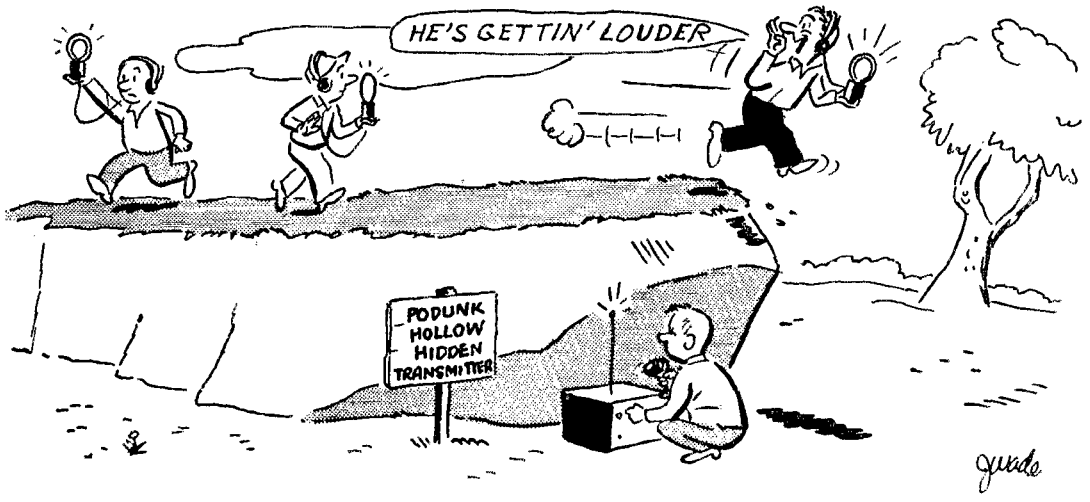
(Continued from page 62)

dent W5PQA was called by JAs 3BB and 4BB for consecutive 14-Mc. c.w. QSOs. . . . KR0RI, erstwhile W2HNI-K5AE-W3JEG-HZ1AB-W4JEG, has 400 watts and a dipole atop a 1000-foot Okinawan hill. Twenty phone and c.w. are under siege while Angelo techreps with the USAF. . . . K2HHV calls our attention to Nobuo Mii, now an exchange student at Columbia University. As an SWL in 1950 Nobuo became interested in ham radio through eavesdropping on KATJH QSOs. Subsequent club meetings developed a warm friendship between Nobuo and Air Force personnel, and this ultimately led to sponsorship at Columbia. "Knobby" already has an E.F. degree from Kyushu U. and is on leave from his position as research engineer with the JBC. For a worthy deed, hats off to the staff of KA7JH! WGDXC learns that KZ2OM works as many as 25 stations per noncontest evening and answers as many as 30 airmail QSLs per week. MP4QAL is another rare Asian now up to his neck in W/K QSLs.

Africa — All eyes are on the Comoros Islands but VQ3DQ will string along with VQ1, according to W9ICL. From VQ3DQ's Dar-es-Salaam QTH, Zanzibar is just a few miles over the horizon. He'll get a real workout if he hangs around the island for the closing hours of the ARRL Test now under full steam. . . . W6YY has ZS2MT's Marion Isle schedule as Tuesdays, Wednesdays and Fridays around 1700 GMT. . . . African items courtesy SCDXC and WGDXC informants: Sierra Leone will be in sad DX shape when ZD1SW moves out. He's Swiss and new ZDI regs go hard on aliens. The country's other active ham, ZD1FB, shuns QSLing. . . . Gough's ZD-9AD, who will reply to a c.w. call, often is found on 14,200-ke. phone after 1630 GMT. A few miles away on Tristan, ZD9AC puts out spasmodic 14,015-ke. signals. . . . VQ4NZK/VQ9 rumors are rampant once again. Well, there's no time like the present!

Oceania — From old crony ex-VR2CD, now VE7ASL/KH6: "As of mid-February I leave on assignment for Christmas Island to set up radio facilities for South Pacific Airlines. I am to follow up as operator of the station and weather observer to boot. . . . I'll be firing up as a VR3 with the old rig that got out so well before. I hope to have the thing revitalized and ready to go before I leave Hawaii so that all I'll have to do is uncrate the thing and get the generator rolling." VE7ASL/KH6 broke into the ham game long ago by signing ZL1BL, ZL3AE and ZL4FH. . . . That VR3 deal may be a sure thing but ZL2s CU and GX still seek solution of their Kermadec DXpedition transportation problems. Jock writes W1WPO: "We have not given up the idea but it may be a year before we can think of it again. In the meantime I hope that a regular commercial operator may be on the islands but, of course, their interests do not always extend to ham radio." ZL2GX now has his own countries tally up to 244 confirmed, 196 on phone. . . . "Ex-ZK2AA wants all his old ham friends to know that he is back on the air with the call ZK1BS. At present he is using QRP but expects to increase power and raise a Sterba Curtain soon." That welcome note from W6JR. . . . X1NP, intermittently active for years now, is honest about his status, anyway. KA2KS quotes a recent 14-Mc. c.w. X1NP transmission: "QTH is on a ship off VK4 — no QSL required, OM — this is a pirate station — the name is J'ag." . . . From VK3XU, awards manager for WIA: "VK5TL, Alice Springs, Northern Australia, will try to get on 14,060-ke. c.w. twice daily for the benefit of overseas stations desiring contact with this area for the WAVKCA award." Many Yank amateurs will grab this chance to stalk VK5TL because lack of contacts with North Australia is all that stands in the way of many WAVKCA applications. . . . Trust Territory of the Pacific notes via KC6UZ: "KC-land is quiet. KC6UZ monitors a lot but spends much time digesting articles on antennas, between frequency and modulation checks of transmissions by T.T. amateurs, both military and civilian, and helps out the lads with DXCC. KC6RK is a student priest at the Truk Catholic Mission and is heard working padres down in PY and LU areas. No active stations now on Ponape, Yap or in the Palauas. KC6CG's beautiful and effective Sterba had to be hauled down because of suspected distortion in the pattern of the near-by Loran antenna system. . . . Our greatest concern is ambitious DXers who deliberately break into our landline phone-patches for DX contacts. Out here our patches mean a lot to us. . . . it's enough to wipe out good fellowship on the bands." KC6UZ's ham career dates as far back as the early 1920s when he confirmed his first DX QSO, a 15-watt c.w. contact with Northern Rhodesia, under the call 8BCY. . . . VP2VB/P, aboard yacht Yasme, leaves French Oceania and F08AN behind in favor of VR, ZM and CR19 areas.

(Continued on page 132)



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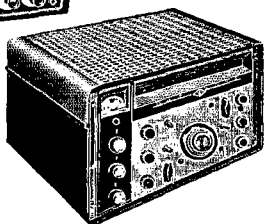


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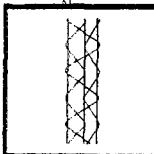
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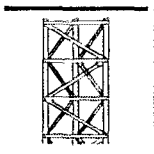
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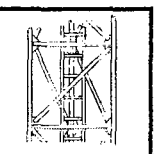
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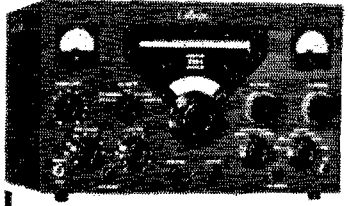
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Europe — From 1200 GMT, March 3rd, to 2400, March 4th, the radiotelephone session of REF's 1958 DPF-DUF DX Test will hold sway on DX bands. C.w. work is scheduled for the same hours on April 14th through 15th. It's an excellent opportunity for DXers to add to their DUF and DPF award totals. The exchange will be six digits consisting of QSO number plus RST or RSM — 001579, 002579, etc. In addition, each French Union station will indicate his DPF section and DUF province or country in the fashion of "FSDU/15/IF" (15th REF section/Isle de France) and "FQ8AG/MC" (Moyen Congo). A copy of your log, which is to be usable for DPF and DUF application in lieu of QSLs, should be forwarded to REF, P. O. Box 42-01, Paris, R. P., France. REF traffic manager F8TM is officiating.

Regarding those French DX awards, F9IL informs us that the regular fee for certificates now is suspended. IRCs still are required to defray return postage costs. Another wallpaper item for your pursuit is the SRAL (Finland) OHA award. Briefly, this one is available to non-European applicants who can submit evidence of contacts (QSLs) with 15 OH stations, these to include cards from at least five Finnish call areas. As is our policy regarding all DX operating awards mentioned in "How's," we urge you to write SRAL for up-to-date detailed rules. Regulations and qualifications for many overseas awards are subject to sudden variance without notice. Before you make an all-out effort to qualify or apply for any operating certification make certain that you have the latest dope directly from the society concerned. . . . F7DH bids adieu to the Continent for return to Missouri and good old W0JEY. . . . WICTW says that W7PGA's QSL will clinch 984AX's WAS. Cal helped set up the circuit on 21 Mc. . . . YU3s HZ IA and IB operated YU3IB/YU6 on a DXpedition to Yugoslavia's hard-to-work Cetinje area. DL4ZC caught the trio pounding away on 80 meters. . . . NCDXC and WGDXC join with these European notes: LZ1SR purportedly is the only private ham station in Bulgaria. . . . Corsica receives a hypo from the activities of F9s RY and SC. F9RY has an 813 modulated by 811s, and F9SC fits about with a c.w. 30-watter. . . . LA9LD/P keeps his Hopen Island, Spitzbergen, operation exclusive by sticking to 3.5 Mc. with 50 watts. If the winds blow right you might pull him through around 0800 GMT.

Hereabouts — VE8AB's first Florida contact was W4HSJ (ex-W9AND). The VE8AB shack is situated at Snag, Y.T., where the coldest temperature ever recorded in North America, 83 below, showed up in February of 1947. . . . KZ5RM, Canal Zone ARRL SCM, reports that YL KZ5DG confirmed her 100th country on 21-Mc. phone. Grace already holds DXCC. . . . If he hasn't shown up yet, W2BBK/VP2 may still be available from Tortola, British Virgins (goes as Leewards) during this month's ARRL DX Test week ends. This via W4YOK. . . . OX3UD made an icy switch from Godthaab to Angmagssalik on Greenland's east coast, according to W3CHU. . . . W9PME advises that Jamaican VP5WS, ex-VPIWS, is rockbound on 3545 kc. but is game for a whack at 75 phone when conditions are right. . . . QST cartoonist W1CJD's southern namesake, W4CJD, is the jr. op of veteran DX hound W4CYY. . . . W5LAK, back from 28 months of YV oil-hunting, looks forward to another DX assignment in the near future. Something new has been added: a French XYL from 3V8-land. . . . W2QHH still manages to keep busy when DX is slow. Howy added a YLCC-450 sticker and awaits four more QSLs to qualify for his WPR-300 endorsement. W2QHH also applied for Binghamton Amateur Radio Club's WANY award which involves QSOing each of New York State's 62 counties. Reference WANY, write W2JMF. . . . Amid considerable applause, W5DMR steps down as editor of the West Gulf DX Club DX Bulletin and a job well done. W5s VAE and ZZR take over the task with a will. . . . The 7th annual joint meeting of the Frankford Radio Club and the Potomac Valley Radio Club exploded on January 29th in Philadelphia with no dearth of DXers on hand. The shindig served as a screaming send-off for the resumption of FRC and PVRC ARRL DX Test rivalry in the brawl now under way. The Potomac group's 1956 efforts to unseat FRC as the activity's club champ doubtless is responsible for a good portion of all that pile-up QRM noted on the first two week ends! . . . LU6DEM's 40-meter DX operation surmounts the obstacle of 220-volt d.c. mains supply. Joe runs 10 watts with all his equipment, including 16-tube receiver, homebuilt. . . . Just in case you didn't notice, ARRL's new Midwest Division director is none other than W0NWX of DXpedition Gonwaki (VP7NG) and DXpedition Clipperton (F08A0) fame, formerly W1NIN. . . . Among West Coast DXers who suffered damage from recent northern California floods are W6s BAX BUY BYB CTL CQZ DIX DZZ KEK LW MX and TI. Our sympathy, guys. . . . Some lucky DXers happily schedule Caribbean trips during ARRL DX Tests and this year is no exception to the tradition. W6AM (aiming for French or Dutch St. Martin), K2CJN, W3VKD and W2BBK are among the gents out to try the current clam-bake as DX foxes instead of DX-chasing hounds. Anyone for KC4?

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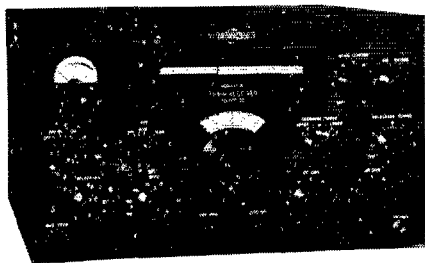


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Hints & Kinks

(Continued from page 64)

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Arrangement A is for use when the s.s.b. ex-

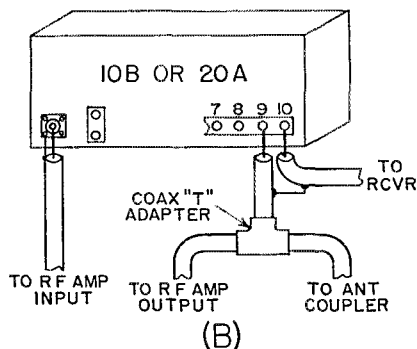
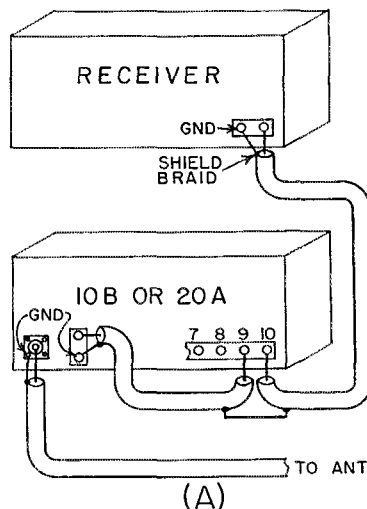


Fig. 3—Block diagram of the TR switch systems. A is installed when the s.s.b. exciter is worked directly into an antenna. B may be used when the exciter is followed by a power amplifier.

(Continued on page 136)

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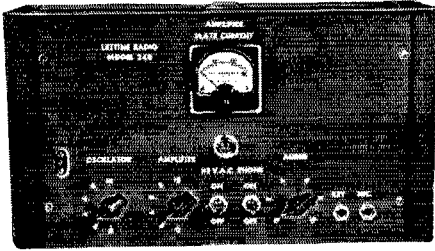
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citer is employed as the *complete* transmitter. The cable between exciter and receiver may be any convenient length, but the jumper cable between terminal strips of the exciter should be as short as possible. Notice that the inner conductor of the jumper and the receiver lead are terminated at positions No. 9 and 10, respectively, of the 10-terminal strip located at the rear right-hand corner of the exciters. The outer braid of the two coax leads should be bonded together — but not necessarily grounded — at this point. Terminals No. 9 and 10 of the 10B and 20A units are connected to the internal voice-control relay.

The system shown as section B of Fig. 3 may be used when the exciter is followed by a 200-300-watt amplifier. As before, the lead from the receiver is connected to terminal No. 10 of the exciter. Terminal No. 9 of the 10B or 20A is connected through the *shortest* possible length of RG-58/U to the center socket of a standard T connector. Lengths of coax run from the T connector to the output and the input jacks of the r.f. amplifier and the antenna coupler, respectively. Naturally, the load lead may go directly to the antenna if the latter is a 50-ohm affair. Output from the exciter is fed through RG-58/U to the grid circuit of the final.

When installing this TR circuit, make sure that the cable between the exciter and T is as short as possible. This does bring the r.f. output lead from the final very close to the exciter unit, but actual operation of the system has resulted in no instability of the r.f. lineup. It is also important that the line between power amplifier and antenna tuner (or antenna) be free of standing waves.

The system shown in section B is used here at W5DLA with the 805 final amplifier running at 225 watts input. It provides voice-controlled break-in without introducing unpleasant plops or other undesirable racket in the output of the receiver.

— J. C. Wallis, W5DLA

MORE ABOUT COPPERCLAD WIRE ANTENNAS

THE DETERIORATION referred to by W2IXH ("Hints & Kinks," *QST*, September, 1955) can be prevented by a practice used in the electrical industry. Wherever the copperclad contacts a stand-off, strain insulator or other support, and at points where bends are necessary, it is covered with a close-wound coil of soft wire or a special wrapping intended for the purpose. The soft wire coating is most practical for ham work. It is advisable to use a wire (for the wrap) that is either the same diameter or one size smaller than the antenna wire.

It is quite a bit of work to provide for this type of protection, but it's well worth the effort if you're building a large permanent system.

— Eugene Austin, W0LZZ

(Continued on page 138)

SENSATIONAL! TELESCOPING 45-ft. MASTS!

- ★ In FIVE 9-foot sections!
- ★ Weather-lacquered steel
- ★ Erected height 40½ feet!
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\$35!

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Crate of 4, \$52.00

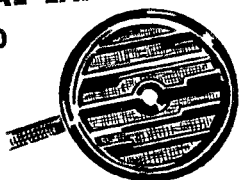
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Order No. QR-8500 Single mast, \$14.95
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CRYSTAL LAPEL MIKE

List \$20.00

\$3⁹⁵

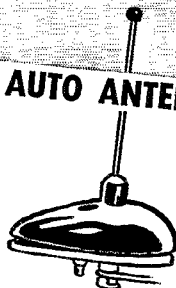


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2-METER AUTO ANTENNA

Reg. \$6.60

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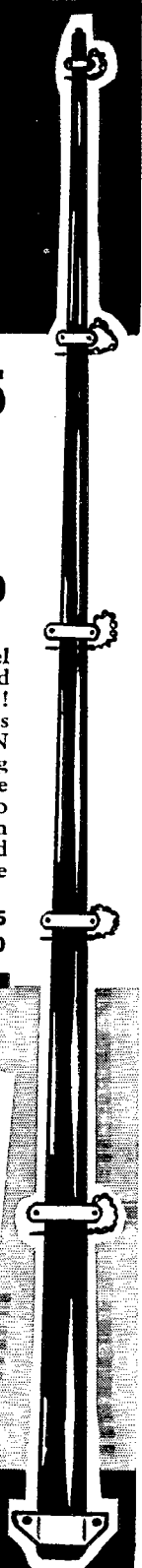
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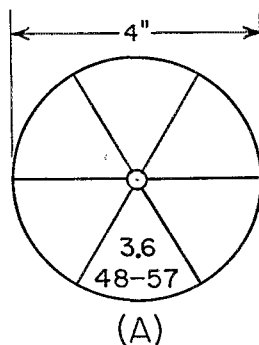
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Lafayette, Indiana

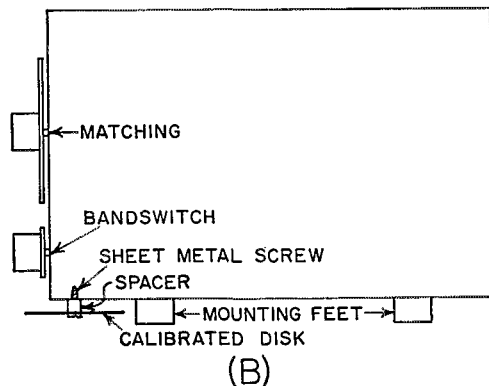
HANDY CALIBRATION CHART FOR THE "MATCHBOX" ANTENNA COUPLER

THOSE WHO USE the R. F. Johnson "Matchbox" will find band changing, or frequency shifting within a band, a much more rapid operation if the coupler is equipped with a revolving calibration chart as shown in Fig. 4. This chart can be homemade without expense and, when mounted as described, is always readily available and easy to read. Installation of the chart does not deface the coupler.

The disk which supports the calibration chart is a 4-inch diameter piece of flat aluminum as shown in A of Fig. 4. A hole that will clear a sheet-metal screw is drilled at the center of the plate. The chart is a piece of heavy white paper



(A)



(B)

Fig. 4 — The calibration chart for the "Matchbox" is a disk as shown in A. Mounting of the dial is shown in Section B.

or cardboard of a type suitable for marking with either ink or pencil. The chart is glued to the aluminum and is divided into pie-shaped segments with the aid of protractor. The number of segments laid out will depend on the number of frequencies and dial readings to be recorded. In my own case, I divided the circle into 18 sections which provide 4, 3, 2, 3 and 6 segments for 80, 40, 20, 15 and 10 meters, respectively. Each section is marked with a spot frequency

(Continued on page 140)

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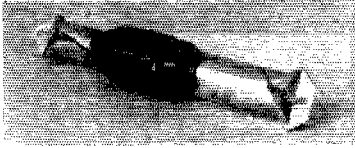
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and the associated dial settings for the tuning and the matching controls. A light coating of plastic spray improves the appearance and protects the finish of the chart.

Mounting of the round dial is a simple matter as illustrated in B of Fig. 4. First drill a hole for the sheet-metal screw in the bottom of the cabinet. Locate the hole just to the front of the two bolts that hold the bandswitch in position. This should allow the 4-inch dial to protrude out from under the front of the panel by a distance equal approximately to the depth of the bandswitch knob. A short metal spacer should be used between the cabinet and the disk when the latter is fastened in place by means of the self-tapping screw. Tighten up on the screw until a little tension is noticed as the dial is revolved.

In the event that a new antenna system calls for a fresh set of operating adjustments, merely replace the old calibration chart or cover it over with one bearing up-to-date data.

— W. J. Mounton, W9DSP

PUSH-TO-TALK CONTROL OF MOBILE CHARGING RATE

MANY OF THE newer automobiles with automatic transmissions have, coupled to the shift lever, a pair of contacts which prevent operation of the starter solenoid whenever the transmission is in the "drive," "low," or "reverse" condition, but which close when the shift lever is placed in the "park" or "neutral" position. It is convenient to wire a d.c.-operated solenoid through this safety contact and the transmitter push-to-talk relay contacts, with the solenoid arranged to open the throttle lever on the carburetor slightly when energized. When parked, this has the effect of allowing the engine to idle normally during the receive condition, and increasing engine speed for charging purposes by any desired amount while the transmitter is on the air, offering an improvement in the automotive system voltage regulation and reducing noise (both electrical and acoustic) over that which would exist if the engine were operated with an open throttle during both transmitting and receiving periods. When the car is in motion, the safety contacts on the shift lever disable this control system to prevent interference with the driver's control of engine speed.

— Richard A. Schomburg, W7WUM

NEUTRALIZING CAPACITOR FOR SCREEN-GRID TUBES

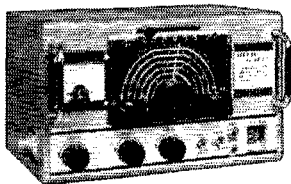
A SIMPLE AND INEXPENSIVE capacitor for the capacitive neutralizing circuit can be made from a war-surplus slug-tuned coil form and a strip of flashing copper. A 1/2-inch strip of copper wound around a 3/8-inch form having a 1/2-inch slug will provide a capacitance range of 0.6 to 10 μf . This range of capacitance is ideal for tubes such as the types 2E26, 6L6, 829B, 6146, etc.

Of course, the coil form should be one having a brass slug.

— Lloyd G. Hanson, W9YCB

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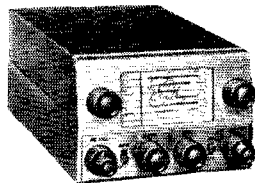
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PS-2V POWER SUPPLY—For AF-67 or other applications. 6 volts at 6 amps, or 12 volts at 3 amps. Delivers 230 volts at 80 ma. or 475 volts at 170 ma DC output. Separate plate and filament transformers. Fused primary.

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PSR-612 POWER SUPPLY — Designed to power the PMR-7. Power controlled by switch on volume control of receiver. For 6 or 12 volts—delivers 250 volts at 90 ma. Circuit permits easy connection of "s" meter. With cable and connector for PMR-7.

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PSR-117 POWER SUPPLY — Designed to power the PMR-7 on 110 volts AC, this unit is similar to the PSR-612 in construction and features with one exception—an "s" meter and adjusting potentiometer is furnished with this unit.

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ESS-2 METER—for mobile operation—**\$16.50.** **PTR-1 KIT**—push-to-talk relay kit for 110 volt installation—**\$4.75.** **CFS-1 CABLE ASSEMBLY**—for connecting the AF-67 and PS-2V for 110 volt AC operation—**\$6.75.**

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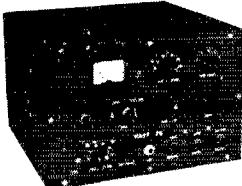
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including tubes, cabinet, detailed wiring instructions, \$69.95. Plug-in modulator kit, \$19.95 extra.

Write for FREE spec sheets

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Correspondence

(Continued from page 63)

LIBERAL POWER LIMIT

Barker & Williamson, Inc.
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Editor, QST:

I just uncovered something which amuses me a great deal. I know that some of the boys around Headquarters must have a Station License Form #765 which was in use around 1925. If they will then withdraw this old document from the archives and read carefully, the very last line, they will find the following statement:

"If vacuum tubes are used, power should be actual watts in antenna circuit, as indicated by rating of tubes."

It would seem that the old Department of Commerce, Bureau of Navigation, Radio Service, was considerably more liberal in its interpretation of allowable power in amateur radio transmitters.

After being a ham for all too many years and having read my old licenses many, many times, it seems odd that this gem has to wait until 1955 to rear its rosy nose!

— Barrie R. Barker, Pres.

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Editor, QST:

A short-wave listener in New York has very kindly sent me a report of my signals on the 28-Mc. band, together with his card and International Reply Coupons to the value of 26 cents to cover the return airmail postage on my QSL card. Now a 1/4 dollar at today's rate of exchange with this country works out at 20 pence but on presenting the coupons at the local post office I am paid out 9 pence.

What I want to know is who collects the rake-off of 11 pence — the U. S. A. or South Africa; or do they split the proceeds! Hi! Anyhow you might warn your readers just how this apparent "racket" works out. Perhaps you could get one of your Postal Authorities to explain the setup to your readers.

— Walter S. Reid, ZS5DS

P.S. Air-mail postage to U. S. A. from here is 27 pence.

(Editor's Note: In the U. S., one IRC costs 13 cents. It is exchangeable in most countries for surface transportation postage to mail a first-class letter. OM Reid's listener friend actually sent him postage for two first-class letters. For an air-mail reply he would have to send him 6 IRCs — at a cost of 78 cents. The difference goes to the International Postal Union in Switzerland.)

STATUS QUO

3744 No. Grace Ave.
Baldwin Park, Calif.

Editor, QST:

Amateur radio today stands on the threshold of a major step forward which will usher in a bright new era of better quality communication. This vision came to me recently while idly tuning the receiver across our heterodyne allocations on 75 and 40 meters.

A brief historical sketch will show the reasoning behind the steps to be taken. Shortly after the arrival of the triode vacuum tube, amateurs began using amplitude modulated telephony in their QSOs. This technique was adopted so enthusiastically that the users were soon forcefully reminded that the method required many (6 or 60 depending on % modulation) kilocycles per QSO. The more daring and resourceful among us then found that by removing the power wasting carrier and one unnecessary sideband, a great improvement in efficiency was effected.

The next step forward is now clearly indicated. We merely remove the remaining sideband and re-insert the carrier, which may be keyed by any suitable method, thus effecting another great improvement in efficiency.

— J. I. Beach, W6CWD

(Continued on page 144)

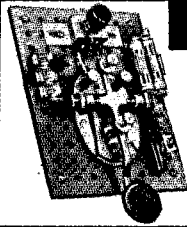
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132 PAGE ELECTRONIC CATALOG

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Just a few of Lafayette's Values



TRANSISTOR CODE PRACTICE OSCILLATOR KIT

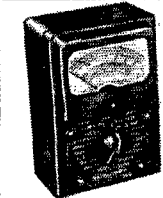
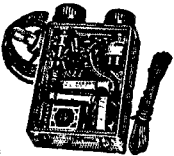
For those interested in mastering the international code, an audio tone oscillator is essential. The circuit of this transistorized feedback oscillator has the simplicity of the neon glow, the signal strength of the vacuum tube, and requires only two penlite cells for weeks of service. It may be used for solo practice, or two may send and receive with the same unit. Kit comes complete with Transistor, Telegraph Key, Resistors, Condensers, Masonite Board, etc., and Schematic Diagram.

KR-72 Net **2.99**
Cannon ECI—Single Headset Net **1.13**

2 TRANSISTOR POCKET RADIO KIT

Packed into a 2 1/4" x 3 1/2" x 1 1/4" plastic case, this Two Transistor plus crystal diode radio kit offers many surprises, utilizing a regenerative detector circuit with transformer coupled audio stage, gives you high gain and excellent selectivity. Pulls in distant stations with ease with more than ample earphone volume. Kit comes complete with two transistors, crystal diode, loopstick, Arconne transistor audio transformer, resistors, condensers, plastic case, etc. Including schematic and instructions.

KT-68A Complete Kit less earphones. **11.80**
MS-260 New Super Power Dynamic Earphone, Ideal for Transistor Circuit Imp. 8000 ohm, D.C. 2000 ohm **3.95**



HIGH SENSITIVITY 20,000 OHM PER VOLT DC 10,000 OHM PER VOLT AC MULTITESTER

35 ua 3" METER SILVER CONTACT SELECTOR SWITCH 1% PRECISION RESISTOR

LOOK AT THESE FULL SCALE RANGES!

D.C. VOLTS: 0-8; 0-30; 0-120; 0-600; 0-1200; 0-6000 Volts—A.C. VOLTS: 0-8; 0-30; 0-120; 0-600; 0-1200 Volts—RESISTANCE: 0-10K; 0-100K; 0-1 Meg; 0-10 Megohms—D.C. CURRENT: 0-60 Microamp; 0-8; 0-60; 0-600 Millamps—DECIBEL: -20 to +17 db (0 db = 0.774V)—CAPACITY: .0001 - .01; .005 - .15 mfd—INDUCTANCE: 20-2000 millihenry—OUTPUT RANGES: 0-8; 0-30; 0-120; 0-600; 0-1200 Volts

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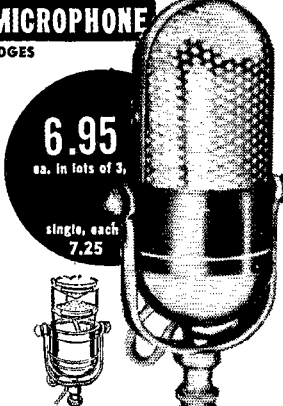
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- ALL DIRECTIONAL
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Here is a microphone with a 360° pickup, and the added power and sensitivity of two individually shock mounted and phased crystal cartridges. This arrangement assures you of maximum pickup from all sides. Swivel mounted to give fuller flexibility. Case is chrome plated. Standard 5/8"-27 thread. Overall size 7" H x 3" W complete with 4 ft. cable. Shpg. wt. 4 lbs.

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A pencil-slim design, high output PA Dynamic Microphone of exceptional quality, at a price that is 1/2 of the price of any comparable microphone on the market today. Very smooth response, 60-10,000 cycles. Omnidirectional, tiltable head. Switch on side gives choice of either high impedance (50,000 ohms) or low impedance (250 ohms). Instantly removable bracket permits use either on stand or as hand mike. Features exceptional mechanical strength. Cast case with satin chrome finish. 5/8"-27 thread. Acoustically-treated grille head, 8" long; 1 1/4" barrel diameter. Shipping weight 2 lbs.

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Singly, Each **9.95**

CRYSTAL MICROPHONE

COMPARE IT WITH ANY MIKE

AT 2 TO 3 TIMES THE PRICE

A quality crystal Microphone for PA systems, house recorders, etc. Frequency response 30 to 10,000 cycles. Output level -52 db. Provides ample output for use with low gain amplifiers. Complete with 5 ft. of shielded cable. Shpg. wt., 3 1/4" lbs.

PA-24— In lots of 3, each ... **3.95** singly, each **4.25**



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**RAYTHEON
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54th Year

What Is This Thing Called the "Hump" in CODE?

THE hump (around 8 words) is the thing that tells you you have wasted your time by starting out wrong. Thirty years ago when we started teaching Code our students too ran head-on into the hump. We went to work to find out why. TWO-PHASE, STEP BY STEP instruction is the perfect answer. In this method dotdash is not A. The SOUND resulting from dotdash is A. There is also the important factor of correct timing. If the signals are not timed correctly the resulting sound will not be correct. There are many, many things connected with proper Code instruction, many of them so small they seem inconsequential. Others are so technical that many so-called experts fail to understand them. It's a long story but I have it all written up and will be glad to send it to you. A postcard will bring you the full story.



TELEPLEX CO. 415 G. St., MODESTO, CALIFORNIA

Tilghman Island,
Tilghman, Md.

Editor, QST:

Like many amateurs today I am fascinated by single sideband and hereby offer a suggestion or two to improve operation.

The main mistake at present is in relation to getting through the heavy interference on the popular bands like 75 and 20. With a modern selectable sideband receiver it is possible to listen only to the desired sideband, rejecting the other sideband. This is a tremendous advantage because you can pick the sideband where there is no QRM. But what actually happens? Why, simply this: since the transmitting station employs only one sideband, the listener, though equipped with the finest receiver, is stuck with that one sideband. If there is QRM on that sideband, he is still stuck with it. A very simple improvement, which I understand is easily installed, is to transmit two sidebands instead of only one, thus enabling the receiving operator to switch back and forth for the one that is free of interference. (I hear that some sideband excitors come equipped with such a circuit.)

The second improvement is not quite so obvious but I feel sure that a great majority of amateur phone operators approve of it as evidenced by current amateur practice. This is to put out some interference along with the intelligible signal in such a way that your own signal will not be obstructed but that a competing signal will be surrounded by a continuous screech, grunting sounds, and noises like buckshot cascading over a tin roof. I can assure any doubters that this is neither beyond their reach or illegal. True enough, regulation prohibits unnecessary interference but it is quite all right to put out seven times as much energy in the form of QRM as you use for transmitting intelligence, just so long as that energy takes the form of an extra sideband and what is known as a "carrier."

The extra sideband (to be frank) is unnecessary QRM and the "carrier" doesn't carry a thing. But boy, can you make it nasty for the fellows that haven't got the savvy you have!

Summing up, the one KW operator who is really on the ball will use 110 watts input for strictly communication purposes, this being the single sideband necessary to that end; 770 watts in unnecessary interference known as "My Carrier," and 110 watts in an extra side band in case some other jerk should want to tune it in.

If some Mau Mau comes along and puts the whole 990 watts into a single sideband, I will sure see my congressman about it.

— Jonathan Eddy, W3JM

SIMPLEST CONVERTER

2014 Fourth Avenue
Sacramento 13, Calif.

Editor, QST:

Just a note to tell you that your "Simplest Converter" (Oct. QST) really works better than your article says. Within two days of finishing it, I had boosted my countries from 9 to 13. I made one change, however, and left the oscillator fixed and tuned my receiver. I am only 14 years old and this converter is what a lot of us fellows have been waiting for. Congratulations and keep up the good work.

— Bob Sequeira, K6CNE

2406 S. Cochran Ave.
Los Angeles, Calif.

Editor, QST:

Three cheers for Southworth! Built one of his "Simplest Converters" for 2 meters and it's really hot, and more selective than a very popular and expensive commercial transceiver combination. Yeh, it drifts and there are images. Could be my old receiver that it is hooked to.

— Herman Miller, W6WHM

ARE YOU LICENSED ?

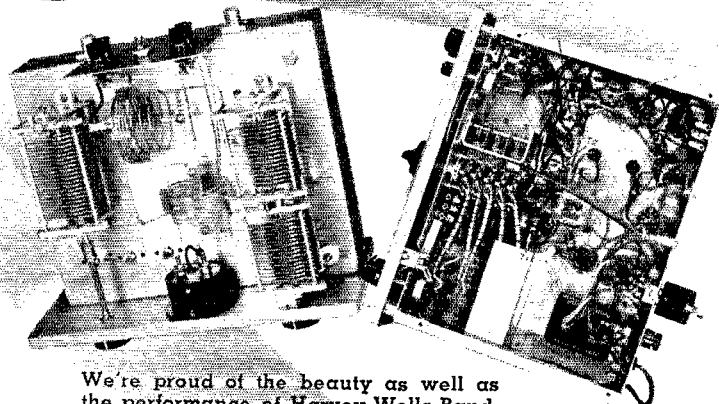
- When joining the League or renewing your membership. It is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.



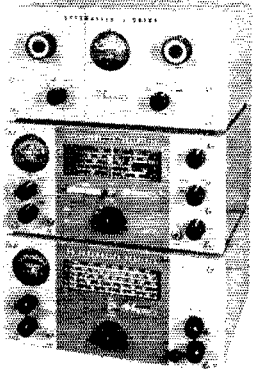
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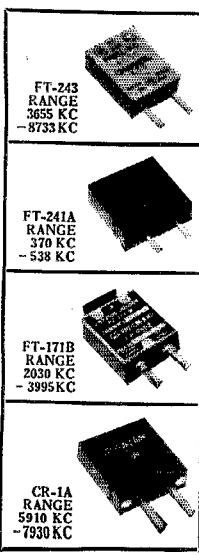
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377	398	422	492
379	401	424	493
380	402	425	494
381	403	426	495
383	404	427	496
384	405	431	497
385	406	433	498
386	407	435	501
387	408	436	502
388	409	438	503
390	411	481	504
391	412	483	506
392	414	484	507
400	462	440	463
441	464	442	465
444	466	445	469
446	470	447	472
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449	474	451	475
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454	478	455	479
457	480	458	482
459	483	461	485
461	486	463	488
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468	493	470	495
472	497	474	499
476	501	478	503
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516	541	518	543
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580	605	582	607
584	609	586	611
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708	733	710	735
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736	761	738	763
740	765	742	767
744	769	746	771
748	773	750	775
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756	781	758	783
760	785	762	787
764	789	766	791
768	793	770	795
772	797	774	799
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780	805	782	807
784	809	786	811
788	813	790	815
792	817	794	819
796	821	798	823
800	825	802	827
804	829	806	831
808	833	810	835
812	837	814	839
816	841	818	843
820	845	822	847
824	849	826	851
828	853	830	855
832	857	834	859
836	861	838	863
840	865	842	867
844	869	846	871
848	873	850	875
852	877	854	879
856	881	858	883
860	885	862	887
864	889	866	891
868	893	870	895
872	897	874	899
876	901	878	903
880	905	882	907
884	909	886	911
888	913	890	915
892	917	894	919
896	921	898	923
900	925	902	927
904	929	906	931
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912	937	914	939
916	941	918	943
920	945	922	947
924	949	926	951
928	953	930	955
932	957	934	959
936	961	938	963
940	965	942	967
944	969	946	971
948	973	950	975
952	977	954	979
956	981	958	983
960	985	962	987
964	989	966	991
968	993	970	995
972	997	974	999
976	1001	978	1003
980	1005	982	1007
984	1009	986	1011
988	1013	990	1015
992	1017	994	1019
996	1021	998	1023
1000	1025	1002	1027

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6000	6200	6656	7440	8383	8700
6006	6440	7000	8000	8400	8733
6025	6450	7025	8025	8425	
6040	6473	7075	8050	8450	
6042	6475	7100	8100	8475	
6050	6500	7125	8125	8500	
6073	6506	7140	8150	8525	
6075	6525	7150	8173	8550	
6100	6540	7250	8175	8558	
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NEW BOOKS

Television Receiver Servicing, Vol. 2, edited by E. A. W. Spreadbury. Published for Trader Publishing Co., Ltd. Distributed by Hiffe & Sons, Ltd., London. 308 pages, including index. Fifteen photographs and 161 schematics. 5¾ by 8¾ inches. Cloth cover. Price, 21s. net.

Volume 1 of this two-volume work covers sweep circuits, synchronizing circuits and the picture tube and its circuits. Volume 2 is a continuation (it begins with Chapter 13) treating tuning methods, signal-frequency and video amplifiers, sound and power-supply circuits, and antennas. Based on British television standards and practices, which differ considerably from U. S. TV in some respects, it is of somewhat limited direct utility to the service technician in this country, just as our comparable manuals would be of restricted usefulness overseas.

Color Television Receiver Practices, by the Hazeltine Corp. Laboratory Staff. Published by John F. Rider Publisher, Inc. 208 pages 5½ by 8½ inches. Paper, \$4.50, cloth, \$6.00.

The scope and technical level of this volume are perhaps best described by saying that the material is the outgrowth of a series of lectures prepared by the Hazeltine staff for presentation to visiting engineering representatives of manufacturing companies. Distinctly not a "popular" treatment, the information is presented in a way that those who are, in the words of the Preface, "technicians and designers having a good knowledge of monochrome receivers", can make practical use of it. The opening chapter gives an excellent overall picture of the considerations that enter into the selection of a color system, and is followed by chapters on the NTSC signal, display devices, decoders, color synchronization, i.f. and video amplification, and laboratory apparatus.

Radio-Control Handbook, by Howard G. McEntee, published by Gernsback Publications, Inc., 25 West Broadway, New York 7, N. Y. 192 pages, 5½ by 8½ inches, paper cover. Price, \$2.25.

A well-illustrated book covering control systems, both simple and complex, single and multitube receivers, transmitters, installation and adjustment, and test instruments. Emphasis is principally on model-aeroplane control because of the more stringent requirements as to weight and space, but the equipment described is applicable to other types of models.

Elements of Electronics, by Henry V. Hickey and William M. Villines. Published by McGraw-Hill Book Company, Inc., New York. 487 pages, including index. 6½ by 9½ inches, cloth cover. Price, \$5.00.

The word "electronics" usually brings to mind broader applications of the vacuum tube and related devices than those familiar to us through radio alone. Perhaps the title of this book would have been more apt if the word "radio" had been substituted for "electronics", since only the conventional radio circuits (including, of course, audio) are considered. Based on the authors' experience in conducting courses for technician training, it treats fundamental electricity, tubes, LC circuits, and such applications as radio receivers and transmitters. Antennas and transmission lines are discussed briefly, and there is a concluding descriptive chapter on transistors.

The book is divided into fifty chapters, each about lesson length, and each having a set of questions for either classroom or home study. Necessary mathematics is introduced as the need for it arises.

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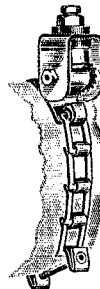
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March, 1931

... "The country has no place for a bunch of bum superheterodynes — except the nearest river." Hams, in an editorial stressing this point, are urged to be cautious, look them over first, and are advised that "if you can't check up on the design features yourself, make the dealer guarantee your set against high-frequency interference."

... Interest in more nearly perfect performance, air-blast oscillator cooling and transformer coupling of oscillator to amplifier is centered in an article titled "A Medium-Powered Oscillator-Amplifier Transmitter," by Ross A. Hull, in which he tells the story of a transmitter which at first failed to behave as its designer thought it would, and the steps taken to improve upon its performance.

... Twenty-one ARRL members in the western Florida territory of the Southeastern Division were authorized to constitute and establish the West Florida Section of the Southeastern Territory, ARRL.

... P. H. Quinby, W9DYX, tells in an article how he and his XYL were able to use the same skywire for both broadcast and amateur use simultaneously. "Making the Family Antenna Do Double Duty" describes the procedure followed in eliminating the possibility of domestic circumstances that might have possibly arisen within the household.

... "The Old-Timer Investigates Push-Pull" — a story with some practical dope with Eugene A. Hubbell, W9FRU, as its author, reviews several other articles in recent issues of *QST* covering reduction of effective tube capacity, choosing a circuit, antenna coupling and r.f. chokes and other applications.

... H. T. Maser and H. L. Saxton combine their efforts in discussing mercury-vapor rectifier ratings and circuits as well as make a further contribution to design data for the amateur power supply system. The article gives a detailed explanation of the ratings of the UX-866 rectifier tube as well as a discussion of some of the filters and circuits for use with this tube.

... A portable test panel — a set tester that does the work of a large instrument — featuring the use of nine meters, is described by A. C. Buden-Kaye. In addition to the regular tests made on the set with the aid of a cord and plug, each of the nine meters can be used individually for outside measurements by means of connections through binding posts.

... Described in the "Experimenters' Section" are a home-made "bug," neon tube oscillators, discharging tongs, antenna coupling, keying the power amplifier, end loading of the antenna and more information on filament by-pass condensers.

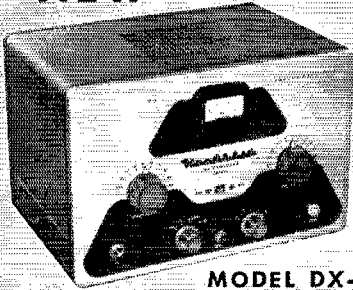
... Announcement is made that a new ARRL rule will permit any amateur station to take part in the Fourth Annual Relay Competition scheduled for March 8th to 21st and that no advance entries are necessary. This contest, as now, was based on securing the highest number of QSOs.

... For those technically minded, F. Dawson Bliley describes an easily constructed 100-ke. crystal oscillator with temperature control. His contribution is titled "A Home-Made Sub-Standard of Frequency."

... Amateur radio stations described in full in this issue are VO8MC, W6CNX and VE5AW. Predominating illustrations accompanying facts on the three rigs are pictures of the cone and horn type speakers generally in use at this time.

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NEW



MODEL DX-35

\$56.95

Shpg. Wt. 24 Lbs.

- Built-in modulator for phone operation.
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- Switch selection of three crystals—provision for external VFO excitation.
- Attractive and functional physical design.

This brand new transmitter model provides phone and CW operation on 80, 40, 20, 15, 11, and 10 meters. Plate power input to 65 watts on CW and controlled carrier modulation peaks to 50 watts on phone. Completely bandswitching.

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Truly a remarkable transmitter package for the price. Ideal both for the novice and for the more experienced operator.

Send for free 1956 Heathkit Catalog describing more than 65 interesting "build-it-yourself" projects.

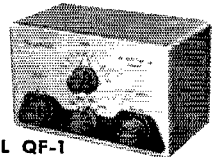
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MODEL QF-1

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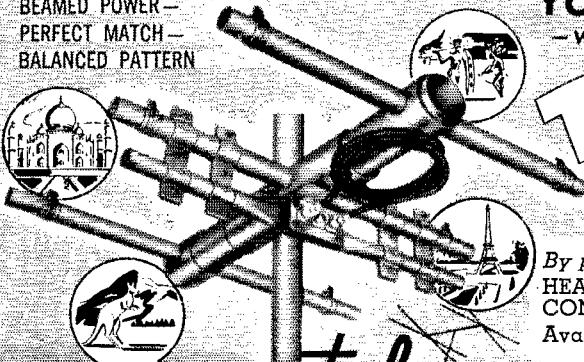


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KC4USA and KC4USV

According to advance prognostications both these calls should be heard on the air during March or as soon as the supporting party departs north. Work was started on the bases at McMurdo Sound (KC4USV) and Little America V (KC4USA) in the Kainan Bay area a week ahead of the expected schedule. These base stations are at the two extremities of the Ross Ice Barrier, over 400 miles apart. Once in operation, each month should show new amateur contacts. Next fall additional locations on the Antarctic continent are expected to be occupied in connection with U. S. A. support of the International Geophysical Year plans. Other nations are also setting up in connection with the IGY scientific studies.

Interest has been indicated in the amateur radio background of people in the U. S. Antarctic program under Admiral Byrd. Answering questions about those connected with the expedition, here is a list of those known to us thus far. Commander C. A. Snay, K4GFR, is the Staff Communications Officer. C. W. Franklin, K4GDU, Asst. Staff Com. Officer holds forth at the Washington expedition office (Rear Headquarters). Accompanying the group to the Antarctic are Owen Perry, W3NOT; James White, W1QDI, radio officer of the *CGC Eastwind*; Ed Wilson W1VUP, and C. A. Johnson, W1YEM, of the *U.S.S. Edisto*. Members of a six man Signal Corps mission, Bud Waite, W2ZK, and R. A. (Dick) Handy, W1RZP; Robert Forbes, WN3CNA, QMC U. S. Army; Francis Marino* W5GOP, and A. B. Garrett*, RMC (expected to be stationed at KC4USA); V. E. McGehee, RMI, and perhaps others. Those shown with (*) are indentified with the wintering-over plans. Perhaps we can add more names when the reports of amateur operating start to come in.

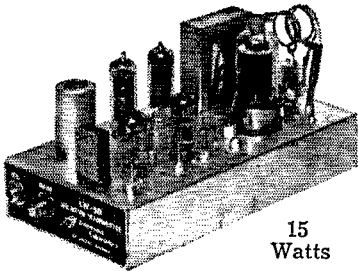
The IGY work will cover an 18-month period in '57 and '58. We should very soon have contacts by amateurs and all operators working these stations in the KC4USA-Z block may expect later to receive acknowledgments on the penguin-style QSLs (p. 75 Jan. '56 *QST*). Mr. Perry, W3NOT, with the expedition recommends effective procedures for the two-way contact and traffic exchanges that we hope will be plentiful during the whole time the expedition is in the Antarctic.

"The men who winter over will be depending on amateur radio for contacts with their families and friends, so directional CQs will probably be numerous. Hamming on the ice is fun, but it also has its problems. If after zeroing in a KC4, patiently waiting for him to sign and after giving him a husky call, you suddenly find that he has slid off on another frequency, please don't credit it to discourtesy. It isn't. It's just the fact that there are 499 other stations calling him on the same frequency. A better procedure would be to call *just off to one side.*"

— F.E.H.

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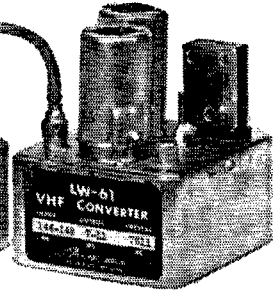
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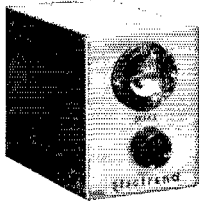
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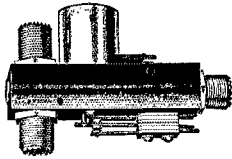
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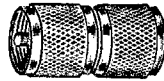


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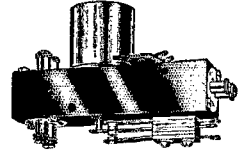


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(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th 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. 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, takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate is employed.

(7) Because error is more easily avoided, it is requested that signature and address be printed plainly. Typewritten copy preferred, but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

(Above regulations effective April 1956 QST)

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WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9YIV, Troy, Ill.

CODE slow! Try new method. Free particulars. Donald H. Rogers, Ivyland, Penna.

MICHIGAN HAM'S! Amateur supplies, standard brands. Store hours 0800 to 1800 Monday through Saturday. Roy J. Purchas, W8RP, Purchase Radio Supply, 605 Church St., Ann Arbor, Michigan. Tel. NOrmandy 8-8696. NOrmandy 8-8262.

WANTED: All types aircraft & ground transmitters, receivers, ART-13, RT18/ARC1, R5/ARN7, BC610E, BC221 mounts and parts wanted. Fairest prices possible paid. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

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WANTED: Early radio books and magazines dealing with crystal sets and 1-tube receivers. Send description and prices. G. E. Taylor, VE3BNJ, Graham, Ont., Canada.

MULTI-BAND Antenna, 80-40-20-10, \$18.95. Patented. Send stamp for information. Lattin Radio Laboratories, Owensboro, Ky., UFO Patrol data. W5CA.

ATTENTION Mobileers! Leeco-Neville 6 volt 100 amp. system alternator, regulator & rectifier, \$60.00. Also Leeco-Neville 12-volt 100 amp. system, alternator, regulator & rectifier, \$85.00. Good condition. H. A. Zimmermann Jr., K2PA1, 570 Jamaica Ave., Brooklyn 8, N. Y. Ulster 2-3472.

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QSL'S-SWLS. 100, \$2.85 up. Samples 10¢. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

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QSL'S "Brownie," W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

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CASH for BC-610E, BC-614E, RC-939, BC-729, BC-221, BC-312, 348, TCS, AN/GRC-9 and higher, and parts for all these. Amber Industrial Corporation, Surplus Div., 75 Varick Street, N. Y. C. 13, N. Y.

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2-METER beams: 6 element, horizontal or vertical, all seamless aluminum. \$6.95 prepaid. Wholesale Supply Co., Lunenburg, Mass.

WANTED: ARC1, ART-13 transmitter. Write to W4VHG, Box 5878, Bethesda, Md.

WANTED: ART-13, ARC-3, ARN-6, ARN-7 test sets, other military surplus. Advise price, condx. We pay freight and C.O.D. James S. Spivey, Inc., 4908 Hampden Lane, Bethesda, Md.

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HQ-129X with speaker, \$175.00 F.o.b. Dartmouth, N. S., Can., or nearest offer. Aaron D. Solomon, VE1OC, 8 Crichton Park Road, Dartmouth, N. S., Canada.

DAYTON Hamvention is the best treat in ham radio. See Hamfest Calendar this issue.

FOR Sale: HT20, NC183D, Matchbox, Micro-Match all with manuals: Command VFO-160 output, separate supply; microphone, key, crystals, cables and speaker. Every item in excellent condition. \$550 for the lot, considerably higher as single units. Make offer. You pick up any evening or Sunday or will deliver 100 miles. W2FVP, RD, Coxsackie, N. Y.

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SELL: New R.C.P. combination tube checker and vac. tube voltmeter, in oak case, leads, etc. \$50. K. Long, 933 E. B'way, So. Boston, Mass.

FOR Sale: One home-made transmitter 75 watts input to a pair of 807s, p.p. \$60; one TR-75-TV111 xmitter wired and operating: \$60; one Panoramoscope model SA-3-T-200, 200 Kc., sweep, \$85. All of this equipment is in gud condx, fairly new. O. B. Shule, KN6KGE, P. O. Box 112, Riverdale, Calif.

SELL: Panadaptor PCA-2T-20, \$50; Panadaptor BC-1013A (3V), \$75; CE Model A slicer, w/AP-1, \$50; Viking I, factory wired, TVI-suppressed; VFO, LPF, 10 xtals, \$225. G. R. 2 KVA variac, new, \$35; carrier Hybrid TA-31 (Daven), \$25; I-192A audio generator, \$50. Federal CS-1 sig. gen., \$3.30 Mc. needs some repair, \$125; RCA 4710 UHF sig. gen. G-560 Mc. \$75. G. H. Goldstone, 1926 National Bank Building, Detroit 26, Mich.

WANTED: QST's 1915 to 1924. Any years you have, please quote issues, condition, and price. Joseph Mullan, W3KRLR, 217 Northway, Baltimore, 18, Md.

FOR Sacrifice: Elmac A54 with 40M converted 12 volt, Gonset Super 6, converted 12 volt; PE103 6 or 12 volt, filtered and regulated w/ sup. 6 or 12 volt input 140 and 90 volt outp @ 100 Ma; Master Band Spanner, antenna, mount, and 750 ohm twin lead-in, \$12 Turner push-to-talk carbon mike, break-in relay, Will crate; best offer over \$155 takes all. Shipped one week after publication. W4ZXT, Box 62, Appalachia, Va.

FOR Sale: Globe Champion, factory-wired, 165 w. trans., with VFO, 2 sets of coils and ant. tuner or trade for good clean ham receiver. P. Schmidt, W9WFFH, Franklin Park, Ill.

SALE: Heath AT-1; VF-1; AC-1, A-1 shape, extras: \$55.00; SW-54, \$35, in A-1 shape. Want: 20 m. unit for ATD xmitter or sig. slicer. Will trade 5 x 7, 2 1/4 x 3 1/4 photographic equipment. List and photos sent. W9NVTGH, 320 Greenwood, Greencastle, Ind.

ATTENTION Communicator Owners! Want an illuminated "S Meter" which can be attached in 10 seconds, that requires no cutting, soldering, or disassembling of Communicator? Write K. T. Graham, WIKTI, Graham Company, Stoneham, Mass.

\$50 takes all this: VFO with built-in regulated power supply and NBFM, TVI-suppressed 75W bandswitching exciter, dual 350/400V power supply, 48" rack cabinet, VX-101 Jr VFO, \$20. Shipping charges extra. K2BIB, 307 Richardson Drive, No. Syracuse, N. Y.

FRLL: In excellent condition: Collins 75A3, \$385 and NC-88, \$85. In original cartons and instruction books. Also Simpson Mod. 260 voltohmmeter with case and leads, \$17.50. Ed. O'Brien, W2GFV, 86-10 44 Ave., Jackson Heights 72, L. I., N. Y.

SELL: New modulator power supply for Viking transmitter; Johnson Viking II; mobile antenna tuner. Make offer. K2BUR, 115 W. Broad St., Paulsboro, N. J. Tel. HA. 3-0484.

FOR Sale: Johnson Matchbox; Johnson SWR bridge, \$40 for both. George Feunig, 8 Tessen St., Teaneck, N. J.

FOR Sale: One BW CX49A for use with tetodes: \$15; BW HDVL 10, 20, 80 with jack bar: \$10. Willard Wehe, 16080 Cambrian Dr., San Leandro, Calif.

FOR Sale: National NC100ASD with speaker, \$55.00; Hammarlund HQ120X, \$80. Both receivers are in 1st class condx. R. Hanson, W0TBX, 5509 Highland Rd., Minneapolis, Minn.

FACTORY-Wired Viking II, VFO, low pass filter, ant. relay, \$285.00; NC183 w/spkr., \$185; Gonset 2-meter Communicator II, 6 volt, \$170; all like new, perfect shape, with manuals. Will deliver 75 miles. Jerry Rowen, W1RAP, 184 Abbott, Lawrence, Mass.

COMPLETE 2-meter rack mount rig. Includes SCR-522, 110/220 VAC, 60 cycle power supply, 8-in. speaker, carbon mike, headphones, 1 Master Plane antenna and 30 ft. coax. Package for best offer around \$100. You ship from Atlanta, Georgia, (P. O. Box 567, Richland, Washington).

PRICED to sell: Meissner, Mod. EX, sig. shifr, like new, \$30; Four 1000A, new, \$60; AX9908, new, \$30; Operadio 30 watt, like new, Hi-Fi, amp. with mike, \$30; two RCA 1 kw mod. xfrms \$30 each; 1 Kw mod., complete, \$22 tubes with spares, \$50. W9AU Flynn Creek Rd., Barrington, Ill.

RUBBER stamp with your call letters, name and address: \$1.50. Stamp pad, 35¢. El Kay Stamps, Box 5-WT, Toledo 12, Ohio.

FOR Sale: Almost new 813 tube, \$12.50. W4FSB, Water Valley, Ky.

WANTED: Will pay cash for surplus Kenyon transformers, No. S-13483, primary 115 60 CPS sec. 3200 at 200 Ma. W4MDQ.

WANTED: AC coil for HRO-7 receiver. Will KP, Fearon, RFD 2, Wells Beach, Me.

SELLING Out: S-76 with speaker, in excellent condx, \$155; good Heathkit AT-1 and AC-1, \$35; 36 in. rack, \$10; xtal osc., minus tank, \$5.00; Vibroxep Champion, hardly used, \$10; unwired RA-105, all components in good condx, \$10. Philip E. Reuter, 700 Hansen Pl., Park Ridge, Ill. W9KMF.

VIKING II, VFO, \$220 or best offer. Might also sell 20A, slicer, HQ-129X. Richard Pippert, Dysart, Iowa.

WANTED: Licensed amateur radio operator to prepare children for amateur license at Peckskill day camp this summer. Write: Walter Borten, Furnace Dock Rd., Peckskill, N. Y.

SELL: One Heathkit 0-7 oscilloscope, in excellent condx. Will accept first reasonable offer. One Carter Dynamotor 6 VDC, 590 VDC @ .2A, extra set of brushes included, \$12.50. Sut Hamilton, 300 W. Mahoning, Punxsutawney, Penna.

ATTENTION 75A2 owners! Complete Collins factory conversion kits with 3 Kc mechanical filter. Worth \$100. Sale-priced at \$55 each. Convert your receiver to a 75A2 Limited quantity! Send order to Radio Shack Corp., Cont., 230 Crown St., New Haven, Conn.

SELL or swap: Lyco 600, \$55; 6V dynamotor 425V @ 375 Ma, \$12.50; Meissner 8C FM tuner, \$20; Sonar 10 meter mobile revr, \$45; UTC S65, \$4. Want: Heath DX-100 and 6 meter xtal controlled converter. Arthur Crissey, Sparta, N. J. Tel. Lake Mohawk 2141.

W9ERU still trying to unload collection of years before moving to Antenna Farm. One thing wanted is a McElroy keyer for Wheatstone tape. Have for sale Lyco 600S, \$49; Johnson low pass filter, \$10; TV rotator, \$12.50; coax relay, \$9; Mallory 6-12 volt pack, \$22; RCA Master Voltohmmeter, \$7.5; pair Gates teletype filters, \$20. Lots more. Send stamped envelope for list to W9ERU, 2511 Burmont Road, Rockford, Ill.

COLLINS 32V-3 for sale, excellent condition, TVI suppressed any bands in fringe area. Write for information: \$500. Will ship prepaid. Gaiand Childs, W0OZF, Rte 4, Waseca, Minn.

SELL: National HRO60, new, \$350. ANFR 250 watt xmitter and rcvr, new, \$600. A. van Breems, WIUUD, 907 Shippan Ave., Stamford, Conn.

FOR Sale: Viking II, with Mod. 122 VFO, HQ-140X, matching speaker, Vibroxep bug; D-104 mike; Johnson lo-pass filter, or Balun coils; BC459A, BC222 Walkie-Talkie range 6 & 10 meters; misc. parts & tubes. All for \$500. L. L. Fredericks, W8DFX, Malinta, Ohio.

WANTED: A, B, C & D coils for National HRO5 revr. Parts list for Winter KP81 revr. C. R. Mersereau, W2ESW, 31 Pomona Ave., Fairlawn, N. J.

WANT: 200DD45 variable condx and set of KW tank coils. W5VHX.

HAMS! Vacation at Miller's Star Line Resort, RR #1, Three Lakes, Wis. Matt Miller, W9JQP.

HALLICRAFTERS SX-71 revr and matching R46A spkr., used only one week, with Heath AT-1 xmitter. Price \$200. Frank Tomanek, 31180 E. Rutland, Birmingham, Mich.

FOR Sale: HQ-129X and matching speaker, in excl. condx: \$115; I K75TV xmitter with extra coils, \$33. L. Doak, 15 Claridge Ct., New Hartford, N. Y.

SELL: Hallcrafters SX-62 with matching R46 spkr. for \$150; in excl. mechanical and electrical condx. Little used. Lorraine Smith, 6 Oakland Ave., Warwick, N. Y.

"IRE Proceedings" for years of 1953, 1954, and 1955 at \$9 per year. F. Thiede, W2EC, 169 Buckingham Rd., West Hempstead, L. I., N. Y.

FOR Sale: BC779 Super Pro with xtal lattice IF stages, product detector, and Q multiplier; \$100 or best offer. Want: 75A2 or SX-100, 12 μ d 2500 V Aerovox condnsr, \$10; 813's, \$8 each. Send for list of meters and other gear. W3PK1, 737 Pine St., Steelton, Penna.

MOBILE trans. wanted for 10 m. WIWRJ, c/o ARRL Hq., West Hartford.

ANTIQUe radio gear and magazines, old QST's, etc; De Forest and other old tubes. Mrs. Conrad Beardsley, 103 Wythburn Rd., So. Portland, Me.

WANTED: Viking or Collins Kilowatt. Give full details and cash price. W3CAV, Station WMB5, Uniontown, Penna.

ELDICO TR-17V xmitter 300 w./w/tubeless VFO: \$350.00. Dr. Don Kilgus, 3 Hugh St., Vahalla, N. Y. Phone WH 6-8764.

DELUXE Kilowatt phone and c.w. xmitter. Custom-built by professionals in dual 8ud rack. Push-pull 4-250A's modulated by 807's separate regulated bias and screen supplies; 23 tube speech amplifier electronically regulated high and low impedance mikes. Fully metered with five 3/4" square illuminated meters. Coax relay and patching panel for switching antennas. Faraday shielded link and hinge door on front for changing bands. May be driven by J10B. All new type commercial parts with spare set all major tubes. Must be seen to be appreciated. \$895. Will consider trades. W1PST, Hyde Park 3-4745, 23 Sanders Court, Boston 36, Mass.

SELL: Hallcrafters S-77A revr, AC/DC model of S-40B in gud condx, \$50. Dan Lynch, KN9ACG, 8306 So. Throop St., Chicago 20, Ill.

SELL: Factory-wired Globe Scout S-5A fone/c.w. xmitter, original owner, brand new: \$85. Paul C. Swartz, W3CXB, 126 Richmond Rd., Paoli, Pa.

SELL: Millen grid dip meter, brand new, \$55; R89/ARN-5, 11 tubes & xtals, unmodified, \$9.00; BC-906 freq. meter, 150-220 Mc., calibration chart and 0-500 u.a. betcr, \$9.00; transformers: 117 v. 60 cy. primaries, 600 v.c.t. 90 ma., 5 v. 2 a., 6.3 v.c.t. 3.5 a., \$3.50; 700 v.c.t. 120 ma., 5 v. 3 a., 6.3 v.c.t. 4.7 a., \$3; 750 v.c.t. 50 ma., 5 v. 3 a., 6.3 v.c.t. 4.7 a., \$5.95; chokes: 8 h. 150 ma. \$4.00; 12 h. 80 ma., \$1.50; 10 h. 110 ma., \$1.75; 13 h. 65 ma., \$1.00. Cecil H. Baumgartner, Box 343, Milton, Pa.

CONDUCTANCE Curves, book, \$1.25; sheets, 157 \$1.00. Sample 15¢. Pullen, Kingsville, Md.

WANTED: Collins 75A2 or 75A3. Will sell SX42 with speaker, \$150 or trade. W6KDR, E. J. Stidham, 904 N. Dickel, Anaheim, Calif.

WANTED: QST May 1916, \$25 or will swap Dec. 1915 or Feb. 1916. W6MCX, 1022 N. Rockhill Dr., Rock Hill 19, Mo.

TRADE: S-41G and \$90 for excellent HQ-129X with matching speaker. Cline Cole, 2215 Lake Ave., Knoxville, Tenn.

SELL: Elmac A54 transmitter, 6V dynamotor, coax relay mobile package, \$125; center loaded whip 20, 80 meter coils, \$15. Holler, Timonium, Md.

BARGAINS: with new guarantee: S-38D, \$39.50; S-40A or S-77, \$69.00; S-47C, \$59.00; HFS w/pow. sup., \$99.00; Lyco 600, \$69.00; S-77, \$79.00; S-76, \$79.00; SX-71, \$149.00; SX-77, \$149.00; SX-77, \$149.00; SX-77, \$149.00; HQ-140X, \$189.00; SX-42, \$139.00; HRO-50T1, \$299.00; Collins 75A3, \$375.00; Sonar VFX 680, \$19.95; Eldico TR75TV, \$35.00; Heath AT-1, \$24.50; Meck T-60, \$39.50; HT-17, \$29.95; LX Shifter, \$35.00; Globe Scout 40A, \$69.50; Globe Trotter, \$49.50; HT-18, \$59.00; Harvey-Wellis Sr., \$69.00; Harvey-Wellis VFO, \$25.00; PSA-500, \$27.50; Viking I, \$159.00; Viking II, \$229.00; Globe King 275, \$249.00; Globe King 400A, \$299.00; 32V1, \$299.00; 32V2, \$369.00; and many others. Free trial. Terms financed by Leo, W9GFO. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

250W Link VHF Communications transmitter, receiver, \$250. E. W. Goodrich, W9PGH, 9337 Lincolnwood, Evanston, Ill.

TRRRENDOUS bargains: New and reconditioned Collins, Hallcrafters, National, Johnson, Elmac, all others. Completely reconditioned with new guarantee. Hallcrafters \$38, \$29.00; S40B, \$79.00; SX71, \$149.00; SX62, \$159.00; SX96, \$199.00; HQ129X, \$159.00; HRO50T1, \$199.00; National NC125, \$129.00; NC173, \$139.00; NC183, \$189.00; HRO50T, \$199.00; NC183D, HRO50T1, HRO60; Collins 75A1, \$249.00; 75A2, \$299.00; 75A3, \$399.00; 32V1; 32V2; 32V3; Viking Ranger; Viking II; large stock of mobile receivers, transmitters, converters, hundreds of other items. Easy terms. Shipped on trial. Write for free list. Henry Radio, Butler, Missouri.

WANT Honest Kilowatt modulator and power supply, 810s preferred; 1craaft converter and LW-50 2-meter xmitter for sale or trade. W1BRX.

QST file 1927 through 1955; complete run except January 1927; January, February, April 1930. All complete after 1931. Excellent to new condition. \$90 transportation prepaid. E. C. Hathaway, 545 Campbell Ave., Los Altos, Calif.

SELL: 3V Westinghouse 0-200 microammeter, \$4.50. Send for list of other meters, including microammeters, milliammeters, voltmeters, decibel meter, and R meters: 810 tubes, \$6.00 each; 832 tubes, \$5.00 each. Carey S. Keyser, W3VYH, 410 E. Green, Shiremanstown, Pa.

SELL or trade: Elmac receiver and power supply, 12 volts: National S-O-J; Reverse tape recorder, Model T700. Henry Kampe, W9OKM, 1207 Oneida St., Joliet, Ill.

WESTON microammeter, Mod. 506, 2" round 0-100 movement with dual scale 0-30 milliamperes and 0-300 volts D.C.; Triplett Mod. 321, 3" 0-200 microamperes, \$3.75 each postpaid. H. W. Bower, W4DLM, 1713 N. E. 16th Ave., Ft. Lauderdale, Fla.

FOR Sale: Hy-Lite 20-meter 3-el. beam, \$30; Leeco-Neville Generator, Set 6V-60 amps; \$50; HRO-5 20-meter band spread coils, \$110. Write only please. Jack H. Garretson, c/o Beverly Theatre, 111 Church Ave., Brooklyn 18, N. Y.

FOR Sale: HQ-129X, gnd condx. Price \$155 or best offer. W8KVZ, Marietta, Ohio.

KW Amplifier, grounded-grid 304TH unit described Jan. 1955 QST; TVI suppressor. Includes all power supplies; 350 watt 304TH bias shift modulator; 6 meters, all tubes. Drive with 32V or Viking series. A \$350 bargain! S. D. Cowan, Jr., W1RST, 45 Park Ave., Old Greenwich, Conn.

SELL: National NC-46 receiver with speaker, \$65. Jim Pickering, Highway 130, Hightstown, N. J.

SELL: BC348, Harvey-Wells with power supply, and Heathkit VFO. Complete — \$175. Robert Moore, 27 Cranford Road, Asheville, N. C.

ATTENTION Novices, etc. Selling excess parts. Have various transmitting transformers, condensers, etc. Also complete 50 watt 10 and 20 meter rig made of finest equipment. Will sell as unit or individual parts. Terms also. Apply only in vicinity of New York City. No mail requests for list. H. C. Kratch, W2JWS, 390 Riverside Drive, N. Y. C. Tel. Monument 2-9822.

75A2A with 800 and 3000 cycle filters, \$395; 32V3, \$500; 300 watt modulator with 811s, \$40; speech amp, \$15; Thordson 21F18, 10 volt 5 amp, \$4.00; Chitrans F-25 2.5 volt 5.25 amp, \$4.00; steelcase 5 volt 15 amp, \$5; Eimac 450TH in original carton, \$40; 800 cycle for 75A3, \$20; the following new: MB-40SL, \$12; MB-40L, \$5; B&W type JTCL, 75 watt 5 band turret, \$7.50; Eimac 4-63A, \$25 pair; Westinghouse 3" round meters, \$3; all F.o.b. Elmhurst, Ill. John Huey, W9AMU, 390 Hill Ave.

450 watt bandswitching linear final, 600 watt variac controlled pwr supply, Moniscope circuit, all for \$135; pick-up for \$110; Dynamotor set, 12 VDC inp, 625 volts at 225 mills out, \$12.50; power supply 750 volt 250 mill out, with 300 volt regulated, \$17.50; four 872As for bridge rectifier, \$15.00; B&W BTEL 35 watt turret, \$5. Write complete details. Walter L. Moss, Jr., W5AYZ, 3719 Zephyr, Houston, Texas.

WANTED: Electronic ideas suitable for manufacture. Write but do not describe idea. Box 828, Anderson, Indiana.

NEED: May 1916 QST to complete set, also 1926 and 1929 ARRL Handbook. L. L. Simpson, \$5-30 152d St., Jamaica 32, L. I., N. Y.

COLLINS 75A4, \$495; 32V3 transmitter, \$495; factory-wired 20A with Q1-1, \$195; JA-400S-B linear amplifier, \$175; Gordon rotor with antennator, \$150; interlaced Gordon 3-element 20-meter and 4-element 10-meter beams; \$100; Millen frequency standard, \$35.00; DuMont #274 scope, \$55.00; Mon-Key, \$15. Oser, W1RMS, 198 Euclid Ave., Waterbury 10, Conn.

ELMAC PMR6-A in perfect condition. Use 2 months. Only \$90. M. S. Bregoff, Box 5087, Duke Station, Durham, N. C.

6146 mobile or fixed r.f. assembly; exact duplicate of item page 436, 1955 ARRL Handbook, \$45; also 35-watt modulator complete with A.C. power supply and Multi-Match modulation transformer, \$25. Barry Hunsaker, W5HJY, 8009 Parkland Dr., El Paso, Texas.

HAM Guest Register Books, \$2.00 in U. S. A.; \$2.25 in Canada, postpaid. Gratton George, W4PJU, Clewiston, Fla.

HEATH AT-1 transmitter and AC-1 antenna coupler in very gud condx, \$30.00. F.o.b. Charlotte, Michigan. James C. McLaughlin, 345 S. Cochran, W8TBZ.

WANT to buy RME-69, RME-70, HQ-120X, HQ-129X, SX-16 or SX-17 recvr. W2ZJH, Kirkman, 2444 "D" St., Lincoln 2, Nebraska.

SX-85 receiver, in excellent condx, \$80 F.o.b. Taylorville, Ill.; Meissner signal shifter, Mod. 9-1090, \$25.00 F.o.b. Harold McMaster, W9LIV, 808 West Main, Taylorville, Ill.

SELL: Best cash offer; 813 multi-band transmitter (duplicate Jan. 1954 QST); also heat-freq. exciter (ARRL 1954 Handbook); ARC-5 2-m transmitter and 100w. home-built transmitter. VE3DF, Stauffer, 150 Glenmorris St., Galt, Ont., Canada.

MUST sell: RCA WR39B crystal calibrator; RCA59C sweep generator; approved A-460 F.S. meter; Heath 0-8 scope, tube-tester, bar generator; two BC222s; Spico battery sig tracer; 2 Handie-Talkies 3685 Kc; Carter dynamotor 6 v inn, 600 VDC @ 250 MA. All inquiries answered. No reasonable offer refused. Graves, W8LRT, Barnesville, Ohio.

SELL: NC-173 receiver and matching speaker, \$140; exceptionally clean; RME HR 10-20, \$40; Meissner deluxe sig. shifter, lots of coils, \$20; BC522 xmitter, new, \$15; RC-457, new, \$10; BC-458, new, \$7; pair 8UD Universal 100-watt Class B modulation xfrmers, \$10; Harrison 1 Kw 300 ohm 20-meter filter \$5.00; pair new 100TH tubes, \$12; pair 813 tubes, new, \$14; 20-VR150 tubes, 50¢ ea; 1 Kw 1500 v. transformer, \$94; misc. meters and tubes. Write: W. H. Goodell, Jr., W2ZDJT, 132 East 5th Ave., Roselle, N. J.

FOR Sale: Factory wired Viking II, Viking VFO and L.P. filter, in excellent condx. Can't tell from new. Asking \$300. W2ZWT, 3611 206th St., Bayside 61, L. I., N. Y.

WANTED: Matching speaker for SX-25 Super Deñant. State condition. Frederick Morrison, 6173 Westminster Place, Saint Louis 12, Mo.

COLLINS KW-1 for sale. Condx like-new: \$2800. F.o.b. location. W1QW.

6 METER Beams. 5 element, seamless aluminum tubing: \$14.95 pd. Wholesale Supply Co., Lunenburg, Mass.

NOVICES! Complete 2-meter station for sale. ARC-4 transceiver, fully converted with power supply, \$40. Also: ARC-5 2-meter transmitter and Superhet recvr, \$25.00. Eph Tomlinson, Medford, N. J.

SELL: 250-watt Temco broadcast xmitter. Same can easily be converted to all-band ham rig. 6 ft. deluxe cabinet, 5 slide-out racklocked controls, time delay on power supplies, all highest quality material worth over \$1400 at current day prices. Parallel 8005s in final, modulated by 811s, Class B. Priced for quick sale, \$350. W6CTH, 1903 Bayshore, Redwood City, Calif.

FOR Sale: AR88 w/ "S" meter, manuals, HF 10-20 and Q multiplier; asking \$200. K9ACU/4 MOQ 608A, Maxwell AFB, Alabama.

HEATHKIT and Johnson equipment wired and tested. Write MATT, 2322 South 2nd Ave., No. Riverside, Ill.

COLLINS 32V3 transmitter serial #771, \$497; new spare final tube 4D32, \$12; Hammarlund Super Pro SP400X with speaker, power supply and 100 Kc xtal installed, \$170; Telrad frequency standard, 1000-100-10 Kc. markers, \$26; BC-453 Q-Ser with power supply and speaker, \$19; Sylvania modulation meter, \$16 and other equipment. Clearing house. H. M. Riddle, W8EDL, 3100 Sherbrooke, Toledo 6, Ohio.

SELL: Lettine 240 50-watt 80-10 meter phone c/w xmitter. Complete with all coils, plus extra built-in low-pass filter. In excellent condx: \$55. George Kimmeldorf, 76-32 171 St., Flushing 66, L. I., N. Y.

BC-348R receiver, new ceramic bypasses, realigned, built-in 110 supply, base, instrux manual, \$48.00; two 2AP1s, \$1.50 ea.; two 810s, \$5 ea., UTC S-9 driver, \$3.90; Thordson T1M76, 125 watt MultiMatch, \$9. W5MQV, McConnell, 2095 Dewey, Bartlesville, Okla.

BUCK Stretchers! Postpaid specials, brand new, original cartons. 717A tubes, 6/81.00; 3AP1s, \$1.00 each; PE-101C dynamotor brushes, 4 sets (40 brushes) \$1.00; Clearcut nuts, standard shaft, one each 5 me.; 2.2 meg.; 10 K per set; 2 acts/1.00; octal & acorn sockets, 15 each (30 sockets) \$1.00; (east of Miss. River add 25%); 200 tons clean new surplus, never undersold. Distributors for nationally advertised ham gear. Write for catalog. Clearfield Surplus Sales, 310 North Main, Clearfield, Utah. "Cnet", W7DTB and "Pat", W7NAX.

COLLINS 32V1, new oscillator, Balun coils, \$325 or best offer. Original HRO5A1A like new, speaker coils, power supply, \$160. Holladay, W4SAT/1, 411 Beacon St., Boston 15, Mass.

SELL or trade: 500W 813 rig as shown January 1954 QST with power supplies enclosed in Bud CR1745 36" rack, with enough room left for modulator. Construction A-1 deluxe. Will trade for Viking II and VFO in gud condx or best offer over \$250. W4AZU, Schlenker, 1713 Blanton Lane, Louisville 16, Ky.

BUY Heathkit, Johnson Viking, Tecraft and other equipment wired and tested direct. Heath DX-100 transmitter wired and tested, \$241.50 complete. New Health Analog computer, wired and tested, \$1000. Free list reconditioned equipment. L. Lynch Electronic Co., P. O. Box 54, Glen Oaks Branch, Floral Park, N. Y., N. Y.

WANT: 2-meter equipment; low or medium power. Dave Smith, K2CHS, 58 Butler Ridge, Scarsdale, N. Y.

75A-1. Looks like new. Recently overhauled. New PTO. \$225. Morrow 5BR-1, \$55. W5ISS, Pickford, 4415 Malden Lane, Dallas, Texas.

FOR Sale: Two Eimac 4-125A tubes, new, sealed cartons, \$15 each; both for \$25; plate transformer, 2000 volts at 1 amp. \$20. Cannot ship. UTC LS-56 HI-FI output, \$8; UTC S-7, Stancor P4086 and A4404, 1 µfd, 4000 v. Pyranolis, \$1.50 each; 1000 v. Pyranolis, 50¢ each. W. T. Curtis, W2IWS, RD #11, Jameville, N. Y.

VARIABLE Inductors. Thirty microhenry ribbon, thirty turns. Rugged commercial type. Handles well over one kilowatt. No arcing under load. Ideal for pi network or antenna tuning in hi-power all-band transmitters. Dimensions 10 x 5 x 5/8 in. Satisfaction guaranteed. Nineteen dollars each. F.o.b. Paul Di Savino, W2QUE, 138 E. 6th St., Clifton, N. J.

HALLICRAFTERS S-40B receiver. \$70; Edico TR75TV xmitter, \$40. Both in excellent condition. Will answer all queries. Ray Gorman, 513 Forest, Charlotte, Mich.

SALE: 35-watt c.w. rig for 80 & 40; two-stage VFO with pwr supply, output 30 & 40; 3 bandswitching rig, 200 watts c.w. or for pi-network final; TVI suppressed. First reasonable offer accepted. On 75 most evenings. W4WEL, 1501 Gay St., Rocky Mount, N. C.

OUTSTANDING ham list revised monthly. Our prices are realistic and attractive. Standout values in used Barker & Williamson, Collins, Central Electronics, Elmac, Gonset, Hallcrafters, Hammarlund, Harvey-Wells, Johnson, Morrow, and National units. We deal easy and offer time payments tailored to you. All leading brands of new equipment always in stock. Write immediately for this new "Buletin" or our exclusively amateur catalogs just out. Stan Burghardt, W9BJV, Burghardt Radio Supply, Inc., Box 746, Watertown, S. Dak.

NC-98 in original carton, new, \$130; Globe Scout 40, exceptionally clean, \$45; new Johnson Matchbox \$40; Johnson Signal Sentry, \$104. Kent Bowron, KN20FJ, 158 Sandford St., New Brunswick, N. J.

300 imprinted labels with name and address. Limited to 3 lines. Two color, silver and blue on mirror finish, gummed stock, for \$1.00. 300 extra labels free if you order within 10 days. Labels in handy pad form. Size is 1 1/2" x 3/4". L. D. Smith, Rainbow Press, 816 Maple Ave., NW, New Philadelphia, Ohio.

VAN SICKLE has the NC-300s and SX-100s. Big trades, too! Gene, W9KJF, 1320 Calhoun, Ft. Wayne, Ind.

SELL or trade Eico scope, Mod. 425 and tube-tester, Mod. 625. Best offer or what have you? Both in excellent condx. Cost when new, \$130. QSL all offers. H. C. Short, W1DUA, 23 Thomas Dr., West Springfield, Mass.

TOP prices paid for BC-348-H, K, L, R, S. Preferably unmodified. Write, giving complete information on model, cost and best price. Industry Services, Inc. 2705 So. Oakland St., Arlington 6, Va.

WANTED: Johnson Matchbox and Jones Micro-Match for 75 ohm coax. Also sell complete set of B&W BVT coils 80-10 with jack bar and Jones M-M-1 Micro-Match. Wally Holl, W3UDW, 538 Luzerne St., Johnstown, Penna.

WANTED: Two-way FM equipment. Ronald Phillips, Communications, 1312 McGee, Kansas City, Mo.

SELL: Lyceo 600 transmitter, modulator, antenna coupler and S-40A receiver. All for \$150. Goodheart, W2KJQ, 1583-74th St., Brooklyn, N. Y. Phone CL 6-6413.

FOR Sale: Morrow 5BRF converter and FTR receiver with power supply; \$140; Master Mobile Hy "Q" coils, meters, and other parts. Write for list. R. Kreisman, K2BBC, 37 Nagle Ave., New York City.

WANTED: Four National XR-4 four pin forms I & 1 1/2 in. diameter. New or used. State price. All letters will be answered. W1AUH, Clinton, Me.

FOR Sale: Globe Scout Model 16S transmitter, modified for VFO by manufacturer instructions. All bands, 65 watt c.w., 55 watt phone. Will ship express collect on best offer over \$90. Pete Smith, W8QZR, 1836 Oak Street, Birmingham, Mich.

HRO-5, rack and table cabinets; six coils, Handbook described control-grid regulated power supply. Contact me before buying any receiver. Joe Craggs, 111 Copeland St., Rochester, N. Y.

LOW prices in surplus parts. List free. ElectroniParts, Box 445, Las Cruces, N. M.

CONELRAD Alarm. To comply with new FCF regulations every amateur will have to monitor for alerts after January 1957. Complete diagrams and instructions on simple Conelrad alarm, \$1.00 postpaid. Requires no power. Works on any superhet. New parts cost less than \$3.00. Can build out of junk-box free in 30 minutes. Guaranteed. Circuit used satisfactorily at broadcast stations over 2 years. B & M Electronics, Box 246, Lewisburg, Tenn.

NATIONAL HROSTA1, 5 coils, speaker, \$139; HRO-7, 5 coils, speaker, \$149; Hallcrafters SX-71, \$129; TBS-50D with VFO, \$99; S-38C, \$24; NC-200, speaker, \$119; 32V-1, \$299; 75A-3, 3 kc. filter, \$385; Gonset 2-meter Communicator, \$149; Viking 1, \$149; Vt. wants AR-1-13, ARK-1, ARN-7, BC-342, BC-312, BC-610, RC-221. Cash or trade for new amateur equipment. Write: Tom, WIAFN, Alltronics, Box 19, Boston 1, Mass. (Richmond 2-0048). Store: 44 Canal St., Boston, 60 Spring St., Newport, R. I.

COLLINS 75A2, \$325.00; 75A3, \$395.00; 32V1, \$395.00; 32V2, \$450.00; 32V3, \$550.00; Deltronic CD-144, \$50.95; Iclenco HSM-3, \$70.00; S275, \$175.00; Gonset 10-11, \$19.95; 3301, \$4.95; 3008, \$29.95; 3011, \$19.95; 3028, \$29.95; 3030, \$34.95; 3041, \$79.95; 3005; \$24.95; 3020, \$19.95; 3026, \$159.95; 3063, \$129.95; Harvey-Wells TRS-50A, \$49.95; TRS-50C, \$59.95; TRS-50D, \$79.95; APS-50, \$29.95; VFO, \$29.95; Lettine 240, \$59.95; Sonar MR-3, SR-9, \$24.95; ME-26, VFX-60, AMP-50, CFC, \$19.95; SKT-120, \$99.95; SKT-120P, \$129.95; Edico A-300, AT-1, GDO, \$14.95; TR-75TV, \$49.95; Hickok 200-C, \$39.95; 288X, \$79.95. Precision 60, \$19.95; E-200, \$34.95; E-202-C, \$49.95; Other used items available. Write for latest list. Evans Radio, Concord, N. H.

COLLINS 75A3 and 32V3, recvr. includes spkr. xmitter includes filters in new condx. \$900 takes both or will sell separately. What am I offered? W2UVC.

BUG: \$4.00. K2GBH.

NEED money for college. Must sell NC-125 with speaker; Viking Adventurer; Viking VFO; Signal Sentry, Worth over \$330. The first \$200 takes all. F.o.b. Chicago. Carl Poch, W90LN, 2333 Euclid, Berwyn, Ill.

MEISSNER Mod. EX Shitter, \$45; SX-23 and matching speaker with Millen R91-20 and 10 meter coils, \$60. Roy Fenning, W2ATF, 1024 Grace Terrace, Teaneck, N. J.

AC Generators and plants. Any size wholesale. Three guaranteed quality makers. Factory 1/2 you or stock. Dun & Bradstreet listing. E. T. Ballou, WIGFD, Wayland, Mass.

SELLING everything. NC-100X, SCR522 T23/ARCS; BC603-4, RC-184, QSTs. Long list. Caldicott, 114 Hamilton Road, Hempstead, L. I., N. Y.

MOBILE Transmitter, bandswitching 6146 modulated with a pair of 6146's Class B; VFO and xtal with PE103 and mike. First check for \$75 will get it shipped immediately. G. G. Schlueter, W7VRB, 114 E. Roosevelt, Phoenix, Ariz.

WANTED: Communicator. Will trade new Winchester 351 automatic, never fired, with shells and case. W8GWA.

CLEANING house: NC:173, \$120; NC-125, \$125; NC-98, \$115—all with speakers, test equipment, meters, tubes, small parts, books, magazines, tools. Send for full list. M. Marshall, 455 Washington Ave., Dumont, N. J.

FIBER-GLASS Scotty Beam, dual 10/15, 10.5 Db. forward gain, \$60. Send stamp for information. Gelow Electronics, 2323 Appletree Drive, Hagerstown, Md.

SELL-Swap: New NC-183D, BC696, Triband, dynamotors, power supplies, meters, 829Bs, 813s, etc. Send for list. W9TKR, Post Box 111, Wankegan, Ill.

EICO 5-in. 'scope, Mod. 425; Eico VTVM Mod. #221. Both in A-1 condx, both for \$35.00. Wm. J. McIntire, WN3ATD, 1912 Rowan St., Phila., 40, Pa. Tel. DA 4-5267.

COLLINS 75A1 w/spkr in perf condx, \$265; Thordarson plate xfrm, 4900/4250 vdc, CT at 500 mills; 115 vdc primary, \$29; swinging chokes 2-12 Henry 600 mills, \$9.50; 6 v. Carter Magmotor, 400 v. @ 150 mills, \$15; 6 v. Carter dynamotor 600 v. at 200 mills, \$24; Dumont Mod. 208 5" 'scope, \$65. D. Weinstein, W2JDR, 252-73 Leeds Rd., Little Neck, L. I., N. Y.

SELL or trade: All-band push/pull 4-125A final with tubes and grid coils. Built by Collins engineer. Want: tape recorder, Panadaptor or what have you? W4RJ.

MULTIBAND Antennas. As designed by W3DZZ. See QST March 1955 and Radio & TV News for December 1949. Write for details now! Frederick Tool & Engineering Corp., 414 Pine Ave., Frederick, Md.

JUST Discharged from Service. Need a 500 to KW rig. AM/CW/VFO, exciter, all-band transmitter. Send information, pictures, price to Bill Slep, W4FHY, Ex KAZAK, Ellenton, Fla.

75A3, 3 Kc filter, xtal calibrator, in perf. condx, \$370 less speaker; pair like new 4-250A, xfrm sockets, connectors, \$85; many high power components, capacitors, transformers, 522 transmitter, \$7.50; 6 v. Vibracog, 100 Dynomotor, \$12; pr. 715C tubes, \$14. D. Gardner, 209 Knapp Rd., Syracuse, 4, N. Y.

FOR Sale: 75A4 plus 800 cycle filter, \$600. National CRM 'scope, \$20. W3RNO, A. P. Schlachter, 7724 Kelly, Pittsburgh 21, Pa.

MACKAY 167BY transmitter, 813's final, Class B Modulation, 2 — 28 Mc. and SX-28 Hallcrafters recvr in one unit: \$600. Pictures on request. C. W. Dickey, K2HNC, 930 Bridgman St., Elmira, N. Y.

FOR Sale: 300 watt phone, 450 watt c.w. rig; also NC-46 recv. A. Schwartz, W1NYA, 52 Augustus Ave., Roslindale, Boston, Mass. Tel FA 3-6508.

SWAP Kalart camera, 3 lenses, accessories, etc. Worth \$250. Want: Communications receiver, Clifford Storeh, 5 Winfield Terrace, Great Neck, L. I., N. Y.

PERFORATED Aluminum Sheet, .051", 5/64" OD holes, 1/8" centers, \$1.20 sq. ft. cut to size. Send for listing on beams, aluminum tubing, etc. Radcliff's, Postoria, Ohio.

FOR Sale: An AR-2 receiver with a QF-1, \$35. Cecil Mills, Rt. #3, Winstonsboro, Texas.

MOBILE 10-meter LinkAm 20UBX factory modified, new, control head, cables, whip, mount, spring; Tri-band and TNS, all: \$75. F.o.b. West Englewood, N. J. Scott, W2LAL, 1254 Beaumont Ave.

WANTED: 6000 or 7000 vct at 500 Ma. power transformer preferably with 220V primary. Communicate details and price to James Martin, W1KIB, 95 High St., Shrewsbury, Mass.

SELL: BC-223, phone & c.w. xmitter, with 80M, 40M and Marine band tuning units, \$45; 12V. Dynamotor, 500 VDC, 400 Ma., \$15; 200 watt triode plate audio, 100V0, 225 Ma., 750V, 225 Ma., 450V, 150 Ma., \$35. Paul Goldman, K2GKU, 248-54 54th Ave., Douglaston 62, L. I., N. Y.

ESTATE W0DK: To settle estate: Parallel 813 SSB transmitter with phasing type exciter, 500 watt power supply, rack, etc.: \$130; SX-71 receiver, speaker and homemade slicer, \$165. Mrs. Agnes Anderson, 1822 -19th St., Boulder, Colo.

HALLCRAFTERS HT-9 transmitter, grid condx, w/coils, \$110. Stan Miller, W7SM, 11526 Alton Ave. N.E., Seattle 55, Wash.

WANTED: QST December 1920 and 1923. Will swap or purchase. W1CUT, 115 No. Beacon St., Hartford, Conn.

WALLETS: Hand carved calf, exquisite designs. Your call letters. Emblems, etc. Double pockets each side. Insert for cards. \$7.00 each. Geo. W6LYG, Box 49083, Veterans Hospital, Los Angeles 25, Calif.

SELL Elmac PMR6A receiver, \$80; 6V power supply, \$12; Webster Electric H.F. amplifier with PP 2A3's, \$18. W9BYX, Vogel, 205 Evergreen, Elmhurst, Ill.

FOR Sale: 250 watt antenna tuner, bandswitching, 0.5 RF 2" sq. Simpson ammeter, changeover relay in 8 x 8 x 10 cabinet, \$15; SCR522 recvr, trans, dynamotor, w/tubes unconverted, \$15; BC645 converted, 420 Mc., \$100; Leeco-Neville alternator 80 amp. 6 volt model 5082-GA3, 100 amp rectifier, regulator, combination pulley, ammeter, \$40.00; 100 watt 2 meter trans., 829B final, lv. hv. supplies built-in, 8 1/2 x 19" std. enclosed table cabinet, metered, switching provisions for 6 xtals, w/tubes and spres, less audio, \$50. All F.o.b. Chippewa Falls, Wisconsin. W. J. Moulton, RFD #5, Phone PArk 3-3000.

VIKING I, TVI-suppressed transmitter and Viking VFO in excellent condx for sale: \$200. John M. Pincomb, W2ISM, 2 Great Oaks Road, Koslyn Heights, N. Y. New York City hams please call RO 3-0574.

WANTED: Buy or borrow Tech Manual for receiver NC-156-1. R. E. Berger, 1349 Hamilton N.W., Washington, D. C.

SELL: Viking I, TVI-suppressed, \$140; Johnson VFO, \$30; Johnson Matchbox, \$40; HQ129X, \$130; Telrad frequency standard, \$15; Gonset Triband conv., \$18; SP44 Panadaptor, \$40. Will not ship. W2WTB, 15 Lane Ave., Plainville, L. I., N. Y. WE 8-0396.

JOHNSON Kitowatt Matchbox, new, in original carton \$115 Shipped prepaid. Calvin Evans, W9LTR, LaGrange, Ind. 327 W. Spring St.

OLD Timers! I have a few new 860 tubes, \$3.00 and new 203As at \$2.00. A Signal Corps Australian HRO "as is," complete with one coil covering 7 to 15 Mc., less pwr supply, \$25. Also have some 28V. dynamotors, \$1.00 each. W6KEG, 2142 Parkway Dr., El Monte, Calif.

SX-17 with speaker, \$110; Lafayette fone/xmitter, complete, \$50; HV power supply, partly assembled, weighs 100/, \$20; S-40, \$40; Hallcrafters T54 TV, cabinet matches ham gear, \$20; new EMC mutual conductance tester, \$60; Heath sweep generator, \$25; Heath signal generator, \$18; Solar condenser tester, \$12. Selling all ham items. Write for list. Postage allowed. Al Pratt, 114 West Lake View Ave., Milwaukee 17, Wis.

ESTATE of W9P5M: Collins 32V3, perfect condition, for sale: \$485. Bernice Mellman, 6001 Forest Ave., Gary, Ind.

WANTED: Gear box for the heavy-duty type prop pitch motor, W1KE c/o ARRL, West Hartford 7, Conn.

HARRISON'S "Like-new" trade-ins give you more actual performance and resale value! This month's "Cream of the Crop": Collins 75A-1, \$269.50; 75A-3, \$395; NC-125, \$125.00; HRC-60, \$395.00; SX-71, \$145.00; SX-96, \$195.00. Fully guaranteed. Free Trial Trades! Terms! Come see our tremendous assortment of lower-priced bargains, or request listing. Harrison Radio Corp., 225 Greenwich St., New York 7, N. Y. (Jamaica Branch: Hillside at 145th St.)

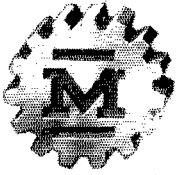
NC-98 with speaker, less than 6 months old: \$115.00; Halldorson G-120 modulation xformer, \$5.00; BC-457-A, \$8.00; Gonset 10-11 with clipper, \$20.00. W2WFFV, Victorson, 255 Eastern Parkway, Brooklyn 38, N. Y.

FOR Sale: Like new: Mosley Tri-bander, antenna 40, 20 and 15 meters complete with tilt head. A \$148 job for only \$95. Contact C. J. Clark, W9OMP, 2910 Orchard Lane, Wilmette, Ill.

SX-88 in new condition. Will accept Hi-Fi equipment in trade. Lund Co., Hi-Fi distributors, at 5236 Blackstone Ave., Chicago 15, Ill.

NATIONAL ARRL Convention Flash! Civic Auditorium, Hotel Whitcomb, San Francisco, July 6, 7 and 8. Plan now for a really terrific show! Exhibits first-time technical talks, entertainment, music, dancing, banquet, golf. DX, SSB, VHF, traffic, mobile, Novice. Complete ladies' program. Write Bud Bane, W6WB, Chairman.

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EDITION

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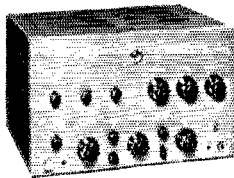
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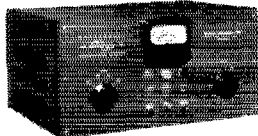
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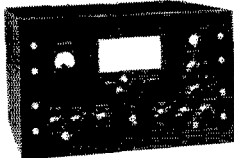
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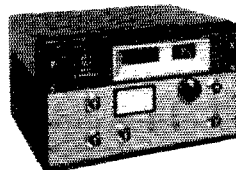
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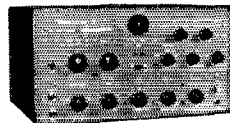
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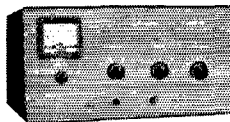
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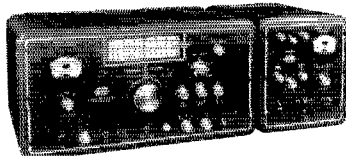
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51 SB-B SSB Generator. Converts transmitter above for single sideband. Takes power from transmitter.

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What makes the NC-300 a "dream receiver"?

First of all, we ran a contest to find out what features hams dream about in receivers. And we got entries from hams all over the world. Then we incorporated a lot of the suggestions in the design of the NC-300. And when we released it to distributors and customers, it was hailed the world over as a true "dream receiver".

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SELECTIVITY is another reason for the NC-300's acceptance as a "dream receiver". In the NC-300's IF system, a pair of switchable double-tuned networks offers a choice of three bandwidths — 500 cycles, 3500 cycles, or 8000 cycles. The second IF at 80 kc permits the use of these three widely different bandwidths, yet maintains a large rejection of the secondary image — a crystal filter is also provided to reject unwanted signals on phone operation . . . so you get the ultimate in selectivity in a receiver at the NC-300's price.

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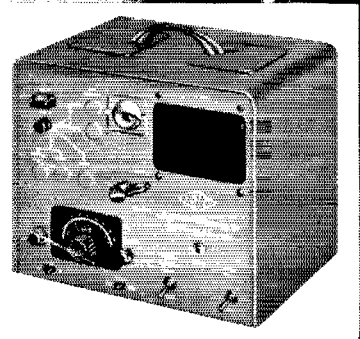


tuned to tomorrow

Leading Amateur Designs ...use RCA Tubes



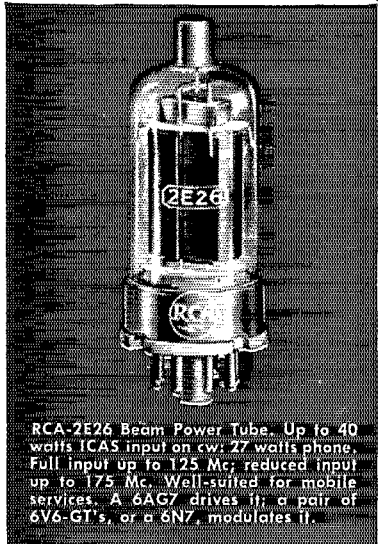
Close-up view of the "final" in the Gonset "Communicator"—showing the RCA-2E26.



Look at the popular Gonset *Communicator*, for example. In this compact mobile-or-fixed 2-meter station, the RCA-2E26 delivers a clean signal capable of covering a lot of territory.

Why do leading amateur and commercial designers recommend RCA Power Tubes for top performance? Because: (1) High-perveance RCA Tubes deliver the power you need—at lower plate voltages, (2) RCA Tubes have enormous reserve of cathode emission to supply peak plate-current demands, (3) RCA Tubes give you more for your money—in life and watts input per dollar.

RCA Power Tubes—both beam power and triode types—are available at your RCA Tube Distributor. Walk in and name your type. For technical data on the 2E26, write RCA, Commercial Engineering, Section C37M, Harrison, N. J.



RCA-2E26 Beam Power Tube. Up to 40 watts ICAS input on cw; 27 watts phone. Full input up to 125 Mc; reduced input up to 175 Mc. Well-suited for mobile services. A 6AG7 drives it; a pair of 6V6-GT's, or a 6N7, modulates it.



TUBES FOR AMATEURS
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