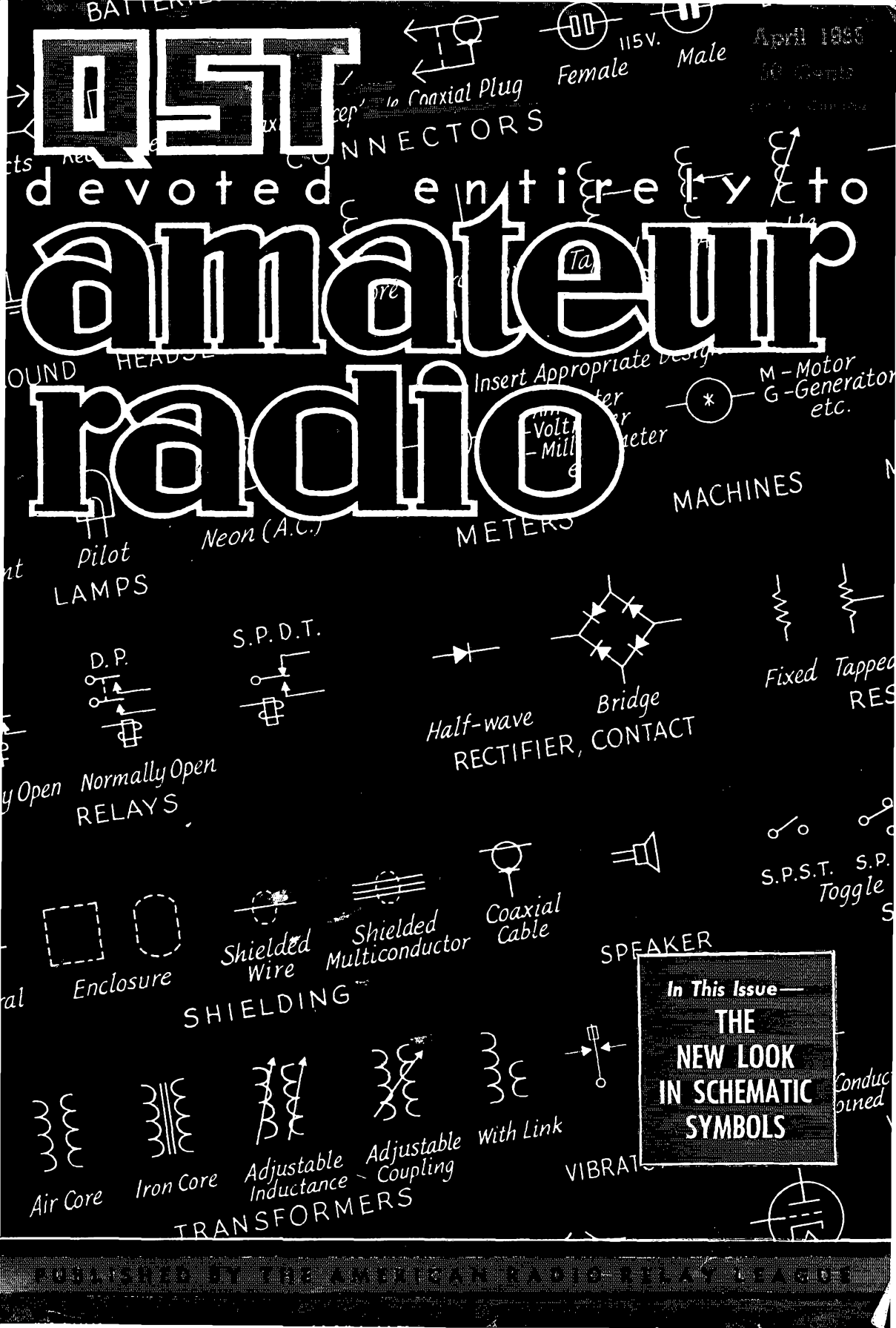

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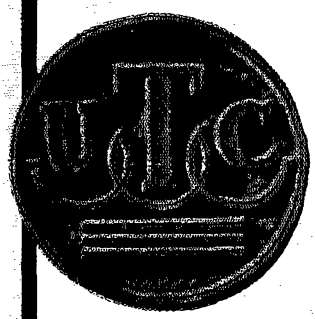
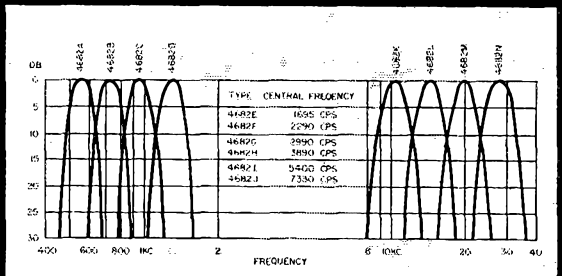
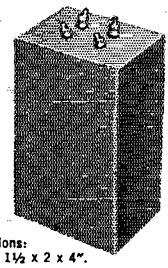
FOR EVERY APPLICATION



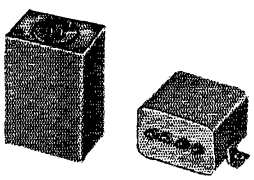
TRANSISTOR CIRCUITS

[illegible]

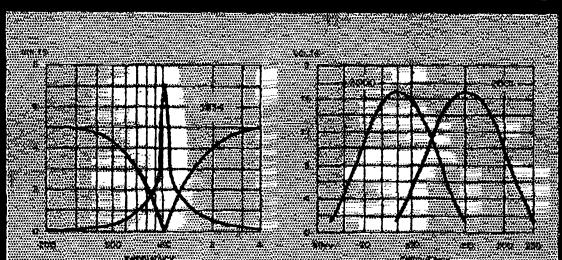




Dimensions:
(4682A) 1½ x 2 x 4".



Dimensions:
(3834) 1¼ x 1¾ x 2-3/16".
(2000, 1) 1¼ x 1¾ x 1⅝".



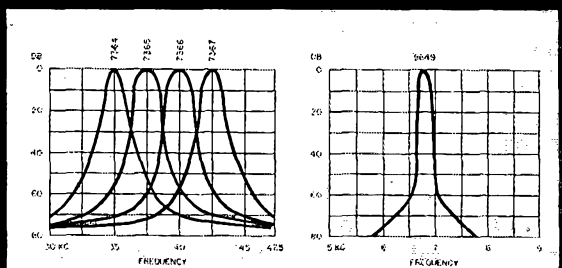
AIRCRAFT FILTERS

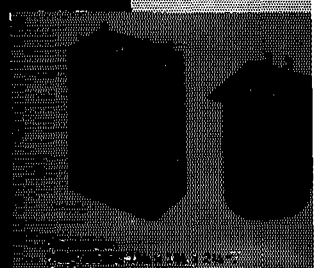
UTC has produced the bulk of filters used in aircraft equipment for over a decade. The curve at the left is that of a miniaturized (1020 cycles) range filter providing high attenuation between voice and range frequencies.

Curves at the right are that of our miniaturized 90 and 150 cycle filters for glide path systems.

CARRIER FILTERS

A wide variety of carrier filters are available for specific applications. This type of tone channel filter can be supplied in a varied range of band widths and attenuations. The curves shown are typical units.

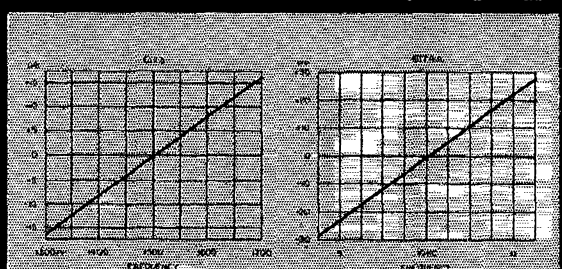


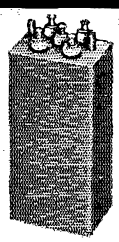


Dimensions:
(6173) 1-1/16 x 1⅛ x 3".
(6174A) 1 x 1¼ x 2¼".

DISCRIMINATORS

These high Q discriminators provide exceptional amplification and linearity. Typical characteristics available are illustrated by the low and higher frequency curves shown.





For full data on stock UTC transformers, reactors, filters, and high Q coils, write for Catalog A.

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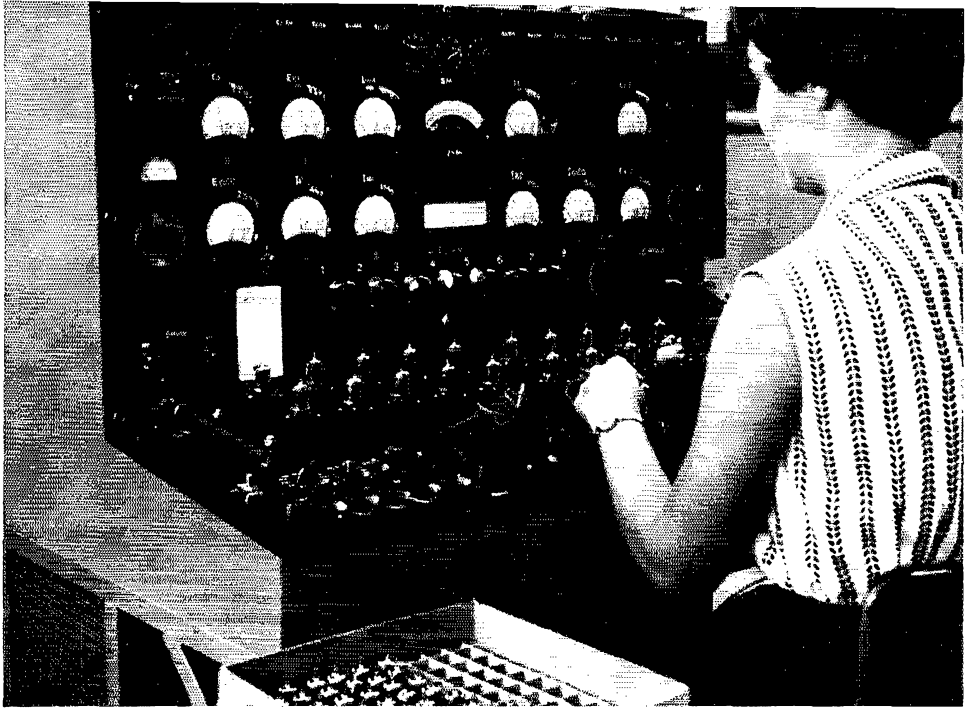

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G-E tubes that pass these individual tests, must run the gauntlet of quality-control checks for over-all satisfactory performance. Are microphonics at a minimum? Does life-testing leave tube characteristics unchanged? Only if the answers to these and many other questions are "yes" can G-E tubes be cartoned and shipped.

The tubes your G-E tube distributor sells are the best that precision manufacture, rigid inspection, and thorough testing can produce. Install them with confidence! *General Electric Co., Tube Department, Schenectady 5, New York.*

★ ★ ★

General Electric congratulates the winner of the 1954 Edison Award, Benjamin S. Hamilton, W6VFT, La Mesa, California. The judges named Mr. Hamilton as the amateur whose achievement was most noteworthy, because he provided San Diego County, California, with "an outstanding Civil Defense and disaster-emergency radio network". Recognition given to Award-winner W6VFT and to others whom the judges cited, was equally a tribute to the public-spirited efforts of radio amateurs everywhere.

GENERAL ELECTRIC

166-182

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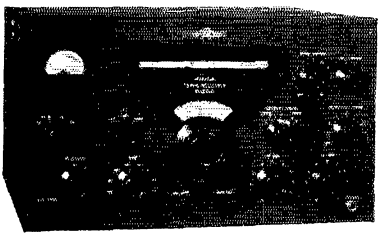
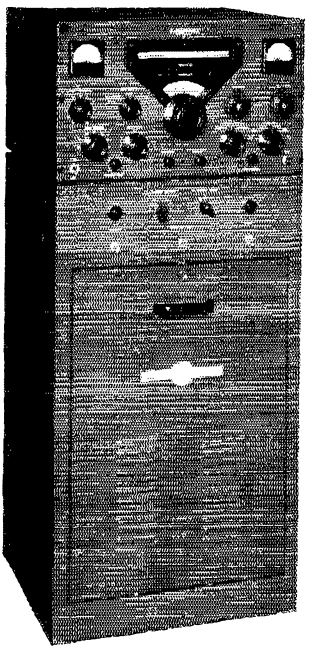


75A-4 Receiver



KWS-1 Transmitter

The new Collins 75A-4 Receiver, 32W-1 Exciter, and the KWS-1 Kilowatt Transmitter are expressly designed for SSB, AM and CW. Like all Collins Amateur equipment, they meet the same high standards as Military and Commercial equipment.

The 75A-4 Receiver features passband tuning, AVC on SSB, bridged T rejection notch filter, built-in crystal calibrator circuit, separate detectors for AM and SSB, a new noise limiter, and provision for three Mechanical Filters together with time-proven features such as good image rejection, and an accurate linear dial with calibration of 1 kc per division.

Transmitter features include a SSB generator using Collins Mechanical Filters, selectable sideband, band switching from 3.5 to 30 mc, voice control or push-to-talk, automatic load control, and dual conversion with crystal controlled high-frequency oscillator and stable, linear, permeability-tuned low frequency oscillator resulting in a linear dial similar to the 75A-4 Receivers.

Power input is one kw peak envelope power on SSB, one kw on CW, and equivalent to one kw AM when received on narrow-bandwidth receiver.

Several versions of the transmitting equipment are available. The 32W-1 Exciter is capable of driving a kw linear amplifier. With exception of the power supply, which is housed in a separate cabinet, it is complete in a receiver-type cabinet and can be converted into a KWS-1. The KWS-1 is also complete in a receiver-type cabinet except for power supplies, which are mounted in an attractive desk-high cabinet. As an alternate, the KWS-1 is available without the high voltage power supply as type number KWS-1K, and kits are available for converting a 32W-1 or a KWS-1K into a KWS-1.

AMATEUR NET PRICES ARE AS FOLLOWS:

32W-1 Exciter complete	**$ 895.00**
KWS-1 Transmitter complete	**$1,995.00**
KWS-1K Transmitter less H.V. power supply and P.A. tubes	**$1,225.00**
428A-2 H.V. Power supply kit for KWS-1K	**$ 545.00**
428A-1 Power supply for KWS-1K, wired and tested	**$ 700.00**
367A-2 P.A. Kit to convert 32W-1 to KWS-1K	**$ 215.00**

See your nearest Collins distributor for delivery information.

COLLINS

QST

APRIL 1955

VOLUME XXXIX • NUMBER 4

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

OFFICES

38 La Salle Road
West Hartford 7, Connecticut

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- 10 tubes, 1 rectifier and voltage regulator.

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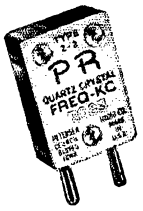

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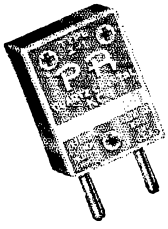

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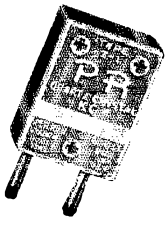

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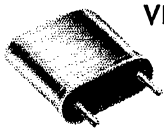

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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **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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Yukon	———	———	———	———
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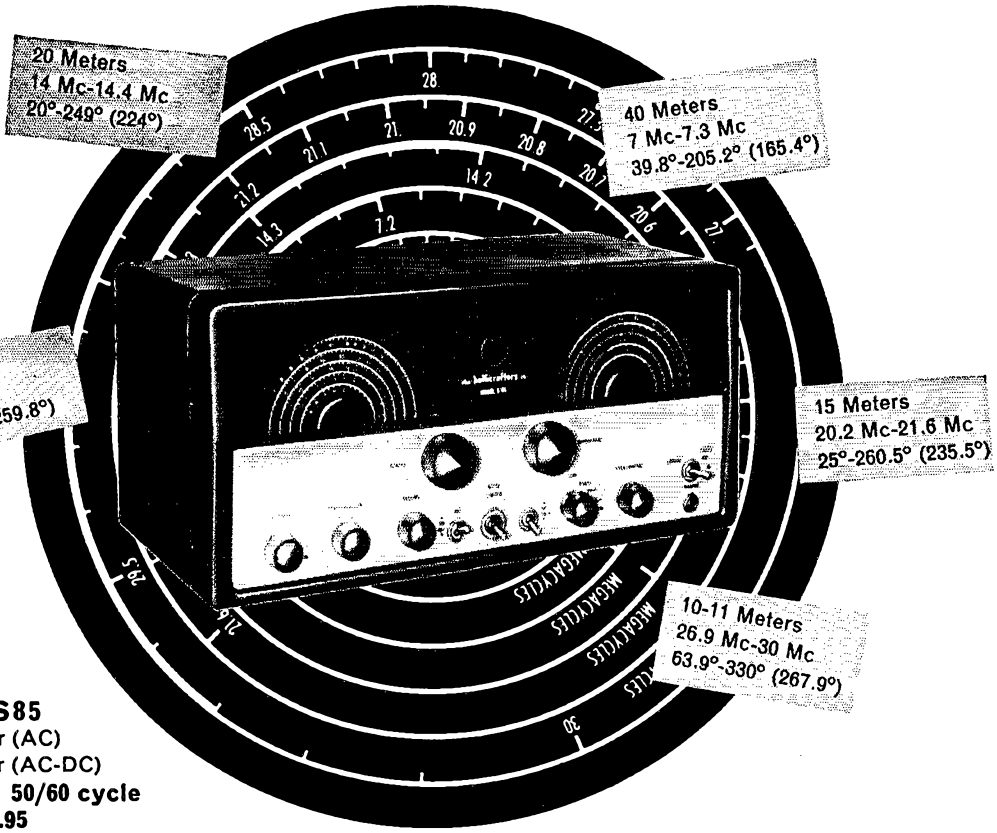

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S-86 Receiver (AC-DC)
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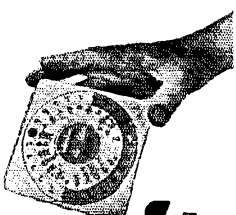

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THE AMERICAN RADIO RELAY LEAGUE, *INC.*,

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

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

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

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

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

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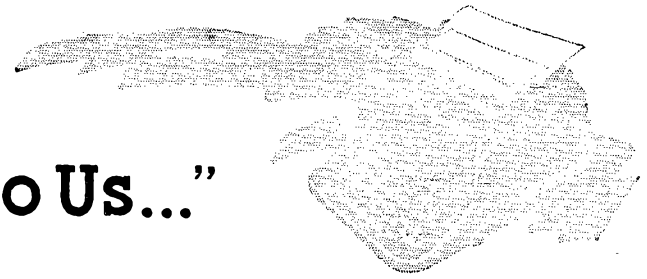


"It Seems to Us..."

MOBILE SIGNING

The receipt of several inquiries on the subject prompts us to discuss some aspects of signing procedures when operating mobile in aircraft or on board ship. Apparently many amateurs assume that *any* station aboard an aircraft is "aeronautical mobile," and any station aboard a vessel is "maritime mobile." Not so, at least as far as amateur call sign identification procedures are concerned.

When operating in one of the ten FCC districts — that is, within the continental limits of the United States — an amateur mobile station in an aircraft or on board ship signs its call in precisely the same manner as any other amateur mobile station such as one in an automobile. For example, a station in an aircraft flying over Wisconsin would sign, .on c.w., "de W3XXX/9." On 'phone, it would identify itself as "This is W3XXX mobile over Madison, Wisconsin." An amateur station aboard a boat in New York Harbor would sign "/2" or "mobile in New York Harbor."

Only amateur stations operating outside the continental limits of the United States use the terms "aeronautical mobile" and "maritime mobile" as part of the required call sign identification. It follows that such terms should be encountered only in the 21- and 28-Mc. bands, such being the maximum permitted U. S. amateurs outside our country. Example: An amateur station on an aircraft en route to Europe would sign, on c.w., "de W3XXX/AM." At the end of the contact, it would also indicate the number of the aircraft and the approximate geographical location, e.g., "de W3XXX/AM NC41752 3000 MI E OF NEW YORK NY." On board ship on the high seas, the c.w. sign would be "de W3XXX/MM," or at the end of the contact: "de W3XXX/MM SS FLYING GULL 40 W 45 N." On 'phone, the same data would be conveyed in the signature.

The point of all this is, however, that amateur mobile stations within the continental limits of the U. S. sign in exactly the same manner whether they are being operated from an automobile, aircraft, a small boat, ocean liner, or a bicycle.

BEST SELLERS

Even in these days of billions and trillions, a little ol' million is still a pretty substantial figure. It is especially so when one is speaking not of Government moneys, but of publication sales. And it becomes a strikingly large figure when it represents the sale of a pamphlet in a field as comparatively limited as amateur radio.

Yet *The Radio Amateur's License Manual* has just sold its millionth copy. *How to Become a Radio Amateur* has topped the half-million mark, and *Learning the Radiotelegraph Code* — the third and newest in the "Gateway to Amateur Radio" series ARRL has available for newcomers — is almost to the quarter-million mark. *The ARRL Antenna Book* is well over a quarter-million; *A Course in Radio Fundamentals* is pushing 200,000 with *Hints & Kinks* not far behind. Any way you look at it, these League publications have earned the title of "best sellers."

Time was when *QST* was the only League publication. In 1926, the first *Handbook* appeared; as its sales now approach the 3,000,000 mark we can laugh at our concern — although it was a deadly serious problem at the time — whether the initial printing of 5,000 copies could ever be sold before the text became obsolete!

But that's another story. In late 1929 the League decided, as one means to increase its membership, to promote interest in amateur radio on the part of potential newcomers. So Hq. got up a little pamphlet briefly outlining what amateur radio had to offer as a hobby, giving constructional details on a 160-meter two-tube (201As) regenerative detector and one-stage audio receiver and a UX 210 t.n.t. transmitter of about thirty watts, and some brief dope on how to learn the code and get licenses. It was given the title *How to Become a Radio Amateur* and thus — just twenty-five years ago — became the first ARRL booklet. Intended strictly as a promotional piece, it was nominally priced at a dime, which went mostly for postage and handling. Distributed through newsstands and from advertising in

Normally pretty cheerful guys anyway, General Manager A. L. Budlong and Circulation Manager David H. Houghton have good reason for these wide grins — the millionth copy of ARRL's *License Manual.*

boys' and home mechanic magazines, it enjoyed an immediate success.

So much so, in fact, that a couple of years later a new edition was brought out with somewhat more elaborate treatment. At about the same time, in response to a growing demand, the League produced a 20-page compilation of licensing information and some questions-and-answers for the amateur exam — which of course became the *License Manual.* A *QST* editorial of the date (1933) announced their appearances this way:

In addition to *QST* and the *Handbook* the League has produced this year a couple of booklets which we believe will be found most instructive and valuable. We intend before the year is out to produce a few more in a series which is now getting sufficiently extensive to be called a "Radio Amateur's Library." One of the important functions of ARRL is to make absolutely-reliable information available to its members at nominal cost. In preparing these booklets it will be our policy to select subjects upon which further light is badly needed, to give them complete treatment to an extent impossible in the pages of *QST* or the *Handbook,* and to sell them at nominal prices.

How could we put it any better today?

OUR COVER

Yes — they're different! Here are the symbols that will appear in *QST* starting with this issue. The objective is to standardize, modernize, and simplify circuit symbolization. The American Standard symbols shown required five years of preparation. Those participating in this task included representatives of industry, government, and publishing.

For a detailed explanation, turn to "Graphical Symbols for Radio Diagrams," by Harold P. Westman, Technical Editor of *QST* in the late Twenties. The article begins on page 16.

Strays

W9DYZ reports considerable interest in the formation of an association by electronic reps who are hams. He plans to have the first meeting at the Conrad Hilton during the May Parts Show and all "Hamreps" are invited to attend. For details write to John A. Benz, W9DYZ, 4809 West Fond du Lac Ave., Milwaukee 16, Wisconsin.

—•••—

W9ARH recently received a QSL from W5BAQ. Nothing unusual except that the card was for a QSO held 23½ years ago!

—•••—

The fog surrounding the origin of the variable bandwidth filter system described by Cmdr. H. E. Thomas, W6CAB, in February *QST,* page 17, has been lifted. Dana Griffin, W2AOE — who incidentally has authored a considerable number of thought-provoking articles in *QST* over the years — holds a patent (No. 2,354,749, issued August 1, 1944) on the system and described it publicly in a paper presented before the Radio Club of America in 1946.

—•••—

An article entitled "An Amazing New Hobby: Ham Radio for the Whole Family" appeared in the February issue of *Parents'* magazine. The author, Walker A. Tompkins, K6ATX, presents a lively description of amateur radio and also some good hints for prospective hams.

—•••—

An advantage of the screen protective circuit not mentioned in "A Protective Circuit for Transmitting Tetrodes," by Beling (*QST* for October '54, beginning on page 33) is that in the event of an open heater in the dual triode, the current path through the screen voltage dropping section would be open, thereby protecting the r.f. amplifier tube. — *W8ELJ*

ROANOKE
ELECTION RESULT

Theodore P. Mathewson, W4FJ, has been elected Vice-Director of the Roanoke Division, receiving 522 votes to 434 for Thomas H. Wood, W4ANK, in the special election tallied on February 21st. Licensed since 1921, OM Mathewson is a past President of the Richmond Amateur Radio Club, an OO, and a member of the A-1 Operator Club. He is a life insurance underwriter in Richmond, Virginia.

FLASH!

The Federal Communications Commission has acted to open the 50-Mc. band to Technician Class licensees effective April 12th. In the same action the Commission decided against opening the 144-Mc. band to Technicians.

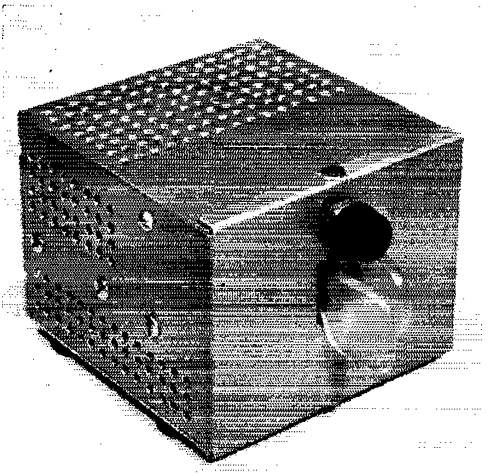
The All-Electronic "Ultimatic" Keyer

Part I — Construction and Handling

BY JOHN KAYE,* W6SRY

THE SELECTION two years ago of "Ultimatic" as a name for "a key with a memory" was a bit premature.[1] Reversion to the hoary twin-lever key and the addition of sequence "seizure" now eliminates most of the back-and-forth motion normally associated with code transmission, carrying the principle much closer to the ultimate.

The new sequencing function provides leeway for key release corresponding to, and greatly exceeding in time, the leeway for key closure provided by advance storage in the memory circuits. It also reduces the maximum back-and-forth motion of the hand to *once per letter*, and that at a greatly reduced rate. On most letters the rocking motion is completely eliminated. By obviating the fight against the hand's inertia, the effort expended for any given speed is greatly reduced. Besides relieving the operator of virtually all timing responsibilities, and most of the labor, the compound leeway does away with all sensation of being chained to an inexorable time base.



Here is an all-electronic version of the "key with a memory," the "Ultimatic." Several improvements over the multiple-relay version have been incorporated in this newer version.

The time base, memory, and interlocked-sequencer circuits handle automatic spacing and advance storage of marking characters in a manner functionally identical to the relay model. (The original article is recommended rereading in conjunction with a detailed study of this improved model.) With twin keys and the new seizure circuitry, continuous closure of one key generates that type of character until the opposite key is also closed. After completion of the character in progress, the output switches to the opposite type, even with both keys closed. Release of either key provides output corresponding to the still-closed key. With one key held closed, a single opposite-type character can be injected by a closure (as short as 2 microseconds) of the opposite key at any time after the start of a desired preceding character.

Multiple intermediary opposite-type characters within a letter are obtained by holding one key closed throughout the entire letter while operating the opposing key long enough in the middle of the letter to get the desired string. When both keys are released together, the terminal character(s) is determined by the lastly-closed key. When the keys are released independently, the terminal character(s) is selected by the still-closed key.

Using the Key

One can, of course, attack the keyer as if it were an ordinary bug or start-stop automatic key, or with any intermediate technique up to that realizing full usage of all functions. Since a given key need not be released to permit selection of an opposite-type character, the motions on the keys may be as careless as the mood dictates, with all kinds of overlap. The *one* and *only* requirement is that the two keys be closed in the proper order for the letter being sent. The output comes up straight and perfect.

A few specific examples of full sequencer usage are in order; otherwise an operator might never discover the really easy way to make a CQ, a numeral or, for that matter, any of the combinations. For the call "W1AW," both keys may be *squeezed* together four times, each time allowing the dot side to close at least a few microseconds before the dash side. They are both held at least until the last dash of each letter starts, and they are necessarily released between letters only long enough to establish automatic interletter spacing. "W6BJ" calls for similar technique, with the dash key making first contact on the "6" and the "B."

A question mark results most easily from continuous closure of the dot key for the entire duration, with the dash key operated any time during the second dot. The dash key is released anywhere from the start of the second dash up to due time for the first terminal dot. The reverse procedure gives a comma. A numeral such as "3" is made by holding dots throughout

* 2296 West Nicolet, Banning, Calif.

[1] Kaye, "The 'Ultimatic'—a Key with a Memory," *QST*, February, 1953.

the number, closing up the dash side any time after the third dot starts. Both keys may be released together any time after the beginning of the second dash, or independently.

That bearcat "CQ" is a pushover: continuous closure of the dash key throughout each letter, with the dots flicked in indiscriminately, taking full advantage of the memory leeway. The "C" can be started with the "squeeze" technique, or it can be made with two quick squeezes just long enough to trip the memories. This is true for *any* combination whose first two characters are of opposite type. In context, a given letter will normally be manipulated differently between different preceding and following combinations, to minimize seesaw motion. All code combinations

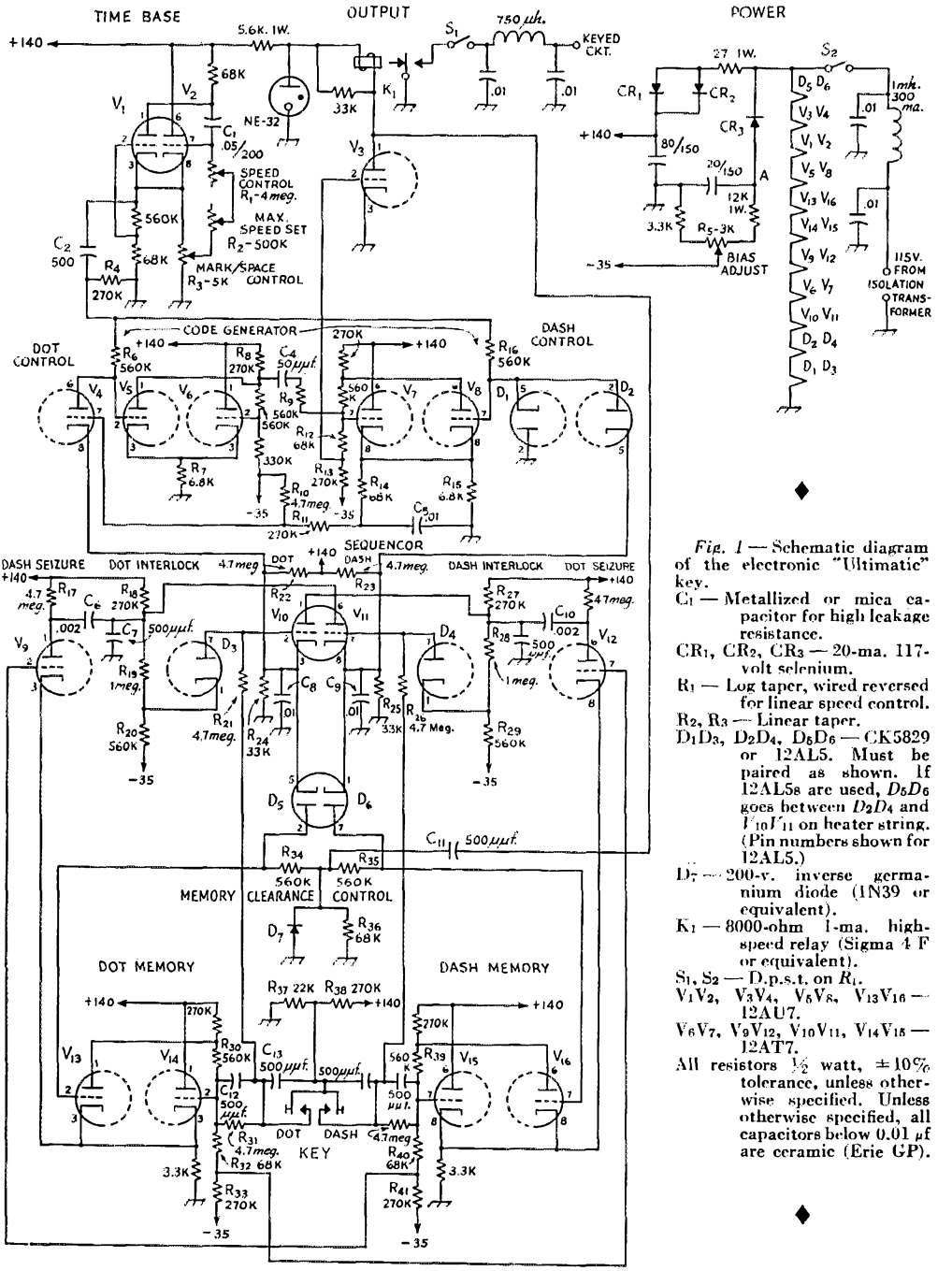


Fig. 1 — Schematic diagram of the electronic "Ultimatic" key.

C_1 — Metallized or mica capacitor for high leakage resistance.

CR_1, CR_2, CR_3 — 20-ma. 117-volt selenium.

R_1 — Log taper, wired reversed for linear speed control.

R_2, R_3 — Linear taper.

D_1D_3, D_2D_4, D_5D_6 — CK5829 or 12AL5. Must be paired as shown. If 12AL5s are used, D_5D_6 goes between D_2D_4 and $V_{10}V_{11}$ on heater string. (Pin numbers shown for 12AL5.)

D_7 — 200-v. inverse germanium diode (1N39 or equivalent).

K_1 — 8000-ohm 1-ma. high-speed relay (Sigma 4 F or equivalent).

S_1, S_2 — D.p.s.t. on R_1.

V_1V_2, V_3V_4, V_6V_8, $V_{13}V_{16}$ — 12AU7.

V_6V_7, V_9V_{12}, $V_{10}V_{11}$, $V_{14}V_{15}$ — 12AT7.

All resistors ½ watt, ±10% tolerance, unless otherwise specified. Unless otherwise specified, all capacitors below 0.01 μf are ceramic (Erie GP).

other than those made up of straight series of like characters (I, S, H, 5, M, O) follow one of these illustrations in full or part, or they can be made by any intermediate motion down to that used on a Vibroplex. And with perfect results, regardless of fumbling!

General Circuit Data

As the circuit diagram [2] in Fig. 1 shows, power is derived from line-type rectifiers. The tube heaters are in series across the line. Alternatively, the heaters can be fed in parallel or series-parallel from a suitable transformer. The plate and bias voltages are obtained from a 117-volt 40-ma. winding, or they can be borrowed from an available source via VR tubes. The NE-32 maintains constant relay current for stable mark-to-space ratio at all line voltages. An isolation transformer is, of course, mandatory unless the station is designed for "hot-line" operation throughout, through the use of appropriate safety grounding.

For long tube life, maximum plate current in most tubes runs around 3½ ma., although some tubes draw less than ½ ma. The pulse peak in V2 hits 6 ma. The keyer is completely stable with line voltages from 80 to 135, but it goes berserk if too much r.f. gets back to it through external leads. Voltages mentioned for various points in the circuit, as measured with a v.t.v.m., obtain with average tubes and 10-per-cent-tolerance components at 113 line volts and −33 volts bias.

Construction

This particular unit was built in a Channel-Lock box cut down to 4 by 4 by 3 inches. The mounting plate fastened to the front panel section provides ⅞ inch below for components and 2 1/16 inches above for tubes. All surfaces except the front are perforated with ⅛-inch ventilation holes on ¼-inch centers, with additional 5/16-inch access holes in the bottom for R_3 and R_5.

To minimize bulk, the CK-5829 subminiature diodes and the NE-32 are wired direct without sockets. If 12AL5s are substituted for the expensive subminiature diodes, with relay output, the housing depth requirement is 4¾ inches for another row of tubes. With electronic output instead of the relay, the two additional potentiometers can be stacked above R_3 and R_5, with top-side access, and the NE-32 can be eliminated. It is entirely feasible, of course, to provide room for three 12AL5s by reducing the size of the keys. Subminiature potentiometers would then occupy the space below the chassis vacated by the CK5829s.

Further reduction of over-all size is not recommended. The thing already runs hotter than the proverbial two-buck pistol, with the present amount of compression. On the contrary, one should really spread it out in a big box or rack mounting, bringing out the key and

[2] Copies of the enlarged schematic diagram are available for 50 cents from ARRL's Technical Information Service, 38 La Salle Road, West Hartford, Conn.

• Two years ago, W6SRY described his "key with a memory," which made it possible to send perfect code without perfect manipulation by the operator. The one stumbling block for some constructors was the multiplicity of relays used in the circuit. We are pleased to present the all-electronic version, which not only eliminates the need for critical relays, but makes for still greater handling ease by the operator.

The length of the article requires that it be published in two parts. We depart from custom in presenting the circuit and constructional details before the circuit explanation, to better serve the many amateurs who have written to the author requesting details on this key. Part II (next month) will explain how the circuits work and how the output relay can be eliminated.

speed-control leads in separate shielded and pi-section r.f.-filtered pairs. Speed-control lead r.f. by-pass capacitors should not exceed 0.001 μf. each side of 750-μh. r.f. chokes. The key-lead r.f.

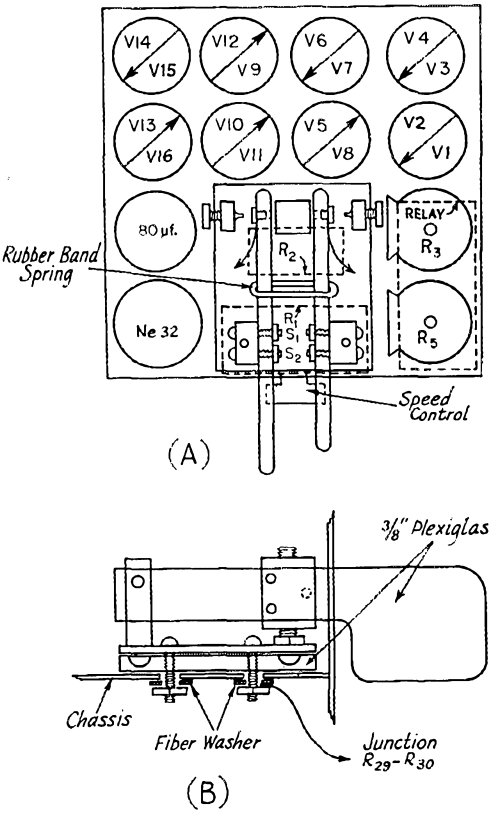


Fig. 2 — (A) Top view of a suggested tube-socket and control arrangement for the Ultimatic key. Arrows point in direction of pin gap. (B) Details of the key-lever construction. The screws are 8-32.

by-pass capacitors should make up the total 500 $\mu\mu$f. of C_{13} and its corresponding capacitor on the dash side.

Fig. 2A and a photograph show the top view of a socket orientation providing optimum component dress, with resistors mounted on and between the sockets. All No. 9 pins and center shields were removed to provide more room for parts. With the heaters connected in parallel for 6.3-volt operation, the No. 9 pins should be bent over and soldered to the mounting rings. If the series heater connection is used, the heater leads should be dressed very tightly against the chassis, to minimize a.c. fields.

Fig. 2B shows a side view of the key levers. Although a cone pivot bearing is definitely superior, the threaded bearing pivots in this unit proved surprisingly good, and they can be readily built with a minimum of effort. The keys are assembled on a $1\frac{1}{2} \times 2 \times \frac{1}{16}$-inch metal plate, insulated from the chassis by $\frac{3}{8}$-inch Plexiglas levers and threaded on the 8–32 pivot bolts. (Metal pivot blocks, tapped for 8–32, are bolted to the $\frac{3}{8}$-inch Plexiglas.) The pivot bolts are secured to the key plate with nuts, as shown. The "spring" tension is adjusted by sliding the rubber band to an appropriate position. This method of supplying spring tension absorbs most of the sloppiness that might result from too loose a thread fit in the pivot screws, a condition apt to arise from filing threads to eliminate binding.

During construction of the many miniaturized models preceding this one, it was found wise to wire subcircuit by subcircuit, performance checking each subcircuit before going on. Nothing is so exasperating as finding a bonehead error buried under three layers of resistors massed together with $\frac{1}{8}$-inch leads. Ask me — I know!

Trigger & Bias Adjustment

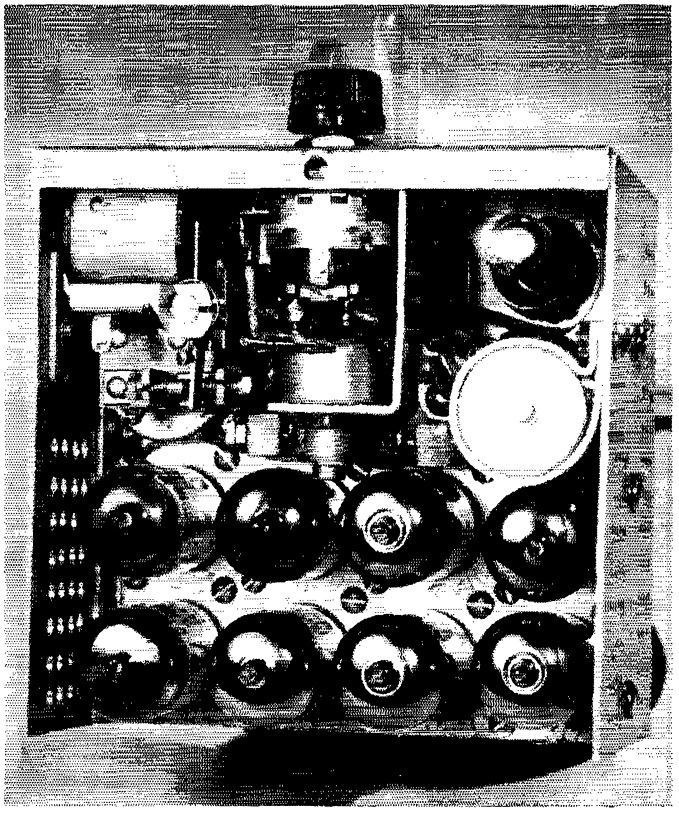
The sole adjustment procedure consists of running the bias up and down at R_5 with various line voltages between 80 and 135, to find the range of stable operation for each functional circuit. At each test setting, check over-all operation and each circuit individually with a v.t.v.m., in accordance with the functional summaries.[3] Observation of circuit performance can be greatly simplified by slowing things down to a walk with 0.25 μf. (metallized, to minimize leakage) shunted across C_1 of Fig. 1, so that the v.t.v.m. needle stands still long enough to be read. Approximate expected voltages are given in the circuit description. Others are readily calculated from the divider strings, bearing in mind grid-loading effects. With normal-tolerance components, it is to be anticipated that one or two of the subcircuits may turn up with a bias range centering somewhat off the median value. The addition of a 2- to 4-megohm shunt across the appropriate element of the resistance string will pull the range center to median. The final setting of R_5 is at the average of the bias-range midpoints for all the subcircuits at expected nominal line voltage.

Tube and component aging is compensated at R_5, though readjustment will not be required until prolonged aging has drastically shifted the tolerance midpoints. The model shown here tolerates a ±5-volt bias shift from the −33-volt median established at a nominal 113 line volts.

Mark-Space Adjustment

With 0.004- to 0.01-inch relay armature travel and continuous 15-w.p.m. dots, R_3 is set for half-scale reading of an ohmmeter connected across

[3] Given in Part II.



This top view shows why the author does not recommend building the key into a small volume.

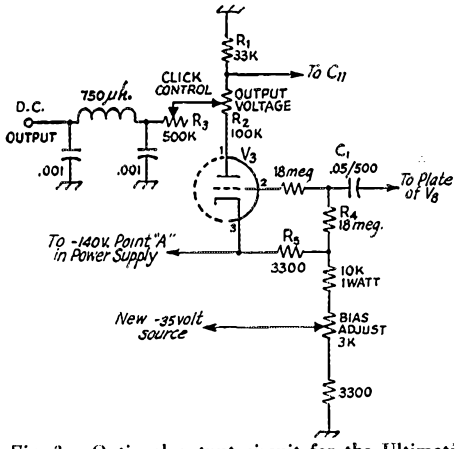


Fig. 3 — Optional output circuit for the Ultimatic. If this circuit is used, the heaters of V_3V_4 must be moved to the ground end of the heater string in Fig. 1. C_1 — Metallized capacitor.

the output terminals. Then at the desired maximum dot speed the relay spring tension is adjusted for midscale on the ohmmeter. Steady dashes should read one-quarter scale. The two adjustments interact a bit, so two or three runs may be necessary to establish a constant mark/space at all speeds. Since R_3 affects the top speed, R_2 is set last, with R_1 at minimum, for the desired top speed.

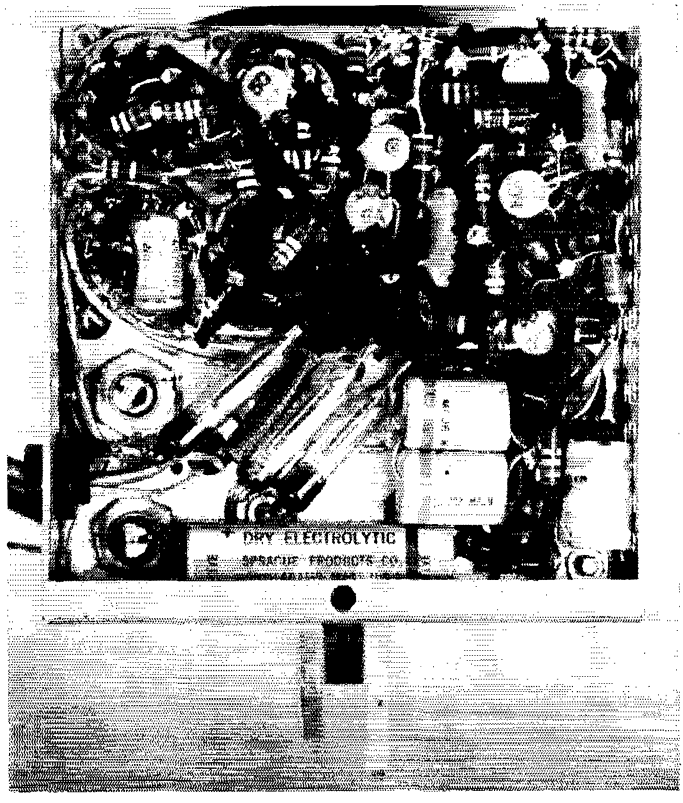
With electronic output, R_1 of Fig. 3 is set, on spacing output, for slightly more than cut-off for the vacuum-tube keyer to be used. R_3 of Fig. 1 is then set, on 30-w.p.m. dots, for the desired mark/space ratio as indicated by final-amplifier plate current. R_2 of Fig. 1 is trimmed for the top speed.

Test Equipment

It must be remembered that the *only* test equipment that can possibly be used to read many of the voltages in the Ultimatic is a v.t.v.m. with an input impedance on the order of 30 to 50 megohms, or an equivalent cathode-follower device. Even with a 1-megohm isolating resistor in the probe, the triggers will sometimes be tripped by capacity as contact is made. To determine which way a circuit is stabilized, it is best to read across the cathode resistor, touching the grid-plate strings only for an actual voltage.

Learning To Use the Key

Trial runs on guinea-pig operators indicate that it takes a little time to reëducate one's reflexes so that at high speed one can take full advantage of all of the sequencing functions and leeway tolerances. Full use of the seizure function calls for a considerable departure from standard techniques. However, the new tricks are readily acquired because they demand much less effort. One who has never used anything but a pump handle has a nice advantage and can master the gadget much faster because he has no cortical synapses to disconnect, nothing to unlearn. However, and this is the beauty of the thing, whatever technique is being used on the present bug or start-stop autokey will produce perfect results at usual sending speeds after 5 minutes of practice. Mastering the tricks simply calls for experimentation, using the functional summaries and specific examples as guides. Every operator will acquire his own personal technique, equally good but possibly different. Initial practice should be at low and moderate speeds to facilitate study of the relationships between the Selector-memory-sequencor, the time base, and the hand.



A bottom view of the key clinches the argument for allowing more room for the circuit components.

Graphical Symbols for Radio Diagrams

Including Criticisms of "Condenser" and "Capacity"

BY HAROLD P. WESTMAN *

• A new American Standard covering symbols for use in electrical circuit diagrams was adopted last year, and there is now under way a serious effort to persuade all users of such symbols to make their practices conform with it. The advantages of having one universal language instead of a large collection of dialects should be obvious, and beginning with this issue the symbols in *QST* schematic diagrams will be those of the new Standard.

GRAPHICAL SYMBOLS is the high-brow name for the drawings that we use in circuit diagrams. Originally, they were crude pictures of actual pieces of equipment but, to save time and to permit a drawing to represent more than one manufacturer's design of a part, the finer details were soon omitted and the pictures gradually lost their resemblance to the actual equipment. They developed into symbols rather than pictograms. In practice, this means that now we have to learn the meanings of these symbols because they don't look enough like the actual equipment for us to identify one from the other. Life does get complicated.

Those of us who are interested only in radio have learned quite a number of symbols and are entirely willing to go on using them until we find that they no longer suit our needs. This is also true of people concerned only with power applications of electricity. Unfortunately, these two groups paid very little attention to each other's symbols over the years with the result that direct conflicts developed for such fundamental units as inductance, resistance, and capacitance.

During the second World War, the armed forces in the United States arranged something of the nature of a shotgun wedding and both the power and communication engineers agreed "for the duration" on a set of basic symbols that did not contradict each other. These were put in effect by *QST* at that time.

Unfortunately, there has been some tendency on both sides to drop back into our old habits and this was encouraged to some extent by the fact that the wartime action concerned only a few basic symbols; other points of confusion existed in the remainder of the standards.

New Symbol Standards

After several years of work, a new American Standard [1] has been approved and it replaces five previous standards on electrical graphical symbols. This single standard includes symbols for both communication and power drawings. It contains symbols for all items that were in the previous standards and many more.

Numerous changes have been made so that the symbols will be consistent with each other and while in some cases more than one symbol is permitted for a given item, there are no cases where a symbol has more than one meaning. Thus, the reader should never be in doubt as to what the author intended even though the author may have had a choice as to the particular form of the symbol he would use.

In general, there will undoubtedly be a tendency for each group to use those new symbols that are most like the old familiar forms. In some cases, the new symbols are easier to draw and will be used for this reason.

Fig. 1 shows where the greatest conflicts were. The communication resistance and the power inductance were identical as were the communication capacitance and the power open contacts. Briefly, the power people gave up the

(*Continued on page 124*)

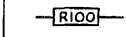
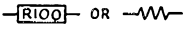
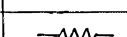
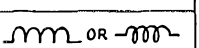
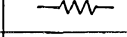
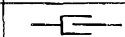
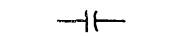
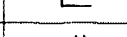
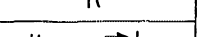
	POWER	COMMUNICATION	COMPROMISE
RESISTANCE			
INDUCTANCE			
CAPACITANCE			
CONTACTS OPEN			
CLOSED			

Fig. 1 — Symbols for basic electrical quantities as used originally by power and communication people, and the compromise symbols now standard for both groups.

* Editor of *Electrical Communication*, International Telephone and Telegraph Corporation, 67 Broad St., New York 4, N. Y.

[1] "*American Standard Graphical Symbols for Electrical Diagrams, Y32.2–1954*," issued by the American Standards Association, 70 East 45th St., New York 17, N. Y. (Price, $1.25, postpaid.) Published as *IRE Standards on Graphical Symbols for Electrical Diagrams, 1954*, by the Institute of Radio Engineers, *Proceedings of the I.R.E.*, volume 42, pages 965–1020; June, 1954.

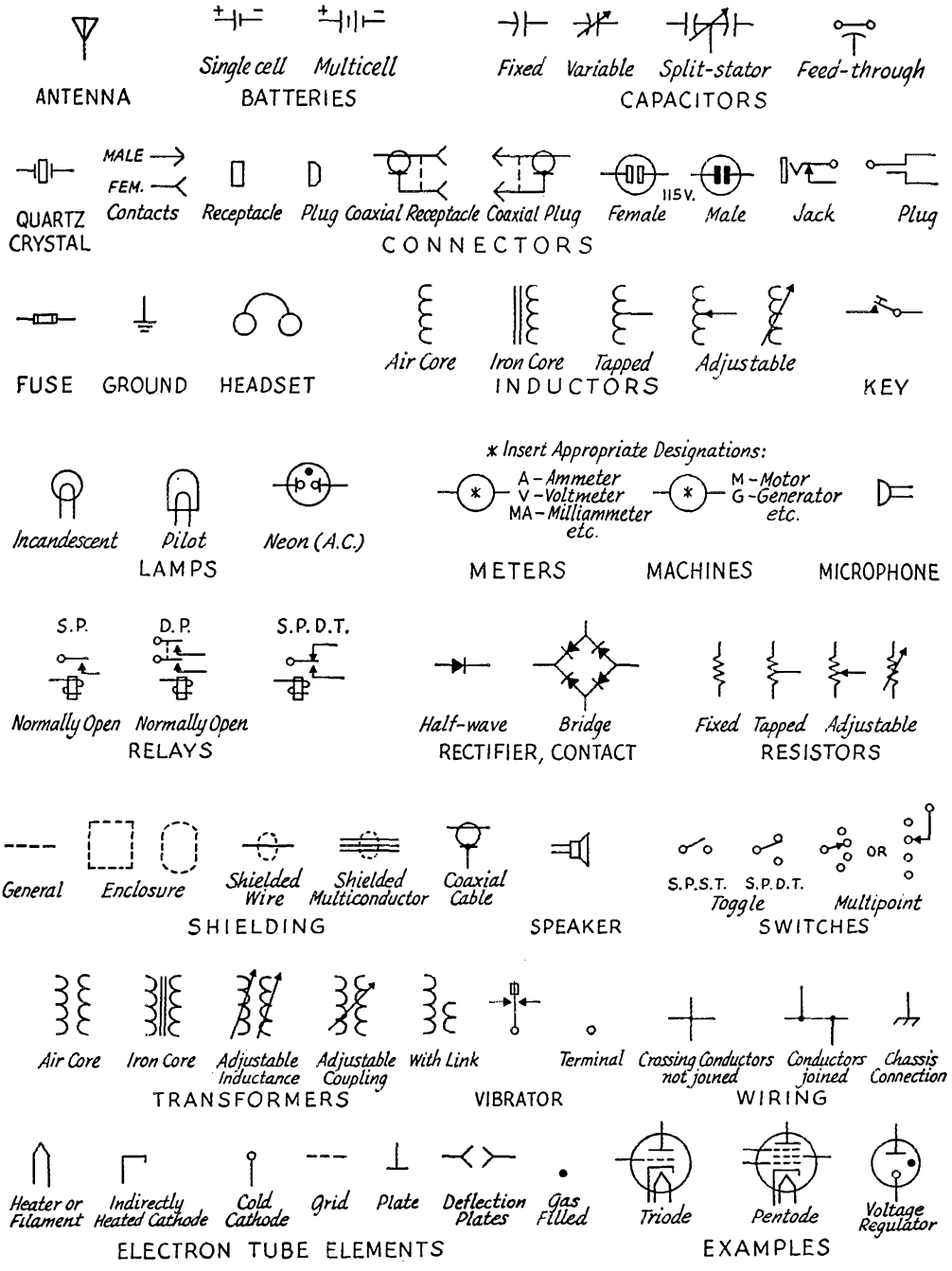


Fig. 2 — Representative symbols according to the new American Standard. These are typical of what will be the future *QST* practice, and in some cases involve a choice where alternatives are permissible. An important change is the omission of a "hook" where one wire crosses another without making a connection. A connection is shown by a dot.

The small circle is used only as a terminal (including a switch contact as a terminal) and does not represent a pivot in the switch and jack symbols shown above. Terminals *may* be indicated by adding the small circles to any component but the new Standard does not *require* their use.

Note particularly the symbol for a chassis connection. It does not imply that the chassis is connected to earth. If an actual ground connection is necessary, it will be indicated.

A Radical Approach to Single Sideband

Revolutionary Ideas for Simplifying 'Phone Communication

BY LARSON E. RAPP,* WIOU

• Here is an article that no discerning 'phone man can afford to pass up. Although the ARRL Laboratory staff has not had an opportunity to confirm Mr. Rapp's findings, past experience with his disclosures have shown us (and our readers) what we can expect from this sage.

THERE can be no question in the mind of any active radio amateur that the most progressive step in the past pentad has been the immediate and wholehearted acceptance of single-sideband telephony. One has only to listen in on any of the low-frequency 'phone bands and hear the pioneers patiently explaining the virtues of s.s.b. to the younger and more timid amateurs to realize that some really splendid work is being done. Many old-timers can be heard jocularly referring to the medium as "Chinese modulation" or "those Donald Ducks," in an obvious effort to put the newcomers at ease.

However, because there is still some reluctance on the part of technically-unskilled amateurs to adopt single-sideband technique and thus enjoy its advantages, the author feels that the time is right to disclose his latest invention. Although originally developed for patent purposes only, the invention is too meritorious to be withheld from radio amateurs, who are always willing to try anything if it is simple and cheap enough. Ergo, before disclosing the invention and the circuits, it is well to review a few basic principles.

The generally-acknowledged advantages of single-sideband are greater effectiveness for the same total power to the transmitter, ability to use voice-operated break-in, and freedom from TVI. On the debit side of the ledger are the use of unfamiliar circuits, inability to use a.v.c. and S-meter at the receiver, and the tendency of SWLs to overlook such a signal in favor of one of the a.m. variety. It occurred to the author that what was needed to make single sideband universally acceptable was a simplification, both at the transmitting and at the receiving end, and this reasoning was confirmed by consultation with several other experts in this and allied fields. Since "a clear statement of the problem is the first step toward a solution,"[1] no time was lost in getting down to work. Through fortuitous and careful design, the eventual solution also overcame the objectionable characteristics of conventional (and now old-fashioned) s.s.b.

* Kippering-on-the-Charles, Mass.

[1] Humperdinck, E., "Orfeo ed Euridice," Part IV.

[2] Rapp, "The Double-Spectrum Theorem," *QST*, April, 1952.

The Approach

Referring to the literature on single sideband, it is almost amusing to observe how blindly one investigator follows another in approaching the problem, with the inevitable result that they have all overlooked the very obvious simplification that will soon be disclosed. For example, every author starts out by describing a double-sideband-plus-carrier a.m. signal, and then laboriously tells of methods for first eliminating the carrier and then one sideband. It is this line of reasoning that has resulted in a blind spot in the thinking which, fortunately, is about to be removed.

Your author approached the problem from another tangent. Having observed that s.s.b. operators still suffer occasionally from BCI (interference to broadcast receivers), and recalling that narrow-band f.m. is immune to BCI troubles, combining the merits of n.f.m. with s.s.b. seemed like a fruitful avenue of approach. It was, and the final solution was really too good to be true. It is being disclosed now so that others can appreciate its advantages.

The Solution

As all amateurs know, an f.m. signal is generated by a *reactance modulator* working on an oscillator to swing the frequency back and forth about a mean frequency called the *carrier* frequency. To generate a single-sideband-f.m. signal, the author cleverly reasoned that it was only necessary to swing the frequency *on one side of the carrier* — on the low side for the low sideband, and on the high side for the high, or upper, sideband. Fortunately, this offered no great problem, since part of the technique had already been disclosed in an earlier paper.[2] Hence, the generator for a s.s.b.-f.m. signal requires only a speech amplifier of sufficient gain, a "positive/negative" modulator driving a reactance modulator, and an oscillator followed by suitable amplifiers. The desired sideband is selected, of course, by switching to either the "positive" or the "negative" modulation condition.

Astute readers will immediately ask, "But what about carrier elimination?" This is a good question, but one that shows a lack of basic understanding of the system so far. It should be obvious that the carrier isn't present while it is busy swinging over the "sideband" portion of the spectrum, and hence *it is only necessary to eliminate the carrier while one isn't talking.* This is not a difficult problem, and is solved by the method current in vogue among the s.s.b. pioneers; namely, voice-operated break-in. By minimizing the "hold-in" time, the carrier is only apparent between very short pauses, and this

slight disadvantage is more than overshadowed by the obvious advantages of the entire system. A balanced modulator can be used, of course, if the ultimate in tube efficiency is desired, but the other method is the simple approach.

Unlike the old-fashioned s.s.b., this new system needs no carefully-designed mixers for band changing, since s.s.b.-f.m. is like conventional f.m. in this respect and requires only frequency multiplication for bandchanging. Furthermore, there is no real need for careful adjustment of linear amplifiers as there is with the older s.s.b., and a Class C amplifier will handle a single-sideband f.m. signal just as well as will a Class AB_1, AB_2 or B amplifier. This feature eliminates the need for special bias supplies and an oscilloscope, as well as the need for careful adjustment when shifting frequency. The use of Class C stages throughout results in the highest possible efficiency, but care must be taken to prevent the generation of high-order harmonics that may interfere with TV reception in the vicinity. As a result of these tolerant parameters, s.s.b.-f.m. can be applied to any existing transmitter by making a few simple changes in the oscillator. A block diagram of the basic exciter is shown in Fig. 1,

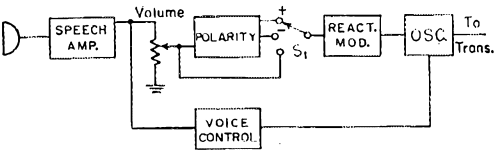


Fig. 1 — A block diagram of the basic exciter. S_1 is the sideband-selector switch. The "+" and "−" points are for upper- and lower-sideband operation — the third position gives conventional f.m. operation and is not necessary except for comparison and tune-up purposes.

and receiving tubes and low-power components can be used throughout.

The Reception of S.S.B.-F.M.

The reader may be wondering what must be done at the receiving end to copy a s.s.b.-f.m. signal and, we are proud to say, this is one of the delightful aspects of the system. It has been pointed out on several occasions that conventional s.s.b. is difficult to tune in — some observers report it is impossible with a conventional a.m. 'phone receiver — but s.s.b.-f.m. eliminates any and all such troubles. It is tuned just like narrow-band f.m. (Signal detuned slightly, to fall on one side or the other of the "slope" of the i.f. characteristic. This is called "slope detection," for obvious reasons.) However, one significant difference becomes immediately apparent, and it is one of the ways an operator can recognize a s.s.b.-f.m. signal in a band loaded with a.m., s.s.b. and n.f.m. signals. In the reception of s.s.b.-f.m., if the receiver is tuned to the *wrong side* of center, the speech becomes inverted, so there is actually only one correct side. Thus the selectivity of the receiver is increased, because the signal only comes in at one spot on the dial. (Some operators object to the broadness of n.f.m., because it comes in at two spots on the dial. However, n.f.m. is, of course, a double-sideband system, and the two-spot tuning is not so surprising if you stop and think of it in this manner.) But, indubitably, the greatest advantage of s.s.b.-f.m. over old-fashioned s.s.b. is that *the need for careful tuning is eliminated*, since the s.s.b.-f.m. need only be tuned on the correct-slope side. There is no longer any need for careful carrier reinsertion! (Remember that the swinging of the carrier is generating the sideband. The carrier has never been eliminated, hence it does not require reinsertion.)

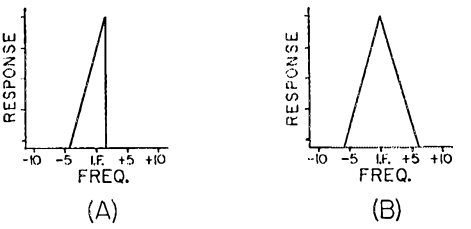


Fig. 2 — (A) Ideal i.f. characteristic for receiving s.s.b.-f.m. Selectable-sideband reception can be used. (B) Ideal i.f. characteristic for general s.s.b.-f.m. reception. Notice that this approaches the i.f. characteristic of current receivers.

An ideal receiver i.f. characteristic for s.s.b.-f.m. would be one that looks like a right triangle, if everyone agrees to the use of only one sideband and whether it shall be the upper or the lower. Failing this, the best receiver characteristic would be one with a double-ramp configuration. Actually, however, the difference in performance between the ideal and a conventional i.f. characteristic is slight.

Financial Considerations

Of interest to the impecunious amateur is the investment required for any new type of equipment. One of the criticisms of s.s.b. has been that it is too expensive, since it wastes the large audio tubes and transformers associated with a 'phone station. Unfortunately, s.s.b.-f.m. offers no solution for this complaint, if one already has reached the legal power limit. However, it is suggested that if one's present transmitter has not yet reached the legal limit (this varies throughout the world and even within countries), he may be able to sell his excess audio equipment to some hi-fi enthusiast among the Cadillac station-wagon set.

Any way it is computed, s.s.b.-f.m. is more economical than either a.m. or s.s.b. Its effectiveness being what it is, practically no time will be spent in making fruitless calls. And once QSO has been established, it is practically certain that no time will be wasted in needless repeats. On a strict dollar-for-dollar basis, a s.s.b.-f.m. transmitter shows a 47.2 per cent superiority over a kilowatt s.s.b. rig and a 71.4 per cent advantage over a kilowatt a.m. rig. *In hock veritas.*

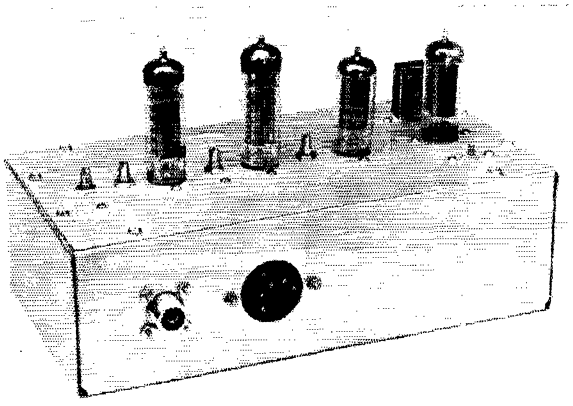
Using the 6360 Dual Tetrode on 220 Mc.

Low-Cost All-Tetrode Transmitter for the 220-Mc. Beginner

BY EDWARD P. TILTON, W1HDQ, AND MASON P. SOUTHWORTH, W1VLH

UNLESS one is content to get along with the various receiving tubes that can be pressed into transmitter service, firing up on 220 Mc. can be a rather expensive proposition. The 832A, surplus variety, has been the only tube that would do the job at power levels above the receiving tubes, without setting the purchaser back a sizable piece of change. And now, unless you already have your 832s, they are no longer very attractive from the standpoint of price. Other tubes usable at 220 Mc. begin at around $15.00, and range on up from there.

The 6360, a small dual tetrode introduced recently by Amperex, makes the 220-Mc. picture a little brighter. It won't handle quite as much power as its larger brothers, the 6252 and 5894A, but it works well on 220 Mc. and it sells at a receiving-tube price. The tube's low cost is largely the result of its single-ended construction. All connections are brought out through the base, so it can be made on the same machinery that grinds out receiving tubes.



The 220-Mc. tetrode transmitter. At the right are the 6CL6 crystal oscillator and multiplier stages, with the 6360 tripler and amplifier in the center and left, respectively. The rig is built on a sheet of aluminum which is screwed to an inverted chassis.

Actually, the 6360 is built a good deal like an oversized 6J6, with screens added. A central heater and cathode have pairs of other elements on either side. Compact construction and short leads result in a tube that works well on 220 Mc., and will even go to 420, in a pinch. One 6360, tripling, will drive another as a straight-through amplifier on 220 Mc., and that is how the tubes are used here.

Transmitter Circuit

Circuitwise, the rig described here is a departure from the technique we have used in most v.h.f. transmitters described recently, in that a conventional tetrode crystal oscillator is used, rather than a triode in an overtone oscillator. This switch was made mainly for the sake of variety, to show newcomers that there are oscillators other than the overtone types used so often in recent years. The tetrode oscillator has an advantage, too: you can put in 8- or 12-Mc. crystals interchangeably. The oscillator plate circuit may be tuned to 24 Mc. or 36 Mc. if 12-Mc. crystals are used, allowing a choice of doubling or tripling in the second stage.

The oscillator is a 6CL6, as is the first multiplier. Type 5763s could probably be substituted in these stages, or a single 6360 can be used for both, if you want to standardize on one tube type. A balanced plate circuit is used in the multiplier, so that its output can be capacitively coupled to the 6360 tripler grids. We insert a hint at this point: If you run into trouble with insufficient grid drive to the 6360 tripler, try putting a small plastic trimmer between the low side of L_2 and ground, to balance up the capacitances on either side. It was not needed in the original, but it would be well to remember the suggestion, just in case.

The 6360 push-pull tripler to 220 Mc. is inductively coupled to the push-pull final stage. No neutralization is shown in Fig. 1. Should neutralization be needed, a method for achieving it is given later. Output from the final 6360 plate circuit is taken off through coax, and provision is made for tuning out the reactance of the link, with C_4.

Construction

The transmitter is built on a flat plate of sheet aluminum 5 by 10 inches in size. This is screwed to a standard aluminum chassis of the same dimensions, that serves as both case and shielding. If more complete shielding is required, a perforated metal cover may be made to go over the top, as was done with the 6- and 2-meter rigs

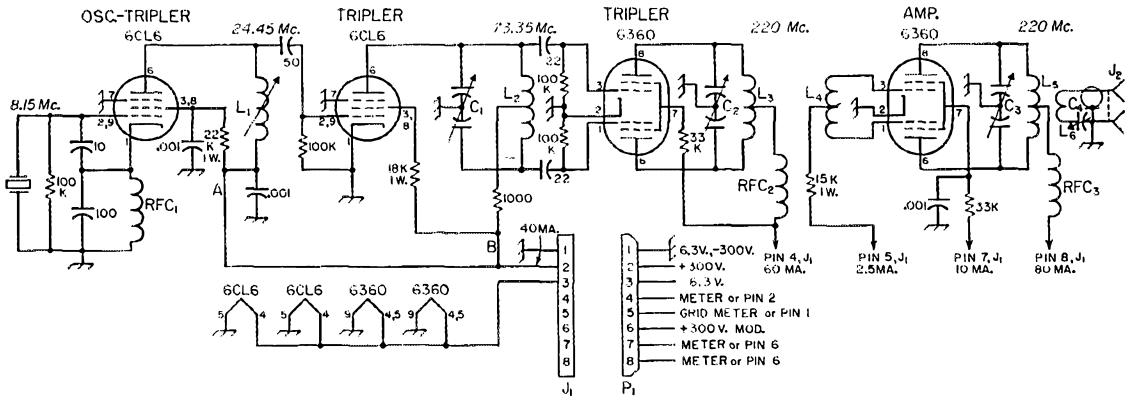


Fig. 1 — Schematic diagram and parts information for the 220-Mc. tetrode transmitter. Resistors are half watt unless otherwise specified. Capacitor values below 0.001 are in $\mu\mu$f.; all ceramic.

C_1 — 11-$\mu\mu$f. miniature butterfly variable (Johnson 11MB11).
C_2, C_3 — 5-$\mu\mu$f. miniature butterfly variable (Johnson 5MB11).
C_4 — 15-$\mu\mu$f. miniature (Johnson 15M11).
L_1 — 14 turns No. 28 enam. on ⅜-inch iron-slug form (National XR-91).
L_2 — 7 turns No. 20, ½-inch diam., 7/16 inch long, center-tapped (B & W Miniductor No. 3003).
L_3, L_5 — 4 turns No. 18 enam., ⅛-inch diam., center-tapped. Space twice diameter of wire, except for ⅛-inch space at center.
L_4 — 2 turns same as L_3, center-tapped. Adjust turns spacing and degree of coupling to L_3 for maximum grid current.
L_6 — 2 turns same as L_5, close-wound. Adjust position at center of L_5 for maximum output.
J_1 — 8-pin male chassis fitting (Amphenol 86-RCP8).
J_2 — Coaxial fitting, female (Amphenol 83-1R).
P_1 — 8-contact power cable connector, female (Amphenol 78-RS8).
RFC_1 — 750-μh. r.f. choke (National R-33).
RFC_2, RFC_3 — 17 turns No. 28 enam. on high value 1-watt resistor, or use Ohmite Z-235.

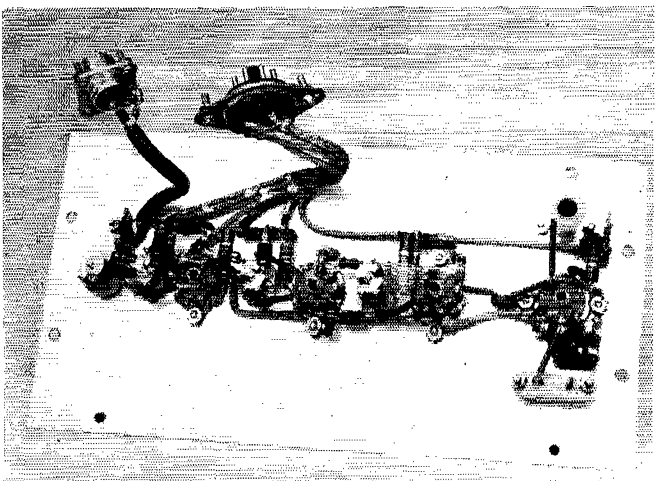
described in October, 1954, *QST*. All parts except the power and coaxial output connectors are mounted on the top plate. The two connectors mount in holes in the rear wall of the chassis. The mounting screws are held in place on the fittings with nuts and other nuts on the outside of the chassis hold the fittings in position.

The tube sockets are along the centerline of the plate, two inches center to center, with the oscillator socket 1⅜ inch in from the right end, as seen in the photographs. The crystal socket and the oscillator plate coil, L_1, may be seen at the lower and upper right, respectively, in the bottom view. The tripler plate tuning capacitors are midway between their respective sockets.

Except for the power leads, there is no "wiring" in the usual sense, as all r.f. leads should be extremely short. The decoupling resistors and r.f. chokes in the various power circuits are supported on tie points. Three single-lug strips and two double-lug ones are needed. All the power wiring is done with shielded wire, as an aid to TVI prevention. The coils L_2, L_3 and L_4 are soldered directly to the stator support bars of their trimmers, with the shortest possible leads.

Adjustment

The power supply for testing the transmitter should deliver at least 3 amperes at 6.3 volts, a.c. or d.c., and 200 to 300 volts d.c., at 200 ma. The lower voltage is plenty for the test work, though up to 300 may be used when everything is properly adjusted. If a 300-volt supply is used for the testing, the tubes can be protected from excessive drain by connecting a 5000-ohm 10-watt resistor in series with the power supply lead. The power connectors, J_1 and P_1, make provision for metering all plate circuits except those of the oscillator and first tripler. The power leads to these are shown connected together, to Pin 2 of J_1, but during testing they should be fed sep-



Lifting the top plate of the 220-Mc. transmitter, in the position shown in the other photograph, the underside shows all the parts except the tubes and crystal. Note the method of attaching the power and coaxial fittings. Nuts hold their mounting screws in place, so that they can be fastened to the rear wall of the chassis.

arately through a milliammeter, as described below.

Testing will be easier if a receiver capable of tuning to 8 and 24 Mc. is available. Connect a 0–50 or 0–100 milliammeter between Pin 2 of J_1 and the oscillator plate-screen circuit, at the low side of the 22,000-ohm screen-dropping resistor, point *A* on the schematic. Be sure that the tripler plate and screen resistors are disconnected for the time being, to prevent this stage from drawing current. Apply 200 to 300 volts d.c. through Pin 2 of P_1, and tune the plate circuit of the oscillator to the third harmonic of the crystal frequency. If you can listen on this frequency (24.45 to 25 Mc., depending on choice of crystal) a large increase in signal strength should be noted as the coil is tuned through resonance. A double check on frequency with a calibrated grid-dip or absorption wavemeter is recommended. Oscillator plate-screen current will be about 20 ma.

Now connect the oscillator plate-screen power lead directly to Pin 2 on J_1, and insert the meter in the lead to the tripler plate-screen circuit, point *B* on the diagram. Apply voltage and tune the tripler plate circuit for maximum output at 73.35 to 75 Mc. A 2-volt 60-ma. pilot lamp with a single-turn loop of insulated wire, about a half inch in diameter, may be coupled to L_2 to serve as an output indicator. The 6CL6 tripler plate-screen current will be about the same as the oscillator, around 20 ma. at 300 volts.

Now wire the power leads to these two stages as shown in the diagram. Leave the 300-volt lead connected to Pin 2 of P_1, and connect a 100-ma. meter between Pins 2 and 4, to measure the 6360 tripler plate-screen current. A low-range milliammeter, about 0–10 ma., should be connected between Pin 5 and Pin 1, to measure final grid current. Tune C_2 for maximum indication on this meter. With no plate voltage on the final stage, there should be at least 3 ma. grid current. Adjust the spacing between L_3 and L_4 carefully, retuning C_2 after each adjustment, for maximum grid current.

In adjusting the final stage, we will ignore the eventual use of a modulator, and connect our power supply direct to the final stage temporarily. Information on modulation will be given later. Solder a jumper between Pins 2 and 4 on J_1, so that voltage will be supplied to the 6360 tripler. Connect a temporary jumper between Pin 2 and Pin 7, to feed voltage to the final screen, and connect the 0–100 milliammeter between Pins 2 and 8, to measure final plate current. A 10- or 15-watt light bulb may be used as a temporary dummy load, connected to J_2. Apply voltage and tune C_3 for minimum plate current, or for maximum output as indicated in the lamp load. Adjust C_4 for best output. The setting of C_4 and the degree of coupling between L_5 and L_6 will be different for an antenna, however, as the lamp is not a good load at this frequency.

If the stage is completely stable, maximum output, maximum grid current and minimum plate current should all occur at the same setting of the plate tuning capacitor, C_3. Another check for neutralization is to cut the drive for a brief period by removing plate and screen voltage from the tripler. Grid current should drop to zero when this is done. If it does not, the final stage is oscillating, and must be neutralized. In the original model, there was no actual self oscillation, but the stage was not completely stable until a small amount of neutralization was added.

This is done very simply with the 6360. The leads are so arranged within the tube that all that is required for neutralization is a very small capacitance between Pins 3 and 6, and between Pins 1 and 8. A stub of No. 18 wire about ⅜ inch long is soldered to Pin 6, with its opposite end "looking" at Pin 3. A similar stub is soldered to Pin 8, with its free end adjacent to Pin 1. The ends can then be bent toward or away from the grid pins to give the required capacitance.

Putting the Rig on the Air

When all stages have been adjusted correctly, the plate voltage may be increased to 300 on all stages, if you want to run the maximum power of which the tubes are capable. Current drains indicated on the schematic diagram are for 300-volt operation. Staying at 250 volts or less allows more conservative operation, and may be well worth while, in the interest of longer life for the 6360s. There is no great advantage to be gained from pushing the tubes excessively, as doubling the power output will net less than one S unit improvement in signal level at the receiving end.

In feeding power to an antenna system using coaxial line, it is merely necessary to connect the coax to the output fitting, J_2, and adjust the coupling and C_4 for maximum radiated power. A field-strength meter that will be helpful in this was described in *QST* for December, 1953, page 43. If 300-ohm Twin-Lead or open-wire line is used to feed the antenna, coupling to the transmitter is done with a coaxial balun, made as shown in Fig. 2. The balun may also be used

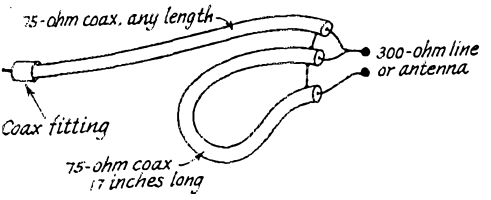


Fig. 2 — Coaxial line balun for feeding balanced loads from the 220-Mc. transmitter.

at the antenna end of the coax, if the antenna system is designed for 300-ohm balanced lines. The part of the balun that plugs into the transmitter can be of any convenient length.

To modulate the transmitter, the final plate and screen are fed through the secondary of the modulator output transformer, as shown schematically in Fig. 3. The circuit is shown in basic

(*Continued on page 126*)

Director Beams

Improved V.H.F. Antenna Performance with Fewer Elements and No Reflectors

BY FRANK C. JONES,* W6AJF

NEARLY all v.h.f. beam antennas use resonant reflectors, to provide good forward gain and reduce signal pick-up and radiation from the rear of the array. However, an investigation of several types of beams conducted in the 220-Mc. band showed that it is possible to dispense with reflectors entirely. Furthermore, by modification of the usual collinear arrangement, a design was evolved that used only half as many directors as one would expect.

The result was a 6-element array with performance equivalent to that of the usual collinear arrangement having four half-wave driven elements, with reflectors. Two of these can be combined into a 12-element beam that is equal to the conventional 16-element design. Of even greater interest, the front-to-back ratio can actually be made better with directors only, without the usual sacrifice in forward gain that is entailed in adjusting for optimum front-to-back ratio.

If a reflector type of beam with four driven elements and four reflectors is adjusted for good front-to-back, over 12 db., the forward gain is reduced at least 1 db.; if it is adjusted for best forward gain, the front-to-back ratio is liable to be considerably less than 10 db. On the other hand, a director-type beam of four driven elements and two directors can be adjusted to provide more than 15 db. front-to-back ratio, without sacrificing more than ½ db. forward gain.

An example is a 12-element 2-meter director beam at W6AJF that has a front-to-back of 17 db. and a forward gain of approximately 13 db. A conventional 16-element collinear array can be adjusted for about this same gain, but the back lobe becomes objectionable, so the usual dimensions provide about 12 db., with a front-to-back ratio of 10 to 12 db.

Something for Nothing?

This better front-to-back and more forward gain with less elements in the array looks like a claim of something for nothing, but such is not the case. There is a price. The director beam must be made with close director-spacing to obtain good rejection off the back without sacrificing forward gain. This means low radiation resistance at the current points, less bandwidth and increased difficulty in matching the beams to standard transmission lines.

The bandwidth limitation is not serious at 144 or 220 Mc., as the director-type array has a bandwidth of about 5 Mc. in these bands, compared to 8 or 12 Mc. for the conventional collinear designs. The bandwidth of the director beam for 50 Mc. would be only about 2 Mc., and perhaps 12 Mc. or so at 420 Mc. These values are too low for full band coverage, so the design would have to be for the parts of these bands which are of primary interest. The bandwidth is ample for the 144- and 220-Mc. bands with design centers at 146 and 222.5 Mc.

A close-spaced director, whether used with one or two driven elements, detunes the driven elements and all elements have to be made a little longer than expected. For example, a director in this design is 39 inches long for the 2-meter band, and 25½ inches long for the 220-Mc. band. Fortunately, the driven elements can be tuned to resonance by a short stub, and the main transmission line tapped across this stub at the proper point for impedance matching. There is, therefore, no critical length for the driven elements in

A 6-element 2-meter array that outperforms the conventional 8-element job. It uses shortened driven elements in pairs, with a single director for each pair. W6AJF's daughter tries it on for size.

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such a system. Where two such 3-element bays are used a single stub can be used to resonate the entire system.

In curtain arrays or with Yagis spaced a half wavelength apart, there is a bucking action of directors of one bay upon those of the other. Reflectors spaced a half wave apart aid slightly in the forward gain of a beam, especially in a 4- or 8-element design. Directors, on the other hand, tend to cancel each other's gain when used at half-wave spacings between bays. It was found that $\frac{5}{8}$- to $\frac{3}{4}$-wavelength spacing minimized this effect when two directors were used, but $\frac{5}{8}$ wavelength was not sufficient spacing for two bays having four directors each in a broadside beam, in tests at W6AJF. A 2-meter vertically-polarized beam of this type had a very sharp front lobe, with large side lobes and less than expected forward gain. When the two 6-element Yagis that made up this array were cut apart and stacked vertically, a considerable improvement in forward gain resulted, and there was a marked reduction in the side lobes.

One Director for Two Driven Elements

In stacking the 3-element design shown in Fig. 1 the director current maximum points are spaced about a wavelength apart, so there is no

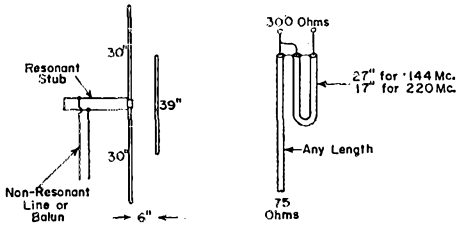


Fig. 1 — A single 3-element 2-meter array having shortened driven elements and one director. Gain of this system is 7 db. A balun for use with coaxial line is shown at the right.

appreciable cancellation. A broadside spacing (in vertical arrays) of about $\frac{3}{4}$ wavelength (60 inches at 2 meters) seems a good compromise value as regards amplitude of side and back lobes.

The idea of using a single director with two driven elements, as shown in Fig. 1, was developed by Ralph Bykerk, W6YSD. Tests on 220 Mc. proved that actually more gain could be obtained with one director than with two, when using two half-wave driven elements, because of the close end-to-end spacing of directors when two are used. Gain measurements at 145 and 221 Mc. showed 7 db. gain with this simple 3-element beam, and front-to-back ratios as high as 30 db. Six-element beams of the type shown in Fig. 2 gave maximum values of 11 db. forward gain, with an average of 10 db. over the whole 144- and 220-Mc. bands.

The two driven elements were originally cut to 38 inches (for 2 meters) but a reduction of the radiating portions to 30 inches did not reduce the forward gain because the two current points were moved down behind the director. Apparently, the gain of this arrangement compensated for the reduction in field strength, from the driven elements alone, when their current maximum points are brought to less than a half wave apart.

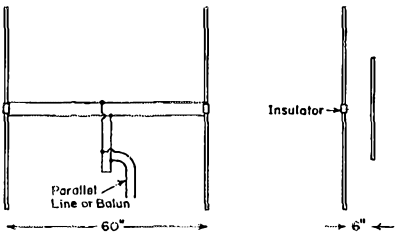


Fig. 2 — Two 3-element arrays for 144 Mc. may be connected about $\frac{3}{4}$ wavelength apart to make a 6-element beam having a gain of 10 db. or better.

The shorter driven elements require a longer tuning stub for the whole beam.

One 6-element array, shown in the photograph, uses 300-ohm Twin-Lead for all portions of the feed system. The driven elements are half-inch aluminum tubing 31 inches long, mounted on $\frac{7}{16}$-inch canvas bakelite insulators. The latter have short aluminum sleeves over them where they pierce the 1-inch mounting booms, leaving an insulation gap of about $\frac{1}{2}$ inch on each side to the two driven elements. The main boom is 1-inch aluminum tubing 5 feet long, so the distance between the elements is 58 inches. The short booms on which the directors are mounted are 7 inches long, to allow a spacing from the driven elements of 6 inches. The directors, being mounted at their electrical centers, are not insulated.

The phasing line of 300-ohm Twin-Lead is not transposed. For this particular antenna the tuning stub was 32 inches long, with the 300-ohm feeder tapped up 3 inches from the shorted end. For test purposes, a balun was used at the feed point to step this impedance down to 75 ohms for connection to 75-ohm coaxial transmission line to the transmitter. Extreme care must be taken to maintain exactly equal line impedances and power input to the lines when comparing a beam with a standard dipole antenna for relative forward gain figures. These conditions are most readily met when coaxial line is used.

Another 2-meter 6-element beam was made with open-wire feeders. In this case the directors were 39 inches long, of $\frac{1}{4}$-inch diameter, mounted 6 inches in front of the driven elements, as before. The latter were 30 inches long, of the same material. End insulators were of fiber bakelite tubing, $\frac{1}{2}$-inch o.d. and $\frac{1}{4}$-inch i.d., to take the driven elements. This particular model had 54-inch spacing broadside, instead of the preferred value of about 60 inches. The tuning stub of open-wire line turned out to be 43 inches long, with the main transmission line tapped at 6 inches from the shorted end. The length of the stub should be adjusted for resonance at the band

(*Continued on page 128*)

The "Tiny Tim" Portable

A Complete Dry-Battery Station for 40 and 80 C.W.

BY STUART D. COWAN, JR.,* W1RST

• Here is a little item that many hams will like to have around the shack, since it has a variety of uses. The unit, which includes transmitter, receiver and battery power supply, has been variously used by the author in the field, on a boat, and in the home station for the thrill of operating real low power.

WEIGHING in at 18 lbs., "Tiny Tim" is a complete ham station in one compact case, for use in emergencies, portable operation on land or sea, or in your regular station for the thrill of real low-power work (or when the power fails).

"Tiny Tim" has been operated from my 19-foot Hurricane-class racing sloop on Long Island Sound, from my home location, and in the field. The little rig performs amazingly well considering its 2 watts of transmitter input. On 3510 kc. one Sunday night, a W4 and W2 were hooked on one call in a mountain of QRM. Signal-strength reports are nothing to write home about, but almost solid QSOs are possible in most cases. The thrill of contacts with true low power is something you know only after you've tried it. And, *building* a rig, for a change, is good for many of us who sometimes lose sight of the values that made ham radio what it is today.

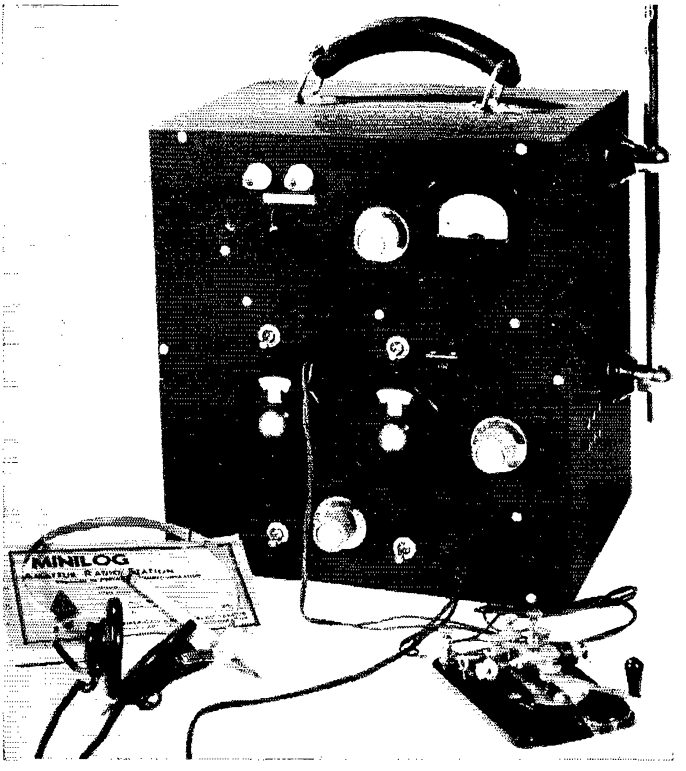
The rig is built in a steel utility cabinet 8 inches deep, 11 inches wide, and 12 inches high (Bud C-881). Two shelves, 5 by 8 inches, were cut from sheet aluminum. After bending one edge to permit bolting to the panel, each shelf ended up 4½ by 8 inches. The whole rig can be easily removed by disconnecting the batteries and unscrewing the front panel.

The Receiver

The receiver is a simple regenerative type with a single stage of audio, but it works well. With a good antenna, strong signals pound in and you sometimes use the volume control which normally is wide open. Selectivity, of course, is not the best but good bandspread helps a lot.

While one coil to cover both 40 and 80 can be wound, two coils are recommended for maximum

* 45 Park Ave., Old Greenwich, Conn.



The "Tiny Tim" with 'phones, key and crystal plugged in ready to go. The receiver is on the bottom and the transmitter at the top. The dial to the left is for the bandset condenser, the one to the right for bandspread tuning. The knob in between is the regeneration control, and the one to the right is the audio gain control. Above, left to right, are the indicator lamp, antenna terminals and switch, transmitter tuning control, and the meter. The four toggle switches are in the battery circuits. The holes at the right and on top are for ventilation.

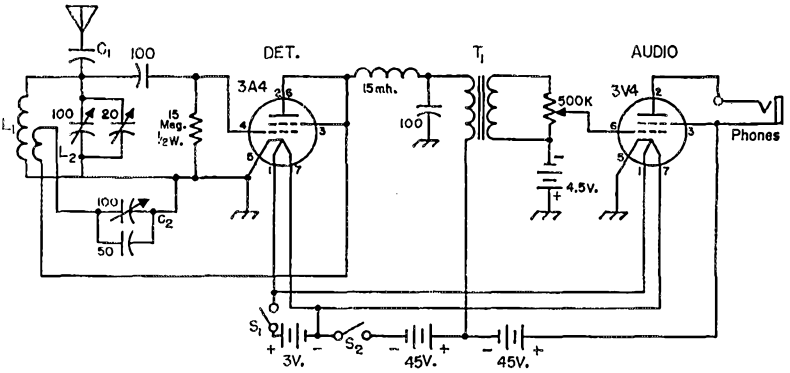
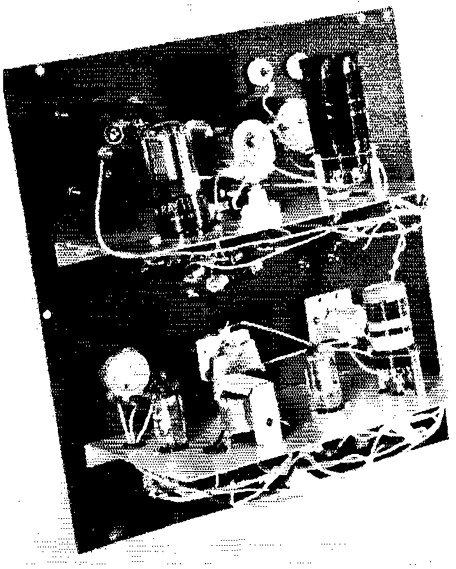


Fig. 1 — Circuit of the "Tiny Tim" receiver.

C_1 — Antenna-terminal lead cut, and 3 or 4 turns twisted together to form small condenser.
L_1 — 80 meters — 24 turns No. 26 enam., close-wound.
40 meters — 10 turns No. 26 enam., ⅜ inch long.
L_2 — 80 meters — 7 turns No. 26 enam., close-wound, spaced ¼ inch from L_1.
40 meters — 5 turns No. 26 enam., close-wound, spaced ⅜ inch from L_1.
S_1, S_2 — Toggle switch.
T_1 — Interstage audio transformer.
Batteries — 4.5-volt — RCA VS-028; 3-volt — Burgess F2BP; 45-volt — Burgess Z30NX; or equivalents.
All capacitances in μμf. All fixed condensers mica.
Coils wound on 1-inch-diameter 4-prong forms (Millen 45004).

bandspread. On 40, the dimensions given result in 57 divisions of bandspread, while on 80 the main tuning setting must be changed three times to cover the band! If the bandspread doesn't suit you at first, spread the L_1 turns, or remove a few. L_1 and L_2 must be wound in the same direction, with the bottom of L_1 and the top of L_2 going toward ground. If, with these connections, the receiver does not oscillate when you rotate the regeneration knob (indicated by a "plop" and a rushing sound in the 'phones), check the wiring carefully. Add a turn or two to the tickler coil, L_2, if needed, or experiment with the fixed condenser across C_2.

[1] Paddon, "The Last Ditcher," *QST*, August, 1947.



Components are mounted on two aluminum shelves, 4½ by 8 inches. The regeneration-control condenser is underneath the lower shelf.

Microphonics are quite bad so try not to hit the receiver when operating.

It is a good idea to calibrate the receiver so you can locate exact frequencies out in the field. Note the dial settings of "main tuning" and "bandspread" on a card and keep it in the logbook.

To lengthen battery life, turn off filament and plate voltages on receiver and transmitter at every opportunity (turn off receiver when sending, transmitter when receiving). The tubes heat almost instantly.

Label all battery leads with small pieces of paper fastened to the leads with Scotch Tape.

The Transmitter

The transmitter circuit is almost identical to that of the "Last Ditcher," [1] and uses a 1J6G twin triode in a push-pull crystal oscillator. Properly loaded, the tube draws about 20 ma. at 135 volts, or 2.7 watts. The note will be pure and sharp if the crystal is a good one. An inactive crystal will cause a chirpy note. Separate crystals are required for each band, of course.

R_1 drops the 3-volt supply to 2 volts for the 1J6G. It can be made up from two 10-ohm and one 20-ohm 1-watt resistors in parallel. However, a variable rheostat is preferable so that compensation may be made as the battery voltage drops off. Plate voltage is not critical, and a maximum of 180 volts may be used; the tube will oscillate with only 22½ volts. For greater plate-battery life, two identical batteries can be added in parallel, if desired.

At the top of the panel, to the left, a ½-inch hole permits the 2.5-volt 0.06-amp. tuning bulb to peek ¼ inch through the panel. This makes it easy to take out blown bulbs. When the batteries are new, the 2.5-volt bulb may

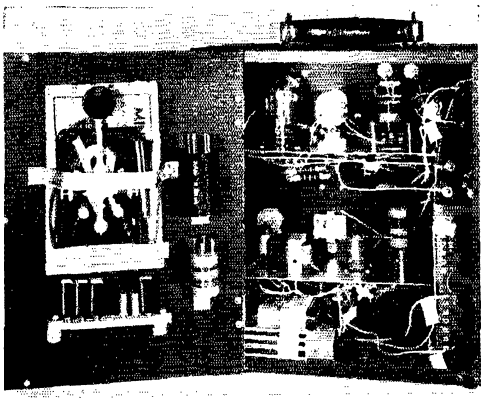
burn out, so you will want to have a 7–8-volt bulb handy.

Next to the bulb is the 3-position switch, S_1. When the switch is turned to the left to receive, the antenna is connected to the receiver. When the switch is in the middle (transmit) the link, L_2, is connected to the antenna. With the switch in the right-hand position (test) and the antenna terminals shorted, the tuning bulb is placed across the link and will light brightly when the transmitter is oscillating. With the short removed from the antenna terminals and the switch still in the test position, the bulb is in series with one leg of the feeders. Tune the condenser for maximum radiation (brightest bulb). Now that the antenna is taking the load, switch to transmit, which removes the bulb from the circuit and you're in business.

The Antenna

The antenna is the key to success with low power (and with high power, too). So far, three antennas have been used with "Tiny Tim":

1) A 4-section automobile radio antenna (Ward SC-8) is mounted on the side of the cabinet (the whip can be pulled out easily, the mountings removed and the holes plugged with bezels, when desired). This antenna is base-loaded, using a coil 2½ inches in diameter with about 45 turns of No. 14 wire, and is worked against a ground consisting of four wires, each 10 feet long, joined like the spokes of a wheel, at 90 degrees to each other, pegged to the ground. The ground connection is to the junction of these radials. Better counterpoises are described in the ARRL *Handbook*, but this one works well. The advantage of this antenna is that it is easy to disconnect and pack up in a box. It is not very efficient for receiving or transmitting but it works. A center-loaded or top-loaded whip would increase efficiency but would not telescope into a short length like this does.



The rear panel of the cabinet is cut and hinged to permit easy bandchanging. Spare coils, key, crystals, as well as log and pencil, are stowed in racks inside the door. The three transmitter batteries are at the upper right, and the receiver batteries are below. Aluminum straps hold the batteries securely in place.

2) The stainless-steel rigging on our 19-foot sailboat was connected to one side of the link and worked against a 4½-foot bronze centerboard in the water. The loading coil and a series condenser were ready but not needed. This antenna, again, is not very efficient, but was the best possible under the often hectic conditions and limited space in a small sailboat!

3) The best antenna, by far, is one 136 feet long, as high as possible and in the clear. A good portable antenna can be made from solid copper trolling line, with nylon fishing line as combination insulator-halyards. A 72-ohm receiving-type line can be used as the feeder. This antenna can be rolled up on a light wooden reel, and works well.

Any antenna and antenna loading method can be used with "Tiny Tim" but the higher the antenna, the better the results. The rig could

(Continued on page 180)

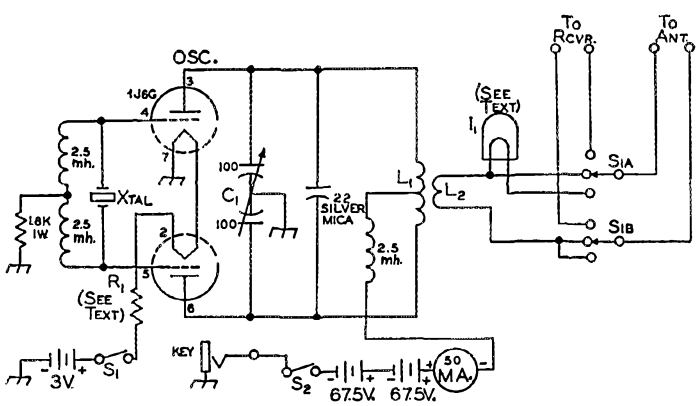


Fig. 2 — The "Tiny Tim" transmitter circuit.

C_1 — Hammarlund HFD-100.
L_1 — Wound in two sections, with ¼-inch space between sections.
80 meters — 19 t. No. 22 e. each section, 1½-inch diam., close-wound (ICA 2159 5-prong form).
40 meters — 12 t. No. 18 e. each section, 1-inch diam., close-wound (Millen 45005 5-prong form).
L_2 — Wound in space between sections of L_1.
80 meters — 4 turns No. 18, close-wound.
40 meters — 3 turns No. 18, close-wound.
S_1 — Rotary ceramic.
Batteries — 3-volt — Burgess F2BP; 67.5-volt — RCA VS-216; or equivalent.

Emergency Power Distribution

Preparing for Field Day and Emergencies

BY GERALD T. WHITE,* W1WUJ

In the rush of preparing for Field Days — and especially emergencies — little thought is given to a.c. power distribution beyond getting a generator and plugging in. The associated twisted bare connections, multiple cube taps, absence of fuses, and so on, not only make for lack of reliability but also create a personal hazard for everybody coming near the site.

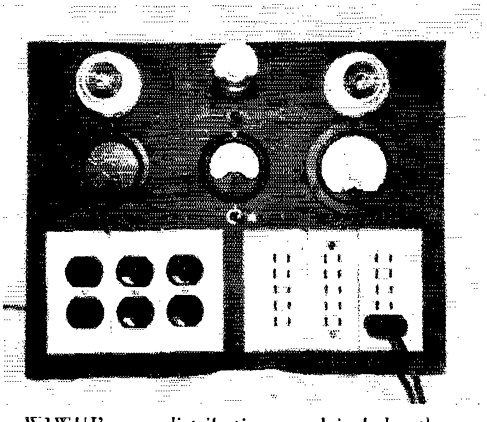
Invariably, not enough electrical fittings are brought along, so off come more plugs and more twisted connections are made, only to come apart in the middle of a QSO. With no fuses in the circuit, especially in multiple-transmitter installations, one short-circuit puts everybody off the air. If the line voltage is in doubt, there *might* be available a multitester of questionable accuracy (probably not having been used to read 115 volts a.c. since last Field Day). After poking the prods in the nearest spare outlet, they are usually left there to "monitor" the voltage. Only with luck will they fail to fall together and short.

After reviewing the situation it was decided to plan the a.c. power distribution system for the June, 1954, Field Day. The problem divided itself into three major categories: (1) generator, (2) feeder layout, and (3) feeder termination.

Generator

The first problem, the generator, requires careful consideration. Both single- and three-phase generators are generally available. The most desirable generator is one with single-phase output, especially 220 volts center-tapped.

* Lieut. Cmdr., USN, FAW-3 staff, NAS, Quonset Point, R. I.



W1WUJ's a.c. distribution panel includes the accessories mentioned in the text and serves as a useful piece of station and shop equipment in the interim between Field Days.

However, many c.d. groups may fall heir to military-surplus 3-phase 110-volt units, and these can be used if a few precautions are observed.

Maximum output should not be drawn from either a 220-volt single-phase center-tapped generator or a 110-volt 3-phase generator unless each leg is equally loaded. If multiple transmitters are placed on separate legs, the line-voltage fluctuations caused by transmitter keying are greatly reduced.

The engine governor should be adjusted to not less than 55 c.p.s. line frequency under full load. If it is set for 60 c.p.s. at no load, the frequency may drop to well below 50 c.p.s. under load and damage to equipment may result. The smaller generators are particularly susceptible to this fault. A 60-cycle electric clock can be used to check the line frequency if a regular frequency meter is not available. If the clock second hand covers much less than 50 seconds in a minute, look out! Almost all ham electronic equipment will operate properly above 60 c.p.s.; however, 60-cycle generators should not be pushed to much over 75 c.p.s. or the engine bearings are likely to be damaged under the prolonged excessive speed.

Power Distribution

The second problem, feeder layout, should also be given careful thought. No fuses, switches, or ammeters should be placed in any wire that is common to two or more branch circuits. One side of each circuit should be grounded, if only by a short rod in moist earth, to help prevent shocks and to reduce the explosion hazard when gassing and servicing the generator. (People *will* attempt to service them while they are running!)

In a 3-phase Y-connected system, the common connection should be grounded. In a 3-phase delta fully-loaded system, one phase must have both sides above ground, so pick one fall guy and let him plan accordingly. However, if only 5 k.v.a. is required from a 7.5 k.v.a. generator, then there is no problem: just ignore one phase and use the junction of the other two phases as common and ground. It should be determined ahead of time which phase is regulated, and this phase should be used for the average (or heaviest) load and the line voltage adjusted accordingly to prevent excessively low voltage or equipment burnouts.

A fuse should be inserted in the "hot" wire of each feeder pair leaving the generator. These fuses should be only a little larger than each station needs, and the total fused current should not exceed the generator capacity. Each trans-

mitter site should have a separate feeder direct to the generator to reduce voltage drop, variations, outage, etc.

All transmitter, receiver, and other chassis at each site should be wired together and grounded. This will avoid r.f. burns and prevent the annoying tingle from the a.c. line by-passes found in most commercial equipment.

A source of adequate a.c. feeder cable is always a problem. Coaxial cable that is too old to be of further value in r.f. service makes excellent feeder cable. For high currents, connect the inner and outer conductors together and run two cables for the two conductors.[1]

Terminal Facilities

The last, but equally important, problem is feeder termination. The receptacle panel should

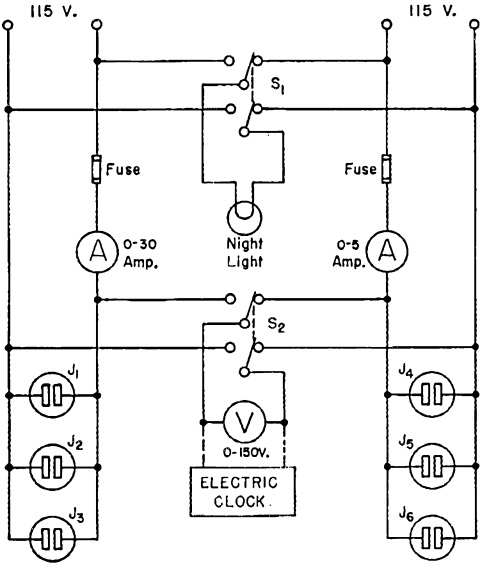


Fig. 1 — Receptacle panel wiring. The number of outlets may be increased as desired.

contain at least eight outlets, protected by a fuse and monitored by a panel-type a.c. voltmeter, and a small night light. An a.c. ammeter is also desirable to help equalize loads on the generator. A frequency meter or an electric clock may be mounted on the panel so it will be available.

It will be noted in Fig. 1 that the night light is connected ahead of the fuses while the voltmeter is connected after the fuses and ammeters. This provides for instantaneous indication as to whether the local fuse blew, the ammeter opened up, or whether the main power failed.

Fig. 1 also shows two separate busses, in anticipation that adequate cable would not always be available. One bus, with three duplex receptacles, is designed for a maximum of 30 amperes for transmitters, lights, and accessories. Under these circumstances, two separate pairs of feeders would be brought to the panel from the generator, thus providing better regulation for voltage-sensitive equipment. The two busses could be paralleled when satisfactory feeders are available. If fuses are provided at the generator end of the feeder, it will be desirable to insert smaller fuses at the receptacle panel than at the generator, to prevent blowing two fuses when a short circuit occurs.

It is not necessary to use expensive meters. There is at least one type of inexpensive meter on the market that is well-damped and is quite satisfactory.

The "quintet"-type receptacle, providing space for five flat or three round a.c. plugs, is far better and safer than using duplex receptacles with cube taps.

Besides its Field Day and emergency applications, the receptacle panel will be a most useful addition to any home workbench since it has adequate outlets and meters to service modern electronic equipment properly.

It is the author's belief that it is always better to do as much as possible in the home workshop before Field Day or an emergency and thereby avoid frustrating work under difficult conditions in the field.

[1] Feeder voltage drop can be estimated quickly by remembering that there will be one volt drop per ampere per 100 feet in a conductor having an area of 1000 circular mils. The drop is directly proportional to current and length, and inversely proportional to circular mil area. The center conductor of RG-8/U (5670 c.m.) would have a drop of 1 volt per hundred feet at a current of 5.67 amp. In a go-and-return circuit (two wires) the drop should be figured on the total wire length, of course. — Ed.

• It isn't too early to be getting ready for Field Day — and, of course, never too early to be getting ready for emergency operation. Planning for adequate power control and distribution is too often overshadowed by radio-equipment problems. Here are some ideas — many of them directly applicable to your own set-up, no doubt — that should stimulate constructive thinking and action.

Strays

In Yosemite Valley, Calif., a ritual called the "fire-fall" is held nightly. A huge bonfire is pushed over a cliff located near Camp Curry. Before the ceremony, scores of blinking lights signal the group on top of the cliff.

W4NQD sent a "light" CQ from the fire area. He was answered from the valley by W9NDM/6 and W9ORY/6. Returning home, W4NQD confirmed by sending QSLs to the stations. Responses were:

To W4NQD/6: confirming our 5 X 10^9 Mc. communication at 8:30 P.M. PST. Pwr: 0.3 watt Xmtr: souped-up 2-cell air-cooled portable flashlight. Rcvr: 2 photosensitive receptory organs. Ur sigs RST 599. — *W9NDM/6*

Tnx W4NQD/6 for fine QSO on 6500 angstroms. Xmtr: 1-watt thermal resistor (flashlight). Rcvr: dual optic. Condx: excellent. Ant: 2-inch diameter parabola. — *W9ORY/6*

Ferroxcube Cores and a High-Selectivity I.F. Amplifier

Design Notes and Suggestions for Improved Receiver Selectivity

BY J. S. BELROSE,* EX-VE7QH, EX-VE3BLW

• If you follow receiver design and improvements, you will be interested in this account of a new inductor-core material that can be easily used by the amateur. Several possible circuits are described, as well as the practical design data for a high-selectivity 20-kc. i.f. amplifier.

WITHIN the last few years there has been considerable interest in the development of the ideal communications receiver. The progress made toward this goal can be readily seen if one traces the development of commercial communications receivers during the past nine years.

The trend in receiver design has advanced from the simple but effective regenerative i.f. amplifier (single-signal superhets so popular in the prewar ARRL *Handbooks*) to the complicated triple-tuned and quadruple-tuned low-frequency i.f. amplifier of the present day. The mechanical filter (or magnetostriction filter) has recently been developed, and it provides an opportunity to obtain a maximum skirt selectivity and quite narrow bandwidths with a minimum number of stages. And, of course, we still have our old stand-by, the crystal filter. However, very high-Q selective LC filters can be designed that will provide a maximum receiver selectivity and which can be easily constructed by the amateur radio designer.

Several excellent articles have appeared in *QST* on selective amplifiers.[1,2,3] The purpose of this article is to collect together some practical data, which the author has accumulated during the last few years of experimental receiver design, and to present these data in the form of notes for the amateur who prefers to build his own receiver. And, together with some simple circuit theory, an amplifier will be designed that has an extremely narrow bandwidth and excellent skirt selectivity. In conjunction with a good r.f. tuner, this amplifier will outperform any receiver which is at present commercially available. The recent advances made in the development of low-loss ferromagnetic-cored materials for high-Q inductors have made coil design and construction a pleasure, and they inspired the author to write this article. Since the heart of the amplifier is the highly-selective filter, it is necessary that a good portion of this article should be devoted to a general introduction to the use of these core materials.

* % St. John's College, Cambridge, England.

[1] McLaughlin, "Selectable Single Sideband," *QST*, April, 1948.

[2] Githens, "Super-Selective C.W. Receiver," *QST*, August, 1948.

[3] Goodman, "All-Purpose Super-Selective I.F. Amplifier," *QST*, May, 1953.

General Considerations

In the design of a communications receiver for radiotelegraphy, it is the author's opinion that a good receiver should be a double-conversion superhet and that the second i.f. should be as low as possible, in order to achieve the required selectivity and stability. Low-frequency amplifiers can readily be designed that have noise figures near to unity but, in any case, the over-all noise figure of the receiver is decided in the first stages, so this factor will not be considered here. Two stages of 455-kc. amplification should be provided to avoid image problems with the low second i.f. The 455-kc. signal should be fed to the second mixer at low level by means of a cathode follower. The signal-handling capacity of the stages before the narrow-bandwidth stages should have sufficient dynamic range to avoid cross-modulation distortion by strong adjacent-channel signals.

Operators not used to copying signals received through a very narrow bandwidth will find that this new experience requires some learning. The familiar ring of a keyed signal, so characteristic of a very selective crystal filter, is considerably reduced by the use of very selective bandpass coupled circuits. Hence, narrower bandwidths, for the same degree of ring, can be used. These circuits are in general designed to produce an optimum flat-top amplitude response. For signaling speeds of 20 w.p.m. and less, the keyed signal sounds clear and with little ring in a 30-cycle bandwidth, except under conditions of great interference of an impulse nature as, for example, local thunderstorm conditions. As the bandwidth is reduced below 20 cycles, the Morse characters start to run together and the information capacity of the channel approaches zero, as the bandwidth approaches zero. (The power required to transmit reliably a given rate of information approaches infinity.)

In the circuit design to follow, an amplifier bandwidth of 100 cycles is chosen because this bandwidth is easily obtained with presently-available circuit components. Additional narrow-band audio-frequency filters can be used if necessary after the signal is tuned in. The over-all circuit stability (from transmitter to receiver) re-

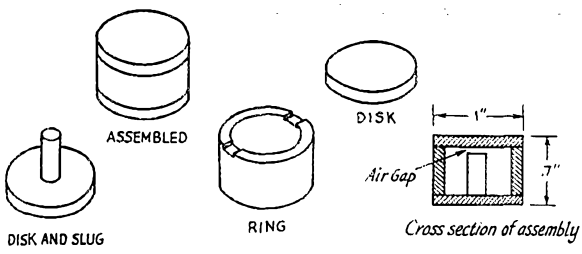


Fig. 1 — Component parts and assembled pot core (Ferroxcube D-25/17,5).

quired for operation with a 100-cycle filter is such as to require fine vernier action for the h.f. oscillator control, in order to "hold" the signal in the passband.

Ferroxcube Pot Cores

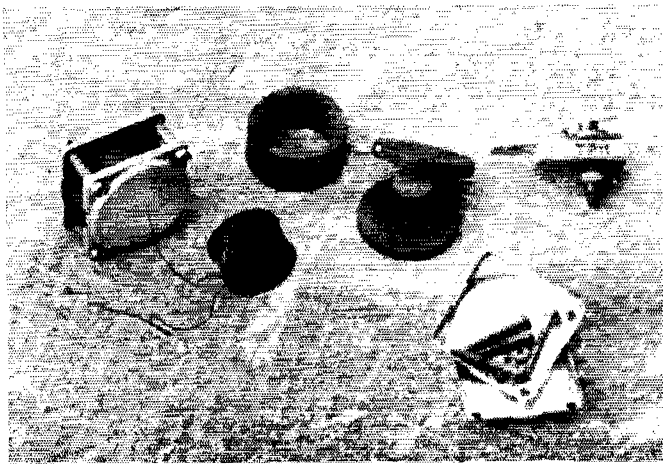
If an air-wound coil is placed in a medium of permeability μ times that of air, the self-inductance L will also be increased μ times. Since the copper losses remain constant, the Q of the inductor will be increased. The resultant increase of the quality factor will depend on the additional losses introduced into the coil by the core. These losses may comprise eddy-current losses, hysteresis losses, and residual core losses. Recently, great advances have been made by manufacturers in producing ferromagnetic materials which introduce very small losses. Ferroxcube III is a low-loss manganese-zinc ferrite with a cubic crystal structure. The metal oxides are extruded in the form of a plastic mass and fired at a high temperature; the result is a material of extremely high resistivity and having mechanical properties which resemble porcelain. This material has many uses and is formed into quite a variety of component shapes. The "pot core" is a specially-designed form developed for very high-Q coils as used in bandpass filters in carrier telephony and i.f. coils in radio engineering. As shown in Fig. 1, the pot core[4] consists of a ring, two disks, and a slug. The slug is slightly shorter than the ring, leaving an air gap in the otherwise closed magnetic circuit. The copper windings are wound on a small plastic bobbin. Since the turns are entirely surrounded by a material of high permeability, excellent shielding is provided, and coils can be placed quite close together without causing undesired coupling. The pot-core assembly can be bolted directly to the metal chassis without affecting the Q. The effective inductance is slightly increased by grounding the core, since the distributed capacity effects are changed. However, this is only of the order of a few $\mu\mu$f. The upper frequency limit for Ferroxcube tuned inductors is about 500 kc.

Application of Pot Cores

If the tuned filter is to be used as the load impedance of a tuned amplifier, some special considerations are necessary in order to insure maximum stability for the inductance. With Ferroxcube, the permeability decreases (i.e., the inductance decreases) as a result of d.c. flowing through the windings and causing premagnetization of the core material. Another factor to consider is the low saturation properties of Ferroxcube. Therefore, if the sharply-tuned filter coil is included directly in the anode circuit of the output valves of the amplifier, where the anode current is likely to change with the signal voltage, the effect is to detune the filter and increase the bandwidth. The simplest method of reducing these effects is to tap the plate quite a way down on the inductor, so that the d.c. current flows through only a few turns of the coil. This results in additional advantages, since it reduces loading of the tuned circuit by the plate resistance of the valve, and provides a convenient means of reducing the stage gain. (The stage gain can become rather too high as a result of the large inductance values needed to tune to low frequencies with convenient sizes of tuning capacitors.)

The other important consideration for a coil wound on a magnetic core is the temperature coefficient of the core material. Because of the low Curie point (the temperature at which the permeability becomes practically unity) of Ferroxcube materials, the permeability of the material is quite temperature-sensitive. Since the inductance varies directly with the permeability, its temperature coefficient will be identical with that of the core. This temperature coefficient can be inadmissably high for coils used in narrow-band sharply-tuned filters. The influence of the core material on the inductance must be de-

[4] Manufactured by Ferroxcube Corporation of America, and Philips' Industries, Eindhoven. Obtainable in Canada through Rodgers Majestic; in Great Britain through Mullard Components Division, and in the U. S. A. through Ferroxcube Corp., 97 Marshall St., North Adams, Mass.



Ferroxcube pot cores make it possible to build high-Q inductors for "super-selective" i.f. amplifiers. The component parts and a complete assembly are shown here.

creased, and this is achieved by providing an air gap. In general, there is an optimum air-gap size for a given Q. In some cases, especially at low frequencies, it is desirable to choose an air gap larger than optimum for a given Q, in order to increase the stability of the coil. A larger air gap also reduces premagnetization effects. Therefore, the largest air gap for the given Q should always be used. As a general rule, the higher the frequency the greater the optimum size of the gap. For gaps larger than 0.5 mm. the core should be symmetrically located, leaving half the total tap at each end.

For frequencies less than about 30 kc. the best Q is obtained by winding the coil with solid enamel-covered wire (not silk-covered), with the wire size chosen to fill the available winding space for the particular value of inductance required. For frequencies above 30 kc., and most certainly for frequencies between 100 and 500 kc., the best Q is obtained by using litz wire. The number of turns required depends on the length of the air gap, since the effective permeability is a function of the air-gap size. For a given pot core and a given gap size,

$$N = \alpha \sqrt{L}$$

where L = inductance, mh.
N = number of turns.

The factor α is quoted by the material manufacturer, and inductors wound with the number of turns specified are generally within a few per cent of that required.

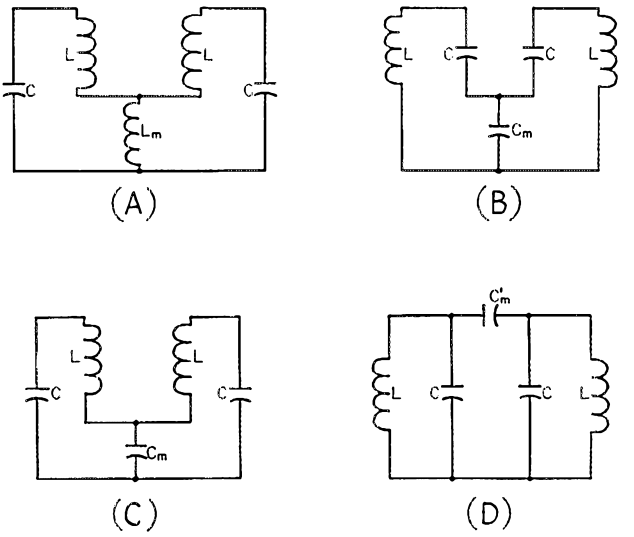


Fig. 2 — **Four common types of coupled circuits. A, B and C illustrate shunt coupling, and D is a form of series coupling.**

Circuit Design Notes

Narrow bandpass filters will be discussed briefly in this section. In amplifier design the desired parameters are stage gain at resonance, selectivity, and off-channel response. The stage gain should be kept low, to avoid trouble with oscillations caused by the difficulty of decoupling the stages at low i.f. frequencies. Single-tuned circuits are not recommended for use in the i.f. amplifier because they give a comparatively narrow passband and poor attenuation outside the passband (a crystal is a very high-Q simple circuit). Capacitance or inductance coupling between two tuned circuits may be used to give a bandpass selectivity curve with good attenuation outside the passband. The coupling impedance may be in shunt connection, the so-called common coupling, or it may be in series, the so-called top-end coupling. Four common types are illustrated in Fig. 2.

All of the methods of coupling shown in Fig. 2 give somewhat similar selectivity response curves near resonance (for near-to-critical coupling). The common inductance type, Fig. 2A, is superior for coupling that is slightly greater than critical, since both peak frequencies (of the double-humped response curve characteristic of overcoupled circuits) move away from the mid-frequency as L_m is increased. The response of this circuit is similar to that for a double-tuned inductively-coupled transformer in which the mutual inductance is equal to the common inductance L_m. For the series-type coupling, only one limit frequency is affected. [5]

We next consider the selectivity far from resonance. Circuits of Figs. 2B and 2D are similar. For both these circuits the low-frequency skirt is the steepest obtainable, whereas there is some flattening out on the high-frequency side below about 60 db. down. The response of the circuit of Fig. 2A is somewhat better on the high-frequency side but somewhat worse (below about 80 db. down) on the low-frequency side. The circuit of Fig. 2C has the steepest obtainable response on the high-frequency side but is very much the worst of the lot on the low-frequency side, since the response starts to rise again about 8 kc. off on the low side (for circuit values to be considered later). At 20 kc., component values limit us to the use of the type of coupling shown in Figs. 2A and 2D, since practical values for C_m are rather high. It can be shown that the coefficients of coupling for these two circuits are

$$k \sim \frac{L_m}{L}, \text{ and } k \sim -\frac{C'_m}{C}$$

In general, the best off-channel response will be obtained by the use of combinations of both these circuits, as in the circuit of Fig. 3. For maximum-flat response, the circuits should be critically coupled; that is,

$$k_c = \frac{1}{Q}$$

[5] Sturley, *Radio Receiver Design*, Chapman Hall, 1953, p. 443.

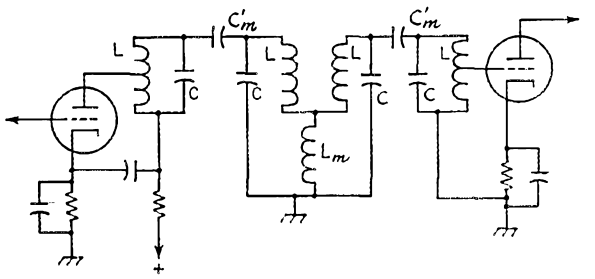


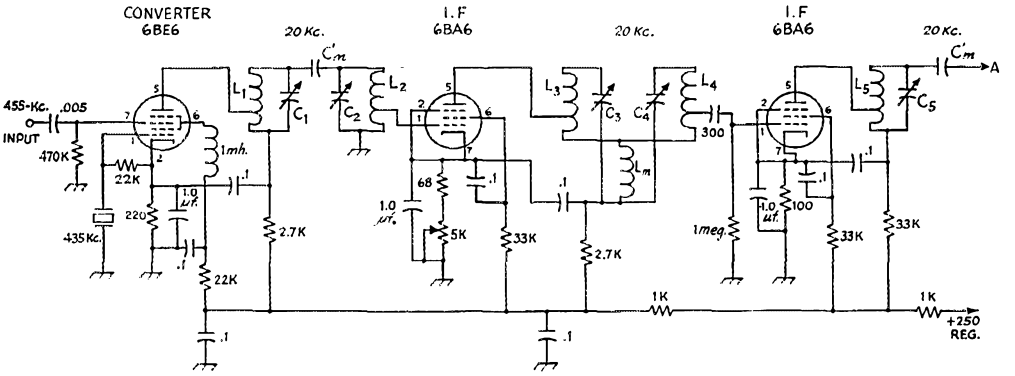
Fig. 3 — Shunt- and series-coupling circuits can be combined for high-selectivity interstage coupling.

With critical coupling, the flat-topped character of the over-all response curve is, if anything, improved when a large number of stages is used. In general, any degree of selectivity, approaching the ideal flat-top response, can be obtained by using a sufficient number of stages and combinations of under-critical and over-critical coupling.

As will be seen later, the anode of the amplifier tube and the grid of the following amplifier stage are tapped down on the inductance L. This does not in any way alter the response of the coupled circuits, since for the case considered, $L >>> L_m$ and $L >> L_1$ (Fig. 5). And because the coil is surrounded by a material of very high permeability, the coupling between the two parts of the coil is almost perfect and the circuit approximates an ideal autotransformer, transforming impedance and voltage.

Practical Circuits

The complete circuit of a practical amplifier is shown in Fig. 4. The 455-kc. signal is heterodyned in the 6BE6 mixer to 20 kc. by beating with a 435-kc. crystal (obtainable from surplus stock) and amplified by a three-stage double-tuned selective amplifier designed to produce a maximum-flat-topped response. The 20-kc. signal is heterodyned to 1 kc. (or whatever audio note is desired by the operator) by beating with a stable series-tuned Clapp-type oscillator. The series-tuned trap in the output filter following the second mixer is tuned to 20.5 kc. to reduce



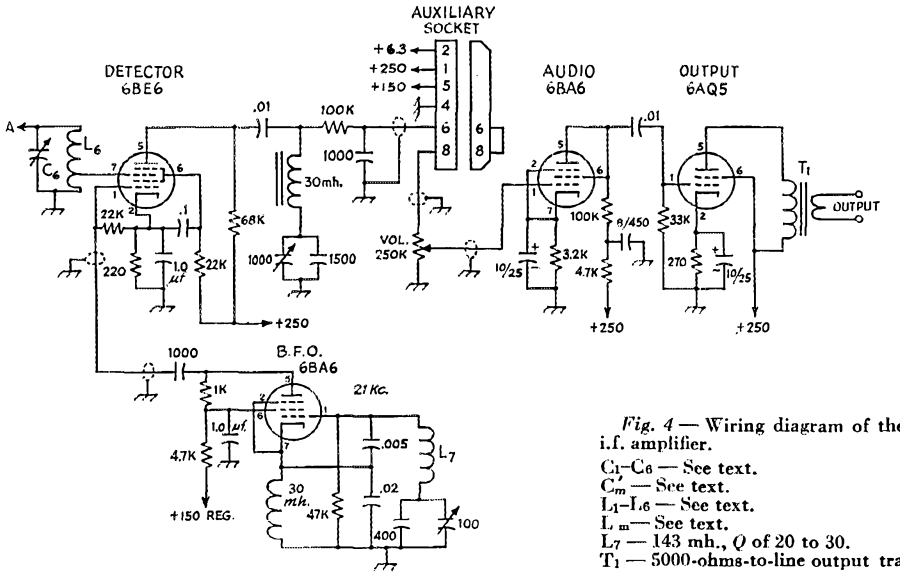


Fig. 4 — Wiring diagram of the selective i.f. amplifier.
C_1–C_6 — See text.
C'_m — See text.
L_1–L_6 — See text.
L_m — See text.
L_7 — 143 mh., Q of 20 to 30.
T_1 — 5000-ohms-to-line output transformer.

the i.f. and b.f.o.-oscillator signals at the grid of the first audio amplifier. The b.f.o. is tuned to the high side of the signal frequency. An octal socket

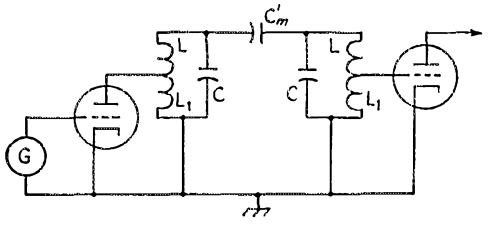


Fig. 5 — Equivalent circuit of an amplifier stage.

is wired so that a Selectojoct can be used with the amplifier. When the Selectoject is not in use, an octal plug must be used to jump Pins 6 and 8. Other types of audio filters could also be used. (A double-tuned critically-coupled selective amplifier tuned to 1 kc., with a bandwidth of 30 cycles, has been experimentally used by the author with very excellent results.) The decoupling between stages may look elaborate, but adequate bypassing is quite difficult at 20 kc., where a 0.1-μf. condenser looks like 80 ohms. After some experimentation the decoupling shown was adopted as a means of completely isolating the stages so the response curves are as calculated and not as modified by the regeneration introduced by the wiring.

Design of the 20-Kc. Tuned Circuits

The gain of an amplifier at resonance is

$$G = g_m Z$$

where g_m = transconductance of the valve in mhos, and

Z = load impedance in ohms.

For double-tuned critically-coupled circuits,

$$Z = \pi f L Q.$$

Now, if the anode of the amplifier and the grid of the following stage are tapped down on the filter, as shown in Fig. 5, the gain is

$$G \simeq \left(\frac{L_1}{L}\right) g_m \pi f L Q$$

where L_1 = inductance of tapped portion, and

L = total inductance of coil.

This is so because the coefficient of coupling between L_1 and L is almost unity when the windings are enclosed by a pot core.

Choose $C = 0.0035$ μf. (convenient because a 0.003-μf. fixed can be used with a 1000-$\mu\mu$f. trimmer);

then $L = 18.1$ mh.

For a stage gain of 60 with a coil Q of 180 and a 6BA6 tube ($g_m = 4400$ μmhos),

$L_1 = 1.2$ mh.

For the Ferroxcube type 25 pot core IIIB2 material with a 0.5-mm. air gap (Philips' type number D-25/17.5-11.00 — IIIB2)[6]

$$n = 65\sqrt{L}$$

where L = inductance in mh.

Hence, we need a coil of 284 turns of No. 34 enamel wire tapped at 71 turns.

The coefficient of coupling

$$k_c = \frac{1}{Q} = \frac{1}{180} = 0.0055.$$

Hence $C'_m = 0.0055\ (3500) = 19.4$ $\mu\mu$f.

(use 18 $\mu\mu$f.)

and $L_m = 0.0055\ (18.1) = 0.1$ mh.

The coil L_m is wound on a small form having an adjustable slug. Each transformer assembly is completely enclosed in a sheet-metal box (20-gauge tinned steel) and short wires are brought out to connect to the external circuits. The boxes used by the author are 2 by 3 inches and 2½ inches high. These are easily bent into shape and the corners of the box soft-soldered. Short bolts with the heads removed are soldered in the

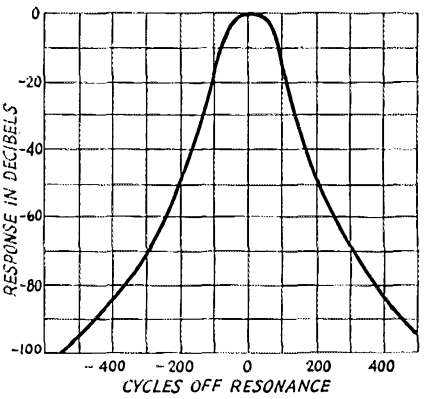


Fig. 6 — Selectivity characteristic of the i.f. amplifier.

corners of the shield box to bolt the assembly to the chassis. The trimmer capacitors are Arco Electric type 307-M padders. These are good for this application because both plates are insulated from the mounting screw and the trimmer can be mounted directly onto the top of the shield box. The trimmer is mounted on the inside face of the top of the shield box, with the slotted bolt for adjustment projecting through the top of the can for ease of tuning. The pot-core assemblies are bolted directly to the side of the shield box.

(*Continued on page 130*)

[6] Pot cores D-25/17,5 have now been superseded by type D-25/16 (i.e., the total height of the assembly is 16 mm. rather than 17.5 mm.). The only important advantage of these new pot cores is that a greater air gap is available than with the older type. The maximum air gap in the former type was 0.5 mm., whereas in the new type 0.85 mm. air gap is available for the Grade IIIB2 material. Grade IIIB1 is recommended for frequencies below 20 kc. whereas IIIB2 is recommended for frequencies above 20 kc. At 20 kc. similar Qs can be obtained with either type. For frequencies above 100 kc., use Type IIIB3. It is recommended that, if this new line of cores is available, Type IIIB2 with an air gap of 0.85 mm. be used at 20 kc., since this will result in a slightly improved temperature stability (here $N = 93\sqrt{L}$).

These new cores have not been used by the author, but it is thought that Qs between 150-170 should be easily obtained, since a Q of 150 was obtained by the author using a Type 25/17,5 pot core with an air gap of 1 mm. This air gap was experimentally ground by hand. However, it is not recommended that the air gap be altered unless accurate micrometers are available to insure a uniformity of the cores. The material is very hard and brittle, and grinding even a few fractions of a millimeter off the slug is a long, tedious job.

Design for the Electronic-Key Manipulator

Switching Lever for High-Speed Operation

BY M. A. MESSERSMITH,* W7DRA

• At the higher keying speeds you have to go from dot to dash in a hurry if you want to turn out tape-like characters. Here's how an army bug was reworked into a high-speed e.k.m.

DURING the past few years many excellent electronic key designs have appeared in *QST*, and from these articles amateurs as well as commercial operators have built a number of efficient keys. Listen any week night to one of the fast c.w. amateur traffic nets and you will understand what I mean and what a large number are being used at the present time.

Some years back I built an electronic key from a circuit in *QST* and found it very satisfactory. In the *QST* article it was stated that the difference between operating the conventional style bug and an electronic key was that you operate the bug and the electronic key operates you. I found this to be true.

When comparing regular bug operating with tape transmission you will find the bug has a characteristic style for each individual because each of his hand actions is reflected in his transmission. At high speeds the characters are sharp and not uniform. On the other hand, the electronic key approaches tape very closely and the individual operator's characteristics are not present because, as already mentioned, you have to make your operating conform with the time-constant circuits, and as you coördinate with them you acquire rhythm to conform. Really most of the actual forming of the characters is out of your control — all you control is the spacing between the words and characters. And now we come to our story.

* 1601 So. Mason, Tacoma, Wash.

At a speed of 30 w.p.m. there are approximately 25 time units per second, figuring 5 characters of two dashes and one dot each per word and giving three units to a dash, one to a dot, one to the space between each, and two units between characters. The electronic key will allow you three time units for going from a dash to dot (if the dash is self-completing) compared with only one unit when returning. So you see, in order to keep a good rhythmic style of transmitting at high speed, you require an operating mechanism with fast action and small movement when going from the dot to the dash side, since the available time is only about one twenty-fifth of a second.

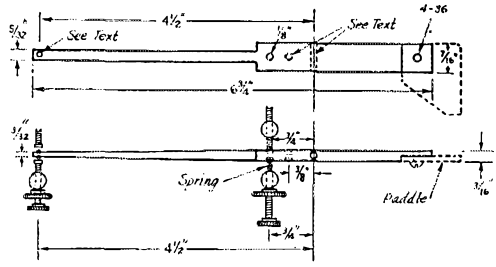
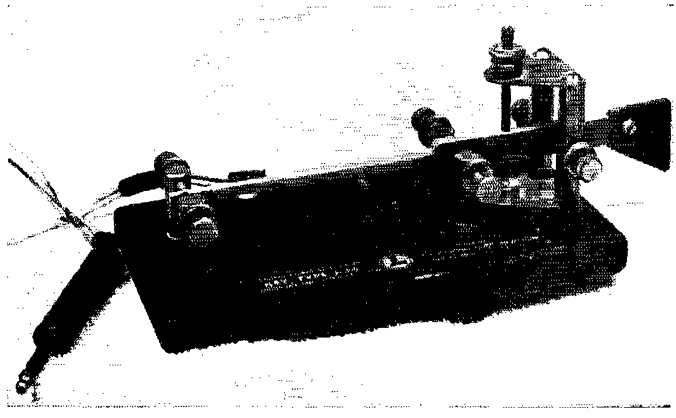


Fig. 1 — Reed dimensions and contact layout. The reed or arm should be made of dural.

I had previously used several different styles of keying devices but was never satisfied with them because as the speed increased it was difficult to keep constant rhythm because of excess motion and play. Keeping the above in mind, a study was made of several styles of keying mechanisms both in operating and on the bench, with the objective of constructing a device having fast action, self centering, and

(*Continued on page 146*)



Despite the almost microscopic movement of the paddle in going from dot to dash, the arm returns to center without overshoot when released. Practically any "bug" will lend itself to modifications similar to those made in this J-36.

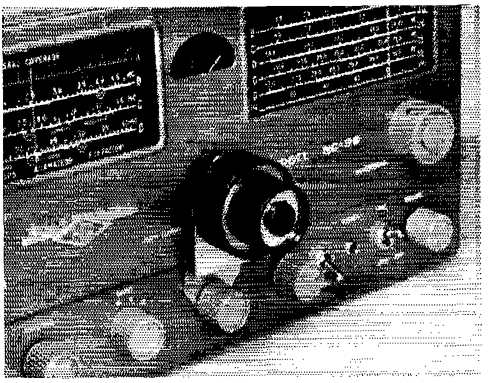
Communications Receiver Hints for the V.H.F. Man

Simple Modifications To Improve Results with Crystal-Controlled Converters

BY EDWARD P. TILTON, W1HDQ

ONCE you've used a crystal-controlled converter for v.h.f. reception you'll never be satisfied with less. The stability afforded by crystal-controlled injection has probably been the greatest single factor in the vast improvement in reliable coverage that v.h.f. men have achieved in the last few years. But this has not come about without introducing a few objectionable features along with the benefits.

Spurious responses, for instance are much more troublesome when the i.f. is tuned and the front end of the receiving system is broadbanded.



Fine tuning of the general-coverage dial on most communications receivers can be accomplished through the installation of a vernier drive mechanism. This can be mounted on a plate that can be removed at any time, thus preventing any permanent defacing of the receiver.

And, as many a converter user has found out too late, there are very few communications receivers that have both tuning rate and tuning range adequate for the job of covering a 4-megacycle spread at 7 or 14 Mc.

The problem of unwanted signals has already been treated in some detail in *QST* by Van Duyne and Treptau.[1] Their discussion was concerned mainly with converter circuit features that help to solve the problem. They showed methods for making the converter response curve flat-topped, with steep-sloping skirts. They also pointed to the need for keeping harmonics and subharmonics out of the energy supplied to the mixer stage from the oscillator-multiplier chain.

After the measures they describe have been taken, if there is still appreciable interference from signals riding through at the first intermediate frequency, some attention must be paid to the receiver with which the converter is used. Signals at 5 to 20 Mc. are likely to be very strong at times. It is hard to find a 4-megacycle spread anywhere in this region where leak-through won't occur at least part of the time, even with fairly good shielding. But our experiences with TVI have taught us that things that look like shielding and grounding may not actually be doing the job we require.

Take the antenna terminals used on many of today's receivers, for example. Fig. 1 shows a typical arrangement. A small bakelite strip on the back of the receiver has three screw terminals. The first is connected inside the chassis to a ground lug adjacent to the terminal board. The other two are the "doublet" terminals, to be used with any balanced-line feed. When an end-fed or coax-fed antenna is used a jumper connects Terminals 1 and 2, "grounding" them, and presumably also outer conductor of the coax. The inner conductor is connected to Terminal 3. The same arrangement is used when coax from a v.h.f. converter is run to the receiver antenna terminals.

That this method of connection can lead to much i.f. interference, through no fault of the receiver or converter, was discovered recently when a new NC-183D was placed in service at W1HDQ. When propagation was good in the 7-Mc. region, Radio Moscow and the BBC gave us considerable trouble. Other signals around 9 Mc. were almost equally annoying. Yet these signals had been no more than barely perceptible on a rack-model HRO-7 used previously. (The antenna connections on the rack job were inside

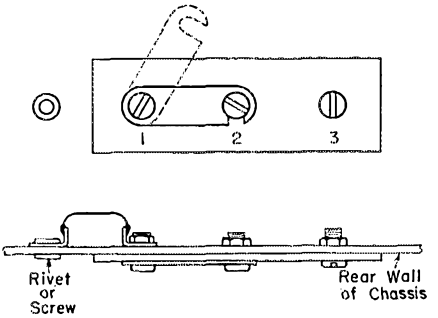


Fig. 1 — Three-terminal antenna connection plate used on many receivers. To reduce i.f. pick-up when the receiver is used with crystal-controlled converters, remove the grounding wire from terminal No. 1 and ground externally.

[1] Van Duyne and Treptau, "Notes on V.H.F. Converter Design," February, 1953, *QST*, page 52.

the metal dust cover.) When a converter that used 14 to 18 Mc. was tried, the i.f. interference was intolerable on the new receiver.

Having had some previous experience with this sort of thing, we laid a screwdriver blade across from an exposed bare metal part on the 183D panel to the chassis of the converter. Down went the i.f. QRM! Yet what was wrong with the coax braid, already connecting the converter and receiver chassis? Nothing — except that the connection to the chassis is on the *inside* of the receiver, as shown in Fig. 1. There is no connection to the outside of the chassis, except through the rivet at the left edge terminal. Result: The wire from Terminal 1 to the ground rivet is a nice little coupling loop, and the converter is effectively an "antenna" for signals at the intermediate frequency!

The cure is obvious. Remove the loop connection on the inside of the chassis and make the ground on the outer wall. Use braid or copper strap, so that Terminals 1 and 2 are really at ground potential, outside the receiver.

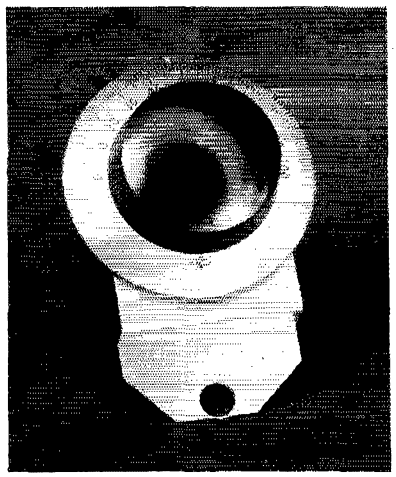
If you have a very bad i.f. interference problem (like a 40-meter ham running a kilowatt in the next block) you may want to go a step further and shield the antenna terminals. On the NC-183D this was made very easy by the manufacturer; he provided the shield, ready-made, over the speaker terminals. By removing the bottom plate you have ready access to the back of the terminals on the rear wall of the chassis. Remove the short screws that hold the antenna terminal board and replace them with ones about ¾ inch long, with the heads inside the receiver and retaining nuts outside. The shield box can then be mounted over the antenna terminal assembly, outside the chassis, in the same way that it originally covered the speaker terminals. If this doesn't cure your i.f. leak-through problems you need to go over the W2MLX-K2CEM suggestions[1] again.

Of course, the really businesslike way to handle the shielding of the antenna input connections is to install a coaxial fitting on the rear of the receiver, and eliminate the terminal board entirely. The steps outlined above are for timid souls who can't bring themselves to drill holes in a commercial receiver, even in the back. If your receiver and converter are close together, try a strap bond between the two chassis.

And here's an operating hint that helps to reduce i.f. interference. If your converter has an i.f. amplifier, run its gain as high as possible, and the "r.f. gain" on the receiver as low as possible. Where the i.f. pick-up is the result of poor shielding in the receiver this will help appreciably. If the i.f. signals are fed through the converter front end, it will, of course, make no difference.

What To Do About Tuning Rate?

It's a sad fact of two-dial receiver design that the general-coverage dial chases the kilocycles by just too fast to make for easy tuning of v.h.f. signals. And the bandspread dial never covers enough tuning range to be of much use, except to the low-edge v.h.f. DX-hound. Single-dial receivers like the HRO, SX62, BC-342, BC-348, SP600JX and SX-73 are somewhat



Vernier drive mounting for using the National type AM dial with the NC-88 and 98 receivers.

better, but only the last three can be said to come close to the ideal in the tuning-rate department.

Some improvement can be achieved by selecting the intermediate frequency according to the receiver's qualifications as to tuning rate. Quite a few two-dial receivers spread out the kilocycles more at the low edge of the various ranges. The SX-71, S-76, NC-88 and NC-98, for example, tune much better at 5 Mc. than at 7. All receivers tune faster on each higher band. The kilocycles go by twice as fast at 14 Mc. as they do at 7.

Nearly all inexpensive two-dial receivers are next to useless for the crystal-converter man; they tune too fast on *any* range. The solution, then, is to slow down the movement of the general-coverage dial, to give us fewer kilocycles per degree of knob rotation. Fortunately, this can be done without making any permanent modifications in the receiver that might impair its resale value or appearance.

The photographs show how this is done. The example is the NC-98, but we've used the same general method on the SX-71, S-76, HQ-140-X and NC-183D with equally satisfactory results. Almost any vernier drive can be used, the first example shown being a Cronamc type 599 planetary drive. A metal mounting plate can be cut and bent to fit almost any receiver, so no specific dimensions are given here.

Use a volume control nut, a chassis retaining screw, or any handy removable screw or nut that appears on your front panel to hold the plate in place. The "CWO-Manual-AVC" switch mounting nut is used on the NC-98. Cut the sheet aluminum plate to suit your taste, mount the vernier drive in place, and you have a 5-to-1 reduction drive that will give you a tuning rate on the general-coverage dial that will closely

(Continued on page 152)

A 5-Band Antenna Coupler

Simplifying the "All-Band" Transmitter Loading Problem

BY LEWIS G. McCOY, W1ICP

A RECENT ARTICLE in *QST* described the construction and use of a standing-wave-ratio bridge.[1] It was pointed out that when the s.w.r. bridge was used in conjunction with an antenna coupler, one could easily match the output from his transmitter to the antenna system. Except for a few special types of antennas,[2] nearly all multiband systems need an antenna coupler to match the transmitter output to the feedline. If one is fortunate enough to have a separate antenna for each band, and each antenna is fed with an untuned, or "flat" (low s.w.r.), line, an antenna coupler is of course not required. However, most of us have to struggle along with a multiband antenna and use a tuned line. The purpose of this article is to describe a coupler that has enough flexibility to match practically any antenna system the average ham can dream up. In addition, for the benefit of the beginner, a few simple antenna systems will be described.

The Circuit

There are two basic circuits used in antenna couplers: series or parallel tuning. Which circuit is used depends upon the antenna and feedline length in terms of wavelengths. In order to take care of the different conditions one is likely to encounter, an antenna coupler should be designed to use both types of tuning.

Fig. 1 shows the basic circuits that can be ob-

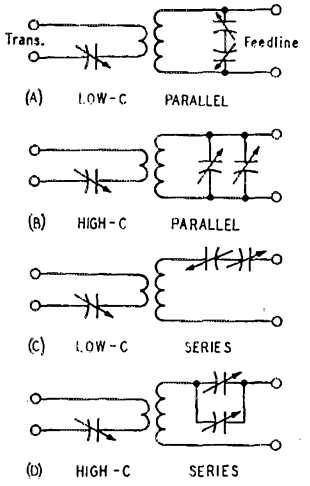


Fig. 1 — In the above drawing, A and B show two parallel tuning conditions: low- or high-*C*. Series tuning, low- or high-*C*, is shown at C and D.

[1] McCoy, "Meet the S.W.R. Bridge," *QST*, March, 1955.

[2] Where special matching devices are used to match the antenna to the impedance of the feedline on more than one band.

tained with the coupler to be described. The two capacitors shown are actually one split-stator variable — simple switching takes care of getting the different circuits. A fixed link is used on the coil, but the effective coupling is readily adjusted by varying the capacitor in series with the link.

The practical circuit is shown in Fig. 2. The switching mentioned above is accomplished by

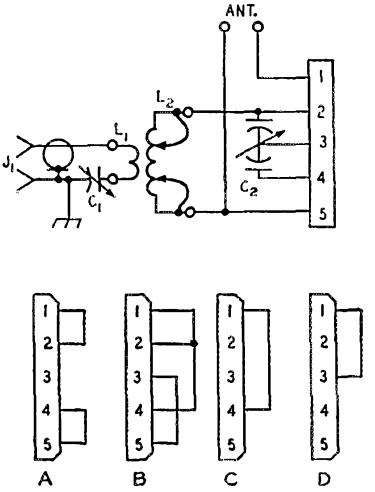


Fig. 2 — Circuit diagram of the antenna coupler.
C_1 — 320-$\mu\mu$f. variable (Hammarlund MC325-M).
C_2 — 100-$\mu\mu$f.-per-section variable (Hammarlund HF-BD-100-C).
L_1, L_2 — See text.
J_1 — Coaxial receptacle (Amphenol 83-1R).

plugging in a suitably-connected bar plug — the letters beneath the plugs correspond to the four circuit conditions of Fig. 1. L_1 and L_2 are both mounted on another plug bar — only two coils are required to cover the bands 80 through 10 meters. Intermediate values of inductance are obtained by shorting turns with clip leads permanently mounted on the coil bar, as can be seen in one of the photographs.

Construction

Although the parts for the antenna coupler might be mounted on a wooden base, we elected to mount them on a $3 \times 5 \times 10$-inch chassis. The condenser spacings and coil wire sizes are adequate to handle powers up to about 500 watts input to the transmitter. Since the Novice cannot run more than 75 watts, the cost of the unit for low-powered applications can be reduced by substituting a smaller capacitor of the same range for C_2. However, the Novice can build for future high-power days by using components with the

ratings given in the caption, with the assurance that the coupler will work just as well for him as it will for the ham with 500 watts.

The two coils and their links are made from a single length of B & W 3906 coil stock. To make the 80/40-meter coil, first count off 46 turns of the coil stock and cut this piece from the stock. Then unwind one turn from each end. This will provide leads to connect to the jack bar plug. Next, cut the 19th turn from each end, making the cut at the top of the coil (calling the side where the outside leads come off the "bottom"). The ends of the wires at these cuts are separated from the form and brought around to the bottom of the coil. We now have three coils of 18 turns, 6 turns, and 18 turns. The 6 turns at the center forms the link, L_1. The inside ends of the two 18-turn sections should be soldered together. This gives a coil for L_2 consisting of 36 turns, with the 6-turn link, L_1, at the center. The leads are inserted in the jack bar plug (Millen 40305) and soldered. The last step is to mount clip leads on the coil ends, so that a portion of the coil can be shorted out for 40-meter operation.

The 20/15/10-meter coil is made up in a similar manner. The original piece of coil stock consists of 14 turns. The completed L_2 has 8 turns, 4 each side of center, with a 2-turn link for L_1.

No specifications are given for tap points because these points may vary with the antenna system. The coil and shorting bar holders are made from Millen 41305 jack bars.

Using the Coupler

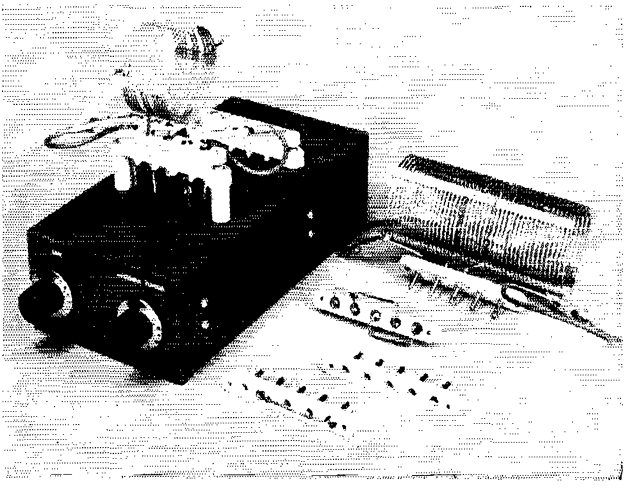
Let's assume we have a half-wave dipole, 135 feet long, fed at the center with open-wire line. We'll start out first on 80 meters and work down through 10 meters, making notes on each setting of the coupler in order to have a permanent record. As pointed out in the s.w.r. bridge article,[1] one of the best methods for adjusting the coupler is with a bridge. The 80-meter coil is plugged into the unit and the feeders are attached to the antenna terminals. For a start, we'll use plug B, which will give us high-C parallel tuning. The

• One of the stumbling blocks among new amateurs is the problem of properly coupling the antenna to the transmitter. A flexible antenna coupler that will handle a wide variety of situations is the solution, and in this article W1ICP describes such a device and how to use it. Since it will handle powers up to several hundred watts, it won't have to be rebuilt if and when you increase power.

bridge is connected by coax line to the transmitter temporarily with nothing connected to the output side of the bridge. The transmitter is set up near 3500 kc., or 3700 kc., if you are a Novice license holder, and full-scale reading is set on the bridge meter by adjusting the transmitter output or excitation. The coax line from the coupler is then connected to the output side of the bridge. The controls on the transmitter are left as they were for this particular frequency setting.

The two condensers, C_1 and C_2, are then tuned for a null indication on the s.w.r. bridge meter. It should be possible to get a reading of zero or very close to it. If a good null isn't obtained, try the other plugs, starting with A and working through D. It may be necessary to tap in toward the center of the coil, but keep the taps as close to the coil ends as possible. Once a good null is obtained, mark down the settings, because as long as the same antenna system is used, the settings will remain the same. The procedure outlined above can be made for each 25 kc. throughout the 80-meter band, noting the settings at each spot frequency. In this way, one can quickly change frequency and always be sure the system is tuned on the button.

For 40 meters, the same procedure is followed, except that the coil is tapped down from the ends until a good null is obtained. With the antenna system used for testing the coupler, the taps were placed at eight turns in from the ends. However, different antenna systems may take different tap



Top view of the coupler with the high-frequency-range coil in place. The shorting-bar assembly is apparent behind the coil. The low-frequency coil and additional shorting bars are shown at the right.

points, so the correct spots must be found experimentally. Always keep the tap points as close to the ends of the coil as possible, consistent with a low s.w.r. Since the turns on the coil are too closely spaced to accommodate alligator clips, clip points can be made from ordinary soldering lugs soldered to the coil at the proper points.

After the 40-meter settings are noted, similar steps can be followed on 20, 15 and 10 meters. The correct settings for the taps are likely to be more critical than for the lower-frequency bands. In addition, it may be necessary to have more than one set of tap points for the entire 10-meter band.

With the procedure outlined above, it is of course assumed that one has an s.w.r. bridge or can borrow one. If none is available, the coupler can be tuned using an output indicator. An r.f. ammeter can be inserted in series with one of the feeder wires and the coupler tuned for maximum output, as indicated by the greatest reading obtainable on the ammeter. This is not as accurate as the bridge method of adjustment, because one cannot be sure the line between the transmitter and the coupler is perfectly matched. Dial lamps in series with the feedline or tapped across a section of line will also serve as output indicators, as

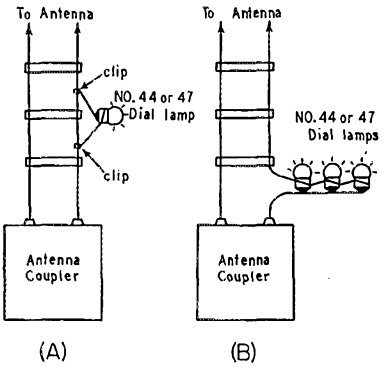


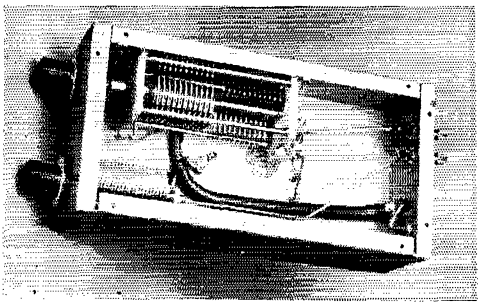
Fig. 3 — Dial lamps serve as an inexpensive output indicator, and either of the two systems shown above can be used. In A, a single dial lamp with one-foot leads is clipped onto the feedline. As the transmitter and coupler are tuned to maximum output, the dial lamp will light up. It may be necessary to move the clip leads up the line to find a point where sufficient coupling is obtained. At B, the dial lamps in parallel are connected in one of the feeders. To start out, all three bulbs should be connected to prevent possible burn-out. They can be disconnected one at a time until the best indication is obtained.

shown in Fig. 3. An absorption-type wavemeter[3] *loosely* coupled to the feedline can be used.

Center-Fed Antennas

A center-fed antenna doesn't have to be a specific length to work well. If you can make the antenna a half wavelength long at the lowest band, fine and dandy. But if your QTH is such that putting up a half-wave antenna would mean tying the far end to your neighbor's TV antenna,

[3] McCoy, "The Baking-Pan Wavemeter," *QST*, February, 1955.



In this view the link capacitor is shown at the bottom and the tuning capacitor at the top. The line connected to the coaxial socket is a short piece of 52-ohm cable.

use a little discretion and compromise with the ideal. A slightly shorter antenna won't show an appreciable difference in performance. The important thing about a center-fed antenna is to be sure that the feedline is connected at the exact center of the antenna and, if possible, that the feedline runs away from the antenna at right angles for a considerable distance. Some amateurs do this by bringing the feedline straight down from the horizontal antenna to a mast or pole and then running the feedline into the shack. The horizontal section of the feedline should, of course, be high enough to clear the heads of any pedestrians.

It is a good idea to make the length of the feedline plus one-half the antenna length a multiple of a quarter wavelength at the lowest operating frequency. A quarter wavelength is found by dividing 246 by the operating frequency in Mc. As an example, suppose the lowest operating frequency is 3.7 Mc.; $246 \div 3.7 = 66\frac{1}{2}$ feet, so half the antenna plus the feedline would want to be $66\frac{1}{2}$ (impractical because it makes either the antenna or the feedline too short), 133, or 200 feet long. If the antenna is 100 feet long, half of this is 50 and the feedline should be either 83 (133 − 50) or 150 (200 − 50) feet long. But if these feedline lengths are inconvenient, don't worry about it too much. Put up the antenna you can, with the feedline coming away from the center, and try tuning it on the bands available to you. There are some combinations that turn out to be a little awkward, but the antenna coupler can handle a wide variety of combinations. If you run up against one it can't, try lengthening or shortening the feedline a few feet.

End-Fed Antennas

The foregoing flexibility of antenna length does not apply to the end-fed "Zepp" antenna. In this case, if the feedline is not to radiate, the antenna length should be a half wavelength long, or a multiple of a half wavelength. Formulas and charts for these lengths are given in the *Handbook*. However, with the right antenna length, the preceding remarks about tune-up procedure hold, except that the preferred over-all lengths involve

(*Continued on page 132*)

• Recent Equipment —

The 75A-4 Receiver

In panel appearance as well as internal arrangement and workmanship the new Collins 75A-4 receiver bears a strong family resemblance to its three predecessors. If this resemblance leads you to believe that the "4" is the same basically as the earlier models, with a few changes here and there that necessitate a new type number, then you had better recall what someone once said about appearances being deceiving. This is far from being a "conventional" receiver; to the best of our knowledge, a number of its features have not previously been incorporated in any manufactured set.

Of course, many of the design points that have been characteristic of the earlier 75A receivers have been retained. The tunable first i.f., working from crystal-controlled converters on each band, is familiar. As shown by the block diagram, Fig. 1, the r.f. section of the receiver is essentially the same as that of the 75A-3, the principal difference

The 75A-4 receiver. Although resembling the earlier 75A series receivers, the new cabinet is deeper and the front panel is less wide.

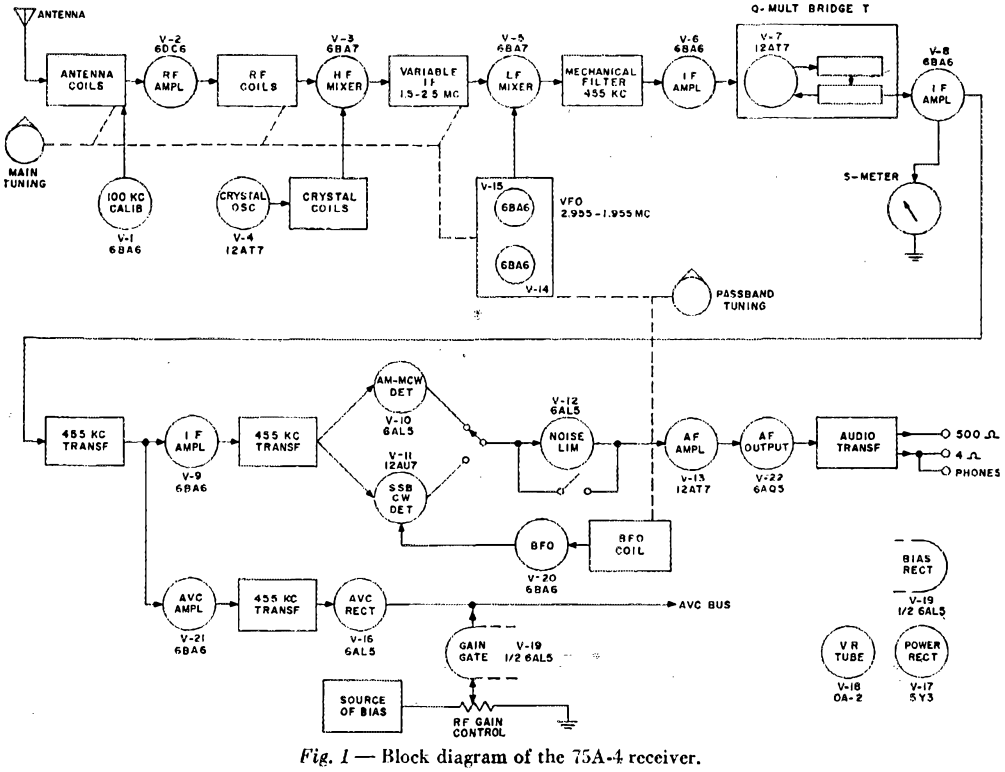


Fig. 1 — Block diagram of the 75A-4 receiver.

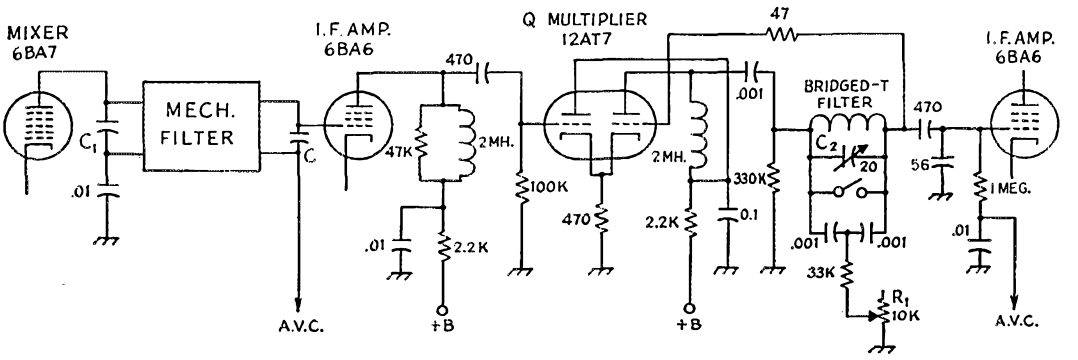
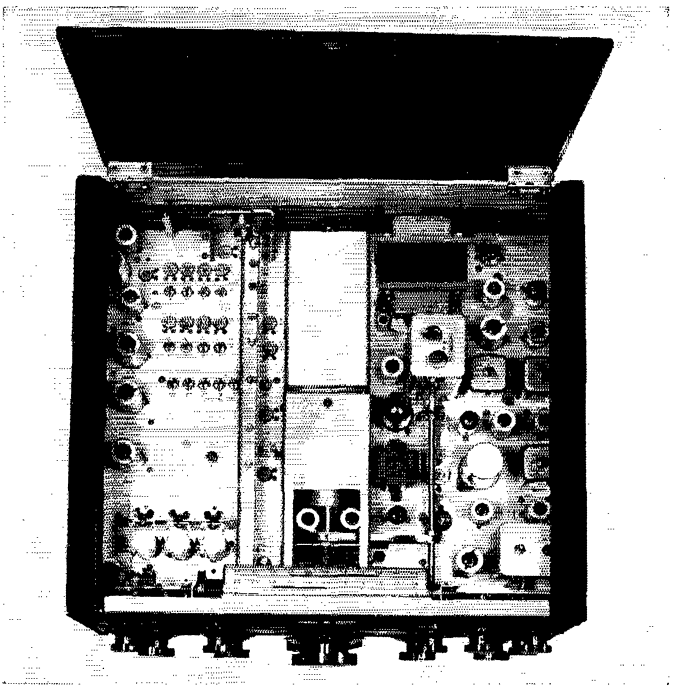


Fig. 2 — The selectivity circuits of the 75A-4. The mechanical filter gives the necessary skirt selectivity, while a bridged-T filter with a *Q* multiplier is used for "notching out" heterodynes. *C* and C_1 are the input and output condensers associated with the mechanical filter. C_2 is the notch frequency control. R_1 is the null adjustment for the bridged-T circuit.

being that a new r.f. amplifier tube, the 6DC6, is used. This tube was selected over other types because it is especially designed to reduce cross-modulation effects. The r.f. and first mixer stages are tuned, as before, by slugs in the coils, ganged with the tuning control of the first intermediate amplifier.

The innovations in this receiver are in the remainder of the circuit. For adjacent-channel selectivity reliance is placed entirely on mechanical bandpass filters; there is no crystal filter of the type that has for so many years been an expected item in a communications receiver. Although the receiver as normally supplied is equipped with only one such filter — one having a bandwidth of approximately 3 kc. — sockets are included for three in the chassis arrangement, and a panel switch is provided for selecting whichever one the occasion requires. Filters having bandwidths of 800 cycles for c.w. reception and 6 kc. for double-sideband reception of an a.m. signal are available. The 3-kc. filter is used for receiving one sideband of a 'phone signal and rejecting the other (if both are transmitted) and in tuning a conventional double-sideband a.m. signal the carrier should be set at one edge or the other of the passband, depending on which sideband is most free from interference. Matched pairs of 3-kc. filters are obtainable, if one prefers to shift sidebands by means of a switch instead of by retuning.

One feature of the old crystal filter that was always useful was the phasing control, for "notching out" an interfering heterodyne. The 75A-4 has a corresponding heterodyne notching-out arrangement, but it uses a bridged-T filter rather than a crystal filter for the purpose. To make the notch sharp and thus not take out a substantial portion of the desired band, the bridged-T circuit is combined with a stabilized regenerative circuit or "*Q* multiplier." As compared with crystal phasing, this has the advantage of giving a sharper notch having a width that remains constant no matter where it is placed in the passband. The selectivity circuits of the 75A-4 are shown in Fig. 2. The bridged-T circuit is tunable over the passband by means of C_2. With R_1 adjusted for good balance,



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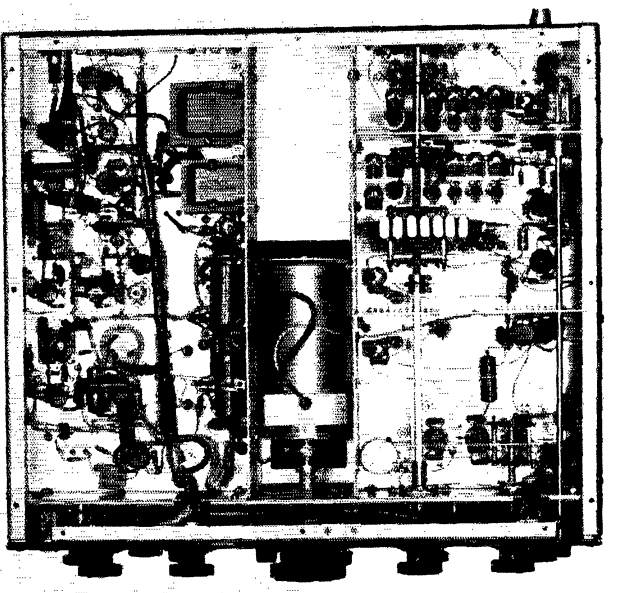
The PTO unit is flanked by the r.f. section, left, and i.f.-power supply section, right. This view shows three plug-in mechanical bandpass filters in place just to the left of the tuning unit.



A sectionalized type of chassis construction is used in the 75A-4, as shown in this photo of the bottom. R.f. tuning circuits and r.f. oscillator crystals are at the upper right in this view.

♦

the attenuation of an undesired heterodyne can be of the order of 50 db., depending on the care with which C_2 is adjusted. The rejection circuit can be cut out by means of the switch across C_2; this switch is ganged with C_2 and operates at one end of the knob travel.

The reception of single-sideband signals has been very much a factor in the design of the 75A-4, and accounts for a number of new features. One of these is the inclusion of two detectors, a regular diode for demodulating ordinary a.m. signals and a "product" or mixer-type detector for s.s.b. and c.w. reception. The latter is a simplified circuit which should be of considerable interest to the s.s.b. contingent. It uses one double triode, a 12AU7, in the circuit shown in Fig. 3. The i.f. signal is fed to the first triode section, which is cathode-coupled to the second section. The b.f.o. voltage is applied to the second-section grid to give electronic switching at the b.f.o. rate. The beat frequency is taken from the plate of this section. Detectors operating on this principle give very good linearity, with the advantage over a simple diode of not requiring excessively large values of beat-oscillator voltage for low distortion. This detector is switched into operation along with the b.f.o.; there is no separate switch for the b.f.o. alone.

In fact, the usual b.f.o. controls are completely missing from this receiver. There is no "pitch" control, in the usual sense. There is a control that varies the beat-oscillator frequency, but it does it in such a way that the tone of the beat note on a c.w. signal does not change. This requires some explaining, and it also requires some practice on the part of the operator to get used to it. The beat note does not vary because the b.f.o. tuning and main tuning are ganged together so that a constant frequency difference is maintained between the incoming signal (in the i.f.) and the beat-oscillator frequency. What would ordinarily be the b.f.o. pitch control is then used for moving a signal back and forth in relation to the passband of the i.f. Collins calls this "passband tuning," and the drawing of Fig. 4 shows how it can be used. With the 3-kc. filter, for example, there is no one point in a 3-kc. range where the signal peaks, as it does with a conventional crystal filter. Outside that range the signal simply disappears. With passband tuning, an undesired signal can be "dropped over the cliff," as shown in the drawing, while retaining the desired signal unchanged. Passband tuning permits holding a single-sideband signal in tune while moving it across the passband to change from one sideband to the other.

The tracking of the b.f.o. and the PTO unit in the main tuning system is done by a mechanical arrangement that rocks the PTO unit from side to side as the b.f.o. control is turned. This requires locking the shaft of the PTO unit, which is accomplished at the operator's choice by means of a front-panel "dial drag" control. The dial drag can be set so that the PTO shaft is held firmly enough to prevent turning when passband tuning is used, but still not so firmly that the regular tuning control cannot be turned. With the dial drag off, the b.f.o. knob can be used as a vernier

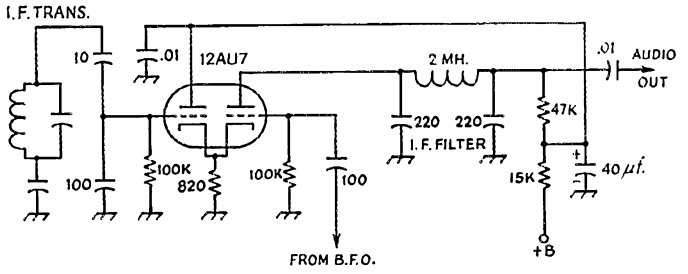


Fig. 3 — The s.s.b.-c.w. detector, a simplified product- or mixer-type detector. Circuit details not essential to the detector operation are not given. Capacitances less than 0.001 are in μμf.

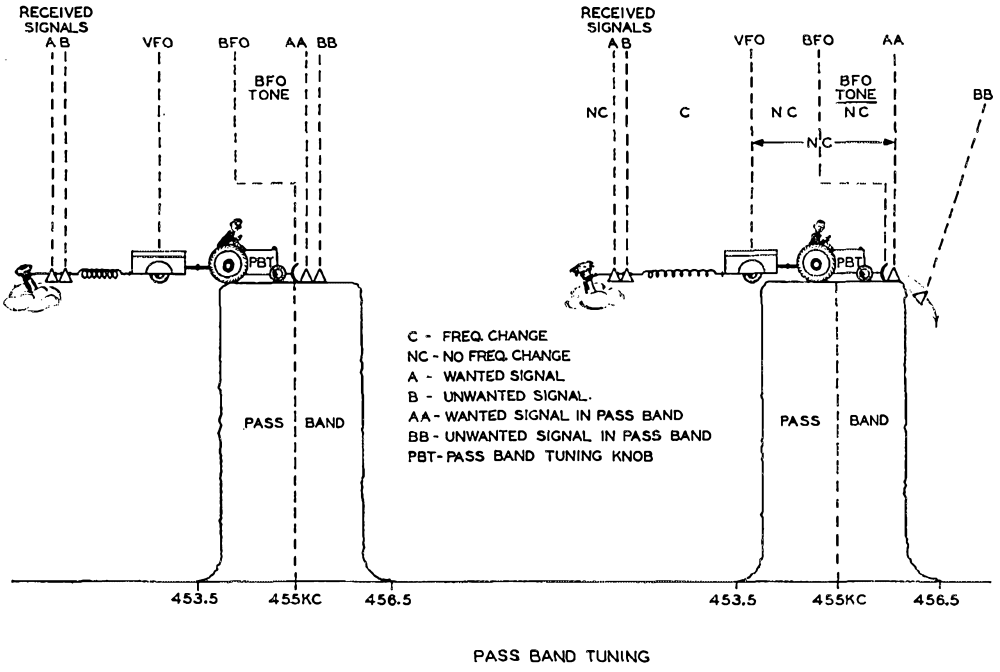


Fig. 4 — "Passband tuning." By ganging the b.f.o. and main tuning control, it becomes possible to move a signal across the passband of the receiver's i.f. without changing the beat note. Interfering signals can be pushed off either side of the passband, depending on whether the frequency is above or below that of the desired signal in the i.f.

tuning control, since in this case the tuning shaft is rocked with the rest of the PTO unit when the b.f.o. control is turned.

The 75A-4 has an amplified a.v.c. system, taken off ahead of the regular detectors, that can be used on s.s.b. and c.w. as well as on a.m. It has a fast attack time and a choice of either fast or slow release. The fast release is used for a.m. reception, normally, while the slow release will hold in between words on s.s.b. signals.

A noise limiter for s.s.b. reception has to meet the same conditions as for c.w. reception — that is, clipping both the positive and negative peaks of the signal. This type of limiter does not ordinarily lend itself well to "automatic" operation such as is generally used in noise limiters for a.m. reception, and earlier 75As used two separate limiters. In the new receiver the two types of operation have been achieved in the rather simple circuit shown in essential form in Fig. 5. The limiter is of the series type using one diode to clip positive peaks and a second connected in reverse to clip negative peaks. For s.s.b.-c.w. operation the threshold bias is from a negative supply in the receiver, but for a.m. reception the bias is the rectified carrier voltage. The threshold in the latter case is fully adjustable, just as in s.s.b.-c.w. reception.

Altogether, the 75A-4 is going to demand a new kind of operating technique on the part of its users, if they hope to get out of this receiver what it is capable of giving. The s.s.b. gang probably will catch on to the fine points in a hurry, since theirs is a relatively open field anyway. C.w. reception with the 3-kc. mechanical filter and passband tuning is considerably different from anything that a confirmed crystal-filter man is used to. On a.m., using the same 3-kc. filter, selectable sideband reception is practically a must, unless you're content to listen to the

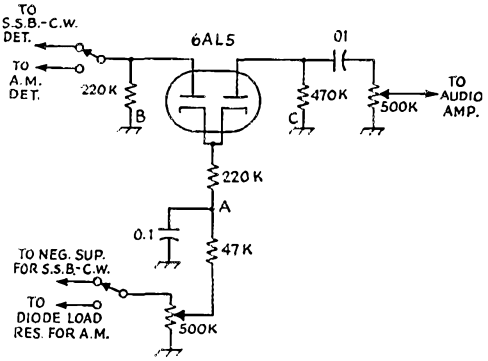


Fig. 5 — Series noise limiter circuit. To make the limiter inoperative, point *A* is grounded and *B* and *C* are lifted from ground.

drummy-sounding voices that accompany tuning the carrier in the center of the passband. This receiver, in brief, has the basic ingredients for coping successfully with present-day interference, but without making concessions to the methods and techniques that were good enough in their day. The latter are now in the "accessory" class, rather than the other way 'round.

— *G. G.*

QST—Volume III

Part II† — Foreword to Sumner B. Young's (WØCO) Index

The use of low-powered *spark sets*, operating on wavelengths *below 200 meters*, as a means of QRM avoidance, was a somewhat more practical suggestion; but it is probable that very few amateurs followed it. The main trouble was the lack of *receivers* capable of being tuned down to 100, 150, or 175 meters; and this difficulty was to continue for some time.[21]

An article describing a spark-coil transmitter for operation on 100, 150, and 200 meters (first suggested in a letter published at 26 to 27, October 1919), will be found at 13 to 14, February 1920.

An improved version of a spark-coil transmitter was later described in Volume IV (by Scott) at pages 55 to 56 of the December (1920) issue. Scott operated on 180 meters, and he suggested the use of waves down as low as 100 meters.[22]

In the February (1920) issue, at pages 23 to 24, and 26, there is a very interesting account of the discussions which occurred at the first Boston Inter-Club Convention. This meeting was called by Guy R. Entwistle, and was held on November 20, 1919. (See 14, January 1920.) Among other things, the use of wavelengths of 150, 175, and 200 meters, by spark-coil stations, was recommended.[23]

The editor of *QST* thought well of this idea; *and he also suggested that all spark stations drop down to 175 meters, and use reduced power, for local and "moderately short-distance work."* [24] [*italics* by S.B.Y.]

The decisions reached at the Boston Conference were referred to, with approval, by Mr. C. A. Service, jr. (Atlantic Division Manager of the ARRL), at pages 19 to 20, in the January (1920) issue.

The most-effective method of dealing with the interference problem, however, was through the use of "time schedules," and rules of operation, enforced by "strong" local or regional clubs or associations.

In this field, the Boston Conference (called by Mr. Entwistle) deserves credit for some wise decisions; although its recommendations as to the enforcement of its policies were not as practical as those which were later developed in Chicago and embodied in the so-called "Chicago Plan."

At pages 19 to 20, January 1920, Mr. Service stated:

. . . The Division Manager wishes to mention a movement among the Boston amateurs which has come directly to his notice, that will sooner or later take form as a nationwide movement in all sections and communities where any radio congestion exists. There was a meeting held of representatives of prominent Boston and New England amateur associations. . . . The situation received a general preliminary discussion, the point of view of the spark coil, the experimenter, the relay station and the local amateur being presented and considered and the following tentative remedies being suggested.

1. Central control station for traffic and communication control, to see all have a fair show and no one encroaches on the rights of others.
2. Use of other waves besides and below 200 meters for local work.
3. Elimination of broadly tuned stations and thoughtless or willful interference.
4. Use of minimum power to ensure reliable communication.
5. Time limits for local and long-distance work.
6. Punishment for persistent offenders.

Amateurs from one coast to the other have been thinking this question over for years and the Boston convention is only one example of what other associations have done or tried to do.[25]

There was also some curiosity, on the part of U. S. A. amateurs, as to what kind of results the Canadian amateurs were obtaining, if they were actually using certain short wavelengths prescribed by law for use in certain locations.

At 27, September 1919, the plight of "Our Canadian Cousins" was discussed by E. T. Scholey, of Toronto:

. . . Perhaps a brief résumé of the Government regulations in Canada would not be out of place. They are rather hard for people living around the Great Lakes, for an amateur station within five miles of a government or commercial station or a

† Part I of "*QST* — Volume III" appeared in March, 1955, *QST*; "*QST* — Volume I" appeared in October, 1954, *QST*; "*QST* — Volume II" appeared in February, 1955, *QST*.

[Footnote 20; continued from p. 52, March *QST*]

Re these *transmitting* experiments, Matthews stated (at 19, July 1920): ". . . Experiments carried on between the Great Lakes Naval Radio Laboratory and a station in Chicago have shown that signals transmitted on underground wires are equal in intensity to those transmitted on any ordinary aerial, the only difficulty being the tendency of the underground wires to 'ground' when any considerable voltage is applied. For this reason only tube transmitters may be used with any satisfaction, although a low-voltage quenched set was used in these experiments with fair results. . . ."

My guess is that transmission and reception of waves shorter than 600 meters by use of subterranean or submarine antennae are *not* presently practised. Very-long-wave *reception*, by submarine or subterranean wires, probably *has* had plenty of attention from Army and Naval experts, recently. But *amateurs* can have little practical interest in such matters. The waves which we use are all too short for such techniques.

[21] Armstrong's superheterodyne, described in the "classic" article at 5 to 9, 15, February 1920, was said to be capable of reception down to 50 meters. See page 5, February 1920. However, these receivers were rarities.

The Grebe type AGP 101 Short-Wave Regenerative, first advertised in *QST* on the inside front cover of the September (1916) issue, was supposed to tune down as low as 150 meters. I suspect this was to allow easy tuning-in of a 200-meter signal.

The Grebe CR-5, CR-8, and CR-9 receivers, as advertised in the fall of 1921, had a bottom tuning range of 150. See 74, September 1921; 78, October 1921; 71, September 1921; and 97, October 1921 — all in Volume V.

At 21, March 1921 (Volume IV), the Clapp-Eastham

route of navigation is restricted to a wavelength of 50 meters for transmission. Up to 25 miles distance the wavelength is 100 meters; seventy-five miles, 150 meters. The power input at the transformer terminals is limited to ½ kw. . . .

Later, some "relaxation" was allowed:

On December 30, 1919, the Department of the Naval Service, at Ottawa, authorized all Canadian amateurs "on the Great Lakes and River St. Lawrence, from Port Arthur, Ontario, to Quebec, P. Q., to use a transmitting wavelength of 200 meters until the reopening of navigation, approximately the 15th of April, 1920." This concession was stated (in the Order itself) to be "in the nature of an experiment"; and the Department further announced that if no interference resulted, it was "prepared to consider a permanent amendment to the regulations regarding wavelengths." [26]

The inquiry, re experiences on short waves, was as follows:

In an editorial called "Greetings, Canadians!" Editor Warner announced that the League's Operating Department had been expanded to include Canadian Amateur Divisions. Then he said (at 15, January 1920):

. . . Can't we be of assistance in working out your technical problems? You are invited to make use of *QST* for this purpose. Relay transmission on 50 meters is an entirely new field to most of us, but we are sure it can be done. *QST* will welcome discussions and articles on this topic. For best results, should the transmission be by the usual spark method, by buzzer modulated v.t. oscillators, or by a big hebuzzer? What kind of a receiver will we have to have to get down to your fifty- or seventy-five meter wave? . . .

It is probable that our "Cousins" decided to put all of their energies into efforts to obtain permission to operate on 200 meters during part (or all) of the year; because I can find no evidence, anywhere in the first 5 volumes of *QST*, that American amateurs were ever given any useful information growing out of any actual use

type ZRFD receiver, tuning down to 175 meters, is described.

In the August (1921) issue, DeForest Radio Tel. & Tel. Co. advertised its Type MT-100 Tuner (150 to 600 meters). See 107, August 1921 (Volume V).

[22] At 48, June 1920, Mr. Bowden Washington, chief engineer of Cutting & Washington, stated (in a letter) as follows: ". . . The writer some years ago put 4.6 amperes into an antenna 15 feet high and 25 feet long at a wavelength of 80 meters and a spark frequency of 1000. . . ." Spark sets would operate on 100 and 150 meters, all right.

At 64, January 1921 (Volume IV), F. B. Llewellyn's letter says that the U. S. Navy used a 52-meter wave for short-distance work during World War One (type of set not mentioned).

[23] 23, February 1921.

[24] See the editorial: "Reducing 'Legitimate' Interference," 17 to 18, February 1920.

[25] At 13 to 14, January 1920, it was stated that the problem of QRM control, at various centers, was becoming "most formidable." Local clubs were urged to grapple with it, and were also invited to affiliate with the League. The Traffic Manager recommended local control of QRM between the hours of 9 P.M. and midnight, "education" of the younger element, etc., etc.

In March (1920), an outstanding article on "Radio Club Organization," by F. H. Schnell and R. H. G. Mathews, was published. See 5 to 6, 21 to 22, March 1920.

The Tacoma Radio Club began controlling local QRM, promptly. See 31, March 1921 (Seefred Brothers' report).

As to efforts made in Baltimore, Md., see 28, June 1920 (Service's report).

The rules and regulations adopted at Chicago, and placed in effect as of July 12, 1920, will be found at 38, August 1920 (Volume IV).

For a full exposition of "The Chicago Plan,' see Mr. Mathews' paper, published at 23 to 25, May 1921 (Vol. IV).

As to the later spread of the Chicago Plan, see the follow-

of 50-, 75-, or 100-meter wavelengths by the Canadian hams.[27] *An opportunity to "discover something" surely was missed.*

This is an outstanding example of "how a horse can be led to water, but can't be forced to drink." And here, the "horse" evidently did not fancy the looks of the "water" which was in the short-wave "trough." *The 50-, 75-, and 100-meter waves must have appeared to be pretty useless, except for short-distance work on spark transmitters.* Amateur tube sets, operating on waves as short as these, were unknown; and when it came to receivers, most hams could reach only a very short distance below 200 meters. Personally, I can't blame the Canadian amateurs for acting as they did.

The real lesson appears (to me) to be this: In radio communication work, that which appears useless, or of little value "today," may be of considerable use, and of high value, "tomorrow."

A small amount of international traffic began to be handled between Canadian and U. S. A. amateur stations, at a few points.[28]

The League and its members could not give all their attention to the technical development of amateur radio, by any means. Postwar days brought a wave of proposed radio legislation.

The leading article on the subject, in Volume III, is entitled "The Amateur Situation," published at 5 to 6, September 1919.

This reports a visit of a League representative (or representatives) to Washington, and the discovery that the Secy. of the Navy had addressed a letter to both houses of Congress, setting forth the "Views of the Navy Department in connection with certain aspects of radio communication." (This was known as "Document No. 165.")

A subcommittee of the Senate Committee on Naval Affairs, headed by Senator Poindexter, was found to be functioning as a special commission to study conditions. It was then reviewing the status of "world-wide radio" problems.

The subcommittee had asked the Navy Department to tender a draft of a law embodying

ing references in Volume IV: adopted in Boston (Entwistle), 35, July 1921; Atlanta Radio Club adopts it (Merritt's report), 37, July 1921; adopted, with modifications, by Cleveland amateurs (Mathews' report), 47, April 1921; a scheme modeled on it is adopted in the Minneapolis-St. Paul (Minnesota) area. (Pray's report), 38, December 1920; advocated for country-wide use (by Scholtes), 22, April 1921; a lecture by Mathews inspires adoption of a similar scheme at Philadelphia, 42, April 1921.

[26] 8, March 1920.

Some Canadian hams later received special licenses allowing year-round operation on 200 meters. Canadian 9AL (at Toronto), for instance. See 38, June 1921 (Volume IV).

Note that the Canadian hams (despite their hard luck in other matters) got back on the air after World War One sooner than we did. J. O. Smith (at 16, September 1919) reported them as already being in operation; but he failed to give the date when this reopening had occurred.

[27] At 28, July 1920, in Service's report, there is a statement that "W. T. Fraser, District Superintendent Western New York, reports that tests with Toronto, Ont. were very satisfactory. No trouble was experienced in working them, but since navigation was opened they are allowed only (a) 50 meter wavelength. . . ."

At 34, July 1920, in Russell's report, we find these words: ". . . with the opening of navigation the wavelength allowed amateurs automatically dropped to the old 50 meters, thus pretty effectively cutting off any long distance work. . . ."

At 27, August 1920 (Volume IV), Russell notes the refusal of the Canadian authorities to allow the Canadian amateurs to remain on 200 meters during the navigation season. On the same page, he remarks that "This decision by the Naval Department emphasizes what has been preached by all the leading amateurs of this Division [the Ontario — *S. B. Y.*]; i.e., that c.w. transmission is the only solution for amateurs in Ontario compelled to work on so short a wave. . . ."

At 31, September 1920 (Volume IV), it is announced that

the desires of the Navy, as expressed in "Document No. 165," so that the subcommittee could study the same.

In the House of Representatives, the matter was in the hands of the Committee on Merchant Marine and Fisheries.

The article (in the September, 1919, *QST*) describes the contents of the Secretary's letter ("Doc. No. 165"), as follows:

. . . After reviewing the situation in detail from the Navy standpoint, the letter asks (1) the appointment of a special commission to study radio problems; (2) authorization to the President to designate specific bands of wavelengths for different classes of work; (3) a Navy monopoly of ship-to-shore radio; (4) a Navy monopoly of transocean and international radio; (5) authorization to use Navy radio stations for commercial and press business; (6) authorization to the Navy to assist American enterprise in the general development of American radio.[29] . . .

This article's recital of the discussions between the League's emissary (or emissaries), and the Navy Department (at Washington), merits extensive quotation. Note, also, that the late President Franklin D. Roosevelt was then Asst. Secretary of the Navy; and that in the absence of Secretary Josephus Daniels (who was then in Hawaii), he acted as one of several spokesmen for the Department in these talks.

. . . We found the Navy Department surprised that we should feel any alarm over the proposed legislation, as they point out that no mention of amateurs is made and that the amateur situation was not even considered by them in this matter. In turn, however, we have been obliged to point out to the Navy that they previously attempted to eliminate us and that the resulting skepticism, coupled with their postponement of our reopening August 1st as planned, causes the amateur to regard with distrust any move on their part to get control of radio. We really wanted to ask what assurances they could give us that, if they secured control of all radio, the stringency of restrictions would not be increased to an extent resulting in our virtual elimination; but the legislation is not yet drawn up and we found the gentlemen wholly in sympathy with the cause of the amateurs and desirous of dispelling the distruct with which we have been regarding them. We told them we desired *recognition* in their contemplated legislation; i.e., rather than make no mention of amateur radio and leave our future to the discretion of some individual, we wanted our status defined in the new bill. The Office of the Director of Naval Communications, which is handling the matter, then invited us to tender our views of how the amateur should be recognized in the new law, and accordingly, as *QST* goes to press, a meeting of the ARRL Board of Directors is being called to formulate our ideas for presentation to the Navy Department and it is probable will also arrange to have us represented in force at the hearings of the bill, to make sure that nothing goes wrong, and that nothing inimical to our interests is contemplated in the Navy's request for "a comprehensive system of regulation and control" to achieve "the full utilization of radio for internal communication."

We are surprised to find no apparent connection between the postponement of our reopening on August 1st and the simultaneous request of the Navy for new legislation. They deny that we were held up to enable them to railroad thru a bill which would endanger us before their control automatically expires with a declaration of peace. But the sad fact remains that we are *not* opened, and no information is forthcoming *why*. Mr. Daniels is in Hawaii and the Assistant Secretary of the Navy stated Mr. Daniels personally disapproved the opening order and that he (Mr. Roosevelt) did not know why. . . . We pointed out to Mr. Roosevelt the bad odor overhanging the whole affair and the extreme desirability of a statement by the Navy explaining why we are held up and what we may expect, if the suspicion with which the amateur world regards the Navy Department is to be eliminated. Mr. Roosevelt promised to immediately radio Mr. Daniels,

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Canadian 5BR, at Vancouver, B. C., is operating a half-kilowatt transmitter of some undisclosed type on 100 meters (Mumford's report). This probably was a spark set, I think.

The *requirement* that a 50-meter wavelength be used during the navigation season is referred to as a *handicap* in an editorial at 29, February 1921 (Volume IV).

Canadian 9AL had a special license to use 200 meters. See 38, June 1921 (Volume IV). This is in Russell's report.

In Hertz's report (32, April 1921, Volume IV), it is stated that the synchronous 360-cycle spark transmitters, found on some Canadian ships and shore stations, and used at one Canadian amateur station (5PC), might do well on short waves.

At 34 to 35, August 1921 (Volume V), Russell declares: "The short wavelength allowed the amateurs near routes of navigation makes it extremely difficult to do any DX work, although certain amateurs (ex-commercial operators), have been able to get licenses for 200 meters for all the year round. . . ."

The new April 1, 1922, Canadian regulations allowed general amateur stations to use spark on 180, and c.w. on 200 meters. Amateurs with special station licenses were permitted to use 275 meters on c.w., and 200 on spark. (See Russell's report, at 46, June 1922, in Volume V.)

Canadian 3GN (H. R. Byerlay, of Ingersoll, Ont.) operated his spark transmitter on 170 meters, and found that this was disadvantageous, because few receivers could tune down that low. He wanted to try 140–170 meters, but believed the receiver situation was even worse, down there. (See his letter, at 62 to 63, April 1922 Volume V.)

[28] At 17, September 1919, Entwistle asked amateurs in northern Maine and N. H. to coöperate with Albert J. Lorimer, of Montreal, in developing some trunklines between Canada and the Northeastern U. S. A.

At 26, March 1920, J. O. Smith said: ". . . The managers of the Atlantic, Central, Rocky Mountain and Pacific Divisions report, however, that considerable traffic is now being handled across the border. . . ." The reports cited don't support such a broad statement. Maybe they were cut down before publication.

Traffic Manager Smith, at 26, May 1920, stated: ". . . There has been much activity among Canadian amateurs during the past winter, and parts of Canada not heretofore represented in active relay work have become closely connected with activities in the states, by means of the trunk lines of the League, which have been extended into Canada with such excellent results. . . ."

Russell's report for the Ontario Division (at 33, June 1920) recites that ". . . Permanent daylight communication has now been established from Toronto to Buffalo via 8ZM, and the new Niagara Falls station should also be in working order by the first week in May. . . ."

Lorimer's report re the St. Lawrence Division, at 45, June 1920, says:

"The route from this division to the United States was opened much sooner than had been anticipated and is now open for traffic.

"The attempt to work direct with 2SZ at Troy, N. Y., failed. Normally the Albany stations are QSA here.

"We have been advised by N. P. Mason of Plattsburg, N. Y., that his station 8BB could bring our route

and we hope to know soon just where we stand. Apparently Mr. Daniels personally is responsible. The whole proposition is so basically unjust, so uncalled for, that we do not believe it will long obtain.[30] . . .

Further news on the legislative "picture" was given in another editorial, at 11 to 12, October 1919. (This one was entitled: "Daniels Only Knows.")

The ARRL had caused a Resolution to be introduced in Congress, known as House Resolution 291. This had requested the Secretary of the Navy, "insofar as compatible with the public safety, to furnish reasons why the restrictions [had] not been removed." This document had been referred to the House Committee on the Merchant Marine and Fisheries.[31]

After reciting these facts, the editorial then reported that on August 28, 1919, the Navy Department had furnished to the Senate Committee on Naval Affairs a tentative draft of its new Radio Bill — the so-called "Government-monopoly" law.

The objections of the amateurs are thus stated:

. . . the big thing is that instead of providing regulations for wavelength, power, etc., this bill would provide for the existence of a technical radio committee, composed of one representative from each department of the government, who in closed session would formulate and promulgate regulations concerning wavelength, power, decrement, purity, operating procedure, etc., for all the classes of stations. This new law states we should use no wavelength except that set for us by the committee, and then leave the regulations to be framed from time to time at the discretion of the committee instead of being definitely set forth in the law. This is small assurance for the continuance of amateur radio, with our destinies entirely in the hands of a government committee who would not be empowered even to hold public hearings where the affected classes of stations could explain their cases. . . .

The November (1919) issue of *QST* reported (see page 4, November 1919) that the Navy's proposed Bill had "died in Committee," and had not even been "reported out." [32]

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Part III of WØCO's index to Volume III of *QST* will appear in a subsequent issue. — Ed.

thru New York State to Albany, N. Y. A quick test was arranged from 2BF (Can.) and communication established with 8BB with little trouble.

"8BB can route traffic east to 1VB at Hanover, N. H. and south to 2SZ and 2BM. As soon as an operating schedule can be arranged we will be able to handle traffic for points in Quebec.

"District Superintendent Jarest reports considerable activity in the vicinity of Levis, with new stations coming along fast. He will attempt to work a route thru to Northern Maine which will connect with the Atlantic route north of Boston. . . ."

At 31 June 1920, Pray's report contains the following paragraph:

". . . Mr. Gjelhaug, Dist. Supt. for Northern Minnesota, reports that he has been testing with the station of the Radio Club of Winnipeg and expects soon to have a route across the border that can handle traffic regularly. He has had some correspondence with the Winnipeg Board of Trade, with some very good suggestions, regarding the status of radio relay work, which is expected to speed things up in that direction."

[29] 5, September 1919.

Just what "American enterprise" there would be left, to "assist," if such a law had been enacted, I don't know.

[30] At 13, August 1919, an editorial called "The Lid" had reported the collapse of an expectation that the ban on transmitting would be lifted on August 1, 1919. The Navy Department had stated that the restriction would continue until the President should declare that a state of peace existed.

At 6, September 1919, it is said: ". . . Mr. Roosevelt stated we would be released 'as soon as Mr. Daniels would permit it' and in response to an inquiry addressed by a Senator, wrote that 'the Department has decided to remove the war-time restrictions on radio coincident with the proclamation of peace by the President.' . . ."

[31] This Resolution was not effective. However, Hon. William Stedman Greene, Chairman of the House Committee on The Merchant Marine and Fisheries, later prepared another (and similar) Resolution (H. J. Res. 217), directing the Secretary of the Navy to remove the Amateur restrictions. This evidently caused the Navy to act. See "The Champion of the Amateurs," at 5, November 1919.

[32] This was not the last to be heard from the so-called "Poindexter Bill," however. See 5 to 6, 12, December 1920 ("Dangerous Legislation Confronts Us"); and 28, June 1921 (both references are in Volume IV).

April 1930

. . . The first editorial announces the ARRL Board of Directors meeting in Hartford on May 2nd and 3rd. In the second, Editor Warner expresses his pleasure concerning the increased occupancy of the 20-meter band, although he states that it isn't as great as it should be. In the last, note is made of the effect of sun-spot cycles upon the usefulness of high frequencies.

. . . The background and importance of amateur radio is the theme of a report concerning President Maxim's recent testimony to the Senate Committee on Interstate Commerce.

. . . Technical Editor James Lamb tells about experiments above 28 Mc. using new u.h.f. transmitters and antennas. NKF, the radio station of the Naval Research Laboratories, is the site of the investigations.

. . . The "Old Man" continues his war against the out-of-band boys in "Say, Son."

. . . "The Superiority of Screen-Grid Detectors" is persuasively discussed by Rydberg and Doty. Shown in the article is an experimental receiver using a UX-224 detector and a UY-227 audio stage.

. . . An a.c. operated receiver for c.w. is described by W8AYO. It features good performance on 20 meters and a low hum level.

. . . In "The ABC of Filter Design," Paul Zottu covers the subject in a simplified manner with practical mathematics.

. . . A multirange capacitor is described in "Revolutionary — and How!" by Otto Luther. It provides longitudinal as well as rotary motion of the shaft.

. . . "Radio-Controlled Airport Lights," by Belgrave Gostin, gives a résumé of recent tests in this new electronic application.

FEED-BACK

W3OTC writes that the microphone transformer used in his 50-Mc. mobile rig (January *QST*) should have carried the type number A4705 instead of A4708. Actually, any small microphone transformer will do, of course.

Hints and Kinks For the Experimenter

OPERATING THE HEATHKIT MODELS VF-1 AND AT-1 AT 21 MC.

Without modification of one unit or the other, the VF-1 and AT-1 will not operate in combination at 21 Mc. The transmitter was designed for Novice use with crystal control. It employs a 5-Mc. crystal and operates with the oscillator plate circuit tuned to 10.5 Mc. when output at 21 Mc. is desired. In designing the VFO, however, it was desirable to produce a device with universal application, which would work with a majority of transmitters and use a minimum number of basic oscillator frequencies. As a result, the VF-1 was designed to deliver 7-Mc. output and must be followed by a frequency tripler if 21-Mc. excitation or output is to be made available. It is in this way that the incompatibility (at 21 Mc.) of the two units developed. Needless to say, the next model revision of the AT-1 will incorporate changes to clear up the matter.

Those who own Models VF-1 and AT-1 may make a simple modification to the transmitter which permits the VFO to be used "as is" for exciting the rig at 21 Mc. The change consists of adding a s.p.s.t. wafer switch to the plate circuit of the AT-1. The switch is used to open the 10.5-Mc. tap on the oscillator plate coil whenever the transmitter bandswitch is set at the 21-Mc. position. With the main switch so set, and with the new switch in the open position, the oscillator tank will cover the 7-Mc. range necessary for tripling into the 21-Mc. band. Naturally, with this method of operation, the 7-Mc. output from the VFO is fed straight through the oscillator to the grid of the 6L6 and the final is operated as a tripler.

The new switch should be mounted on the front panel of the AT-1 to the lower left of the meter. This places the wafer of the switch in front (as seen from the rear of the transmitter) of the oscillator plate coil. In rewiring the circuit, first disconnect the lead that runs to terminal No. 2 (see pictorial No. 2 of the Heathkit manual) at the top of the oscillator coil. Now, connect this lead to the rotor contact of the new switch and then add a short lead between the stator contact of the switch and terminal No. 2 of the coil. In other words, the s.p.s.t. wafer is wired in series with the 10.5-Mc. tap for the oscillator inductor.

Obviously, this extra switch does not represent the "ideal" in convenience. However, for those who wish to operate at 21 Mc., it is a far more desirable modification than would be one involving alterations to the VFO circuit. Furthermore, the change can be accomplished without any great expense or difficulty and permits making use of 21-Mc. dial calibration of the VF-1.

— *E. B. Mullings, W4MKZ/8*

—···—

Although the popular Heathkit type AT-1 transmitter works properly when using crystal control, it will not perform satisfactorily at 21 Mc. when used in conjunction with the Heathkit model VF-1 VFO. The reason why the two units do not work together at this frequency has been explained by W4MKZ/8 earlier and need not be repeated here. However, the method used here at W9RQT to remedy the condition may be of interest to those who do not wish to drill into the panel of their AT-1. The operation requires the addition of a single padder capacitor to the VFO and necessitates absolutely no modification to the transmitter. It does, however, eliminate the 11-meter range of the VF-1.

With the original VFO circuit, excitation for the 11-meter operation of a transmitter is obtained by switching in a padder that provides a VFO tuning range of 6740 to 6808 kc. This particular capacitor is the 4.5- to 25-$\mu\mu$f. job shown at the lower left-hand corner of the diagram for the model VF-1 (see Heathkit manual). By increasing the effective capacitance of this padder, it is possible to obtain a VFO range of 5250 to 5362 kc. I used a 50-$\mu\mu$f. silver mica as the new padder, but there is sufficient space available for the installation of a variable capacitor if the latter is preferred.

With the new set-up, the VFO unit is set at the old 11-meter position and the transmitter bandswitch is adjusted to the normal 21-Mc. position for output at the latter frequency. The 5-Mc. output from the VFO is then doubled in the AT-1 oscillator plate circuit and the final of the transmitter operates as a doubler as before.

The output coil for the VF-1 should be readjusted to peak the output at the new tuning range and the 11-meter scale of the dial can be recalibrated in terms of 21-Mc. frequencies. Excellent bandspread — nearly 180 degrees of the main tuning control — is obtained at 21 Mc. with the modification completed.

— *Richard O. Bremigan, W9RQT*

GROUNDING SHAFTS OF VARIABLE CAPACITORS

Lacking other means of grounding ¼-inch shafts on variable capacitors, a small Type 8 grid cap (for 6J7s, etc.) slipped over the shaft behind the panel, and tied to ground with a sturdy wire, makes a very effective sliding contact.

— *D. B. Angel, W8DBF*

GROUND AND POLARITY TESTER

IN the interest of safety, it is advisable to test all leads to ground (earth) for resistive characteristics. A resistive circuit or lead to ground is not a safe one and may not be depended on as a means of preventing accidental shock.

The simple circuit shown in Fig. 1 may be as familiar to many hams as it is new to others,

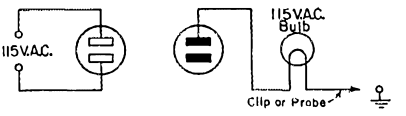


Fig. 1 — Diagram of the simple ground tester described by W4UEB.

but it does provide one of the quickest means of checking the effectiveness of a ground lead. An ordinary lamp bulb of almost any wattage rating is used as the indicator for the tester. One terminal of the bulb is connected to a standard 115-volt plug and the second terminal of the lamp is connected to a heavy clip or probe which in turn is used to make contact with the ground point under test. The bulb will light to full brilliancy when connected between the a.c. line and a good ground point. On the other hand, less than normal brilliancy indicates a poor ground connection.

A second use for the simple circuit is that of testing for either the hot or the grounded side of the a.c. line. The bulb will light when the active side of the plug makes contact with the hot side of the a.c. receptacle and will fail to glow when contact is made with the grounded side of the line.

— *Joseph A. Wright, jr., W4UEB*

[EDITOR'S NOTE: Two precautions should be observed when using the lamp-bulb ground tester. When testing the effectiveness of a lead, make sure that the test lamp is lighted to full brilliancy by checking it against a lamp of similar rating that has been plugged into a convenient 115-volt socket. Second, when attempting to determine the polarity of an a.c. outlet, make sure that the test lamp is a good one; remember, a *burned-out lamp won't glow* even when connected to the *hot* side of the line.]

MODIFYING COMMAND TRANSMITTER RELAYS FOR 6-VOLT OPERATION

WHEN modifying Command transmitters, many hams discarded the seemingly useless antenna relay — the one with two coils and no standard contacts. Fortunately, I saved mine and have since found a good use for the units.

The keying relay for the transmitter is ideally suited for mobile gear because of its compact size and pair of s.p.s.t. contacts, but it won't operate on 6 volts. However, the 300-ohm coil for this relay can be easily replaced with one of the 90-ohm coils from the antenna relay. To complete the transfer, it is necessary to reduce slightly the length of the core for the 90-ohm winding, and this job can be quickly done with a hack saw and file. Removal and relocation of the coils is a simple task because each is held in place with a single flat-head screw.

The modified relay (Fig. 2B) really works on 6 volts and draws only 70 ma. or so from the battery. And the compactness involved is enough to catch the eyes of any mobile fan.

— *K. M. Isbell, W6BOQ*

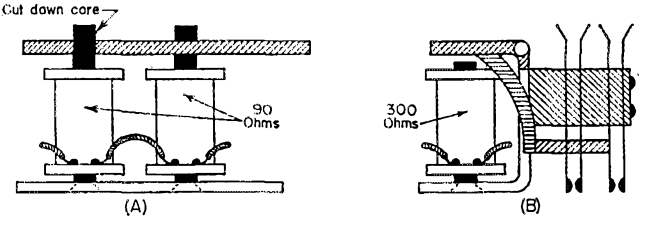


Fig. 2 — Drawings of the Command transmitter relays. The 300-ohm winding of B is replaced with a 90-ohm coil from A in the modification suggested by W6BOQ.

SIMPLE V.H.F. R.F. OUTPUT INDICATOR

AN inexpensive trimmer capacitor and an ordinary pilot lamp, wired in series as shown in Fig. 3, makes a useful output indicator for v.h.f. transmitters. An indicator of this type is especially helpful at v.h.f. where one of the most common indications of circuit resonance — minimum plate current — is frequently difficult to observe.

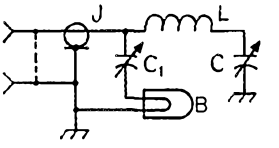


Fig. 3 — Circuit of the simple v.h.f. output indicator. *C*, *L* and *J* are transmitter components; *B* and *C*1 are indicator components.

The indicator may be permanently connected across the series-tuned output circuit of a transmitter. A 3–30-$\mu\mu$f. trimmer and a 60-ma. bulb are used with the 30-watt rig here at W2FFY. The power consumed by the lamp, about a tenth of a watt, is negligible. By adjusting the trimmer and by employing lamps of various current ratings, the indicator circuit can be used with a wide range of power levels.

In addition to providing means for indicating maximum power output, the arrangement provides a continuous check on transmitter performance. The fact that the indicator is permanently connected across the output circuit prevents the need for retuning as is frequently the case when plug-in or clip-on indicators are temporarily installed.

— *George E. Hyde, W2FFY*

Correspondence From Members-

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

T.R.F. FOR S.S.B.

49 Claude Ave.
Denville, N. J.

Editor, *QST*:

I had an interesting experience recently which made me wonder if it had occurred to anyone else.

I set up an old SW-3 receiver (vintage of the 30s) for the first time in many years. After getting it into proper operating condition, I was checking it against my present modern superhet receiver and suddenly decided to see how it would perform on single-sideband signals. Quite a surprise! It performed remarkably well and proved in some respects comparable to the superhet.

For some time the general method of receiving single-sideband signals on a modern superhet receiver has called for the a.v.c. off, the beat oscillator on, the a.f. gain control up and the r.f. gain control varied according to input level; then starts the job of carefully tuning the b.f.o. for proper demodulation.

Well, the old t.r.f. doesn't have a.v.c., is decently selective in its c.w. condition, has good sensitivity (controllable) and readily demodulates single-sideband signals. It has, of course, the disadvantage of being easily overloaded by excessively strong signals. However, for only three tubes it proved to be a remarkably usable receiver.

. . . All of this to prove that a receiver designed for conditions approximately twenty years ago is still acceptable for a method of transmission that was virtually unheard of in Hamdom at that time.

— *W. J. Hicks, W2HQG*

INTERPLANETARY TRAFFIC

138 Cordova St.
Syracuse 5, N. Y.

Editor, *QST*:

A suggestion to the traffic-handling fraternity. We who deliver overseas messages should be careful of the abbreviation MARS, whether by telephone or in writing.

Recipients of overseas messages can get some pretty wild ideas for which they can hardly be blamed. Is it their fault when we deliver to them a radiogram, the origin of which is, for example, "Korea via MARS," particularly when the remainder of the message is obviously genuine?

Unless we wish to perpetuate the general impression of ham radio as being a "kid's hobby" by adding this additional Buck Rogers angle of "———via MARS," it would be better when delivering overseas radiograms to mention that organization by its full name or punctuate the abbreviation.

— *Jerome Blaisdell, W2IEP*

SINES

3434 74th Ave., SE
Mercer Island, Wash.

Editor, *QST*:

I don't like to write to the editor, but my subject hardly has the makings for an article for *QST*, so guess I gotta do it this way.

Here's the deal: Almost without fail on a c.w. contact (as well as 'phone) names are exchanged. Right? You know — ur sigs hr are RST xxx; name hr is . . . ., etc. That's fine for 'phone — doesn't take any longer to say "Uncle" or whatever, than to say "Ed" or sumpin. But . . . I've pounded brass commercially, in the Navy, and on ham circuits for nearly 50 years and in Navy and commercial work any "code" man who bothered with a name for a designation was "out of this world" or "sissy" or something. No respectable code operator (including railroad telegraphers, Western Union, RCA, Press Wireless, Mackay Radio, etc.) would even think of using anything but a sine of two, maybe three, and occasionally only *one* letter! This, of course, was born of the practice of pinning down the commercial, Navy, or private telegrapher who actually receipted for the message, so the responsibility, in case of error, could be fixed. You know . . . dispatcher sends a train order and FS receipts for it by sending . . _ . . . which (in International Morse) is his "sine." Or, an RCA man in New York sends one to Stavanger, Norway; it's receipted by Gustave somebody-or-other. Does he spell out R NR 1 GUSTAVE? Not by a darned sight — it's R GV and that's that!

My point is, let's write it up and boost it along in *QST* — c.w. men use sines of two or three letters. (Max, if it happens to be the guy's name, is also a good sine); 'phone men continue using *names!* Take a name like mine — just ain't no abbreviation worth a hoot, so I spell it all out, H-O-W-A-R-D? Not me! I've been using YB for a "sine" for better'n 40 years, and betcha I'm better known in ham, Navy and commercial circles than I'd ever be as Howard!

How about it — sines for c.w. men — names for 'phone operators — who'll go along with me on this?

— *Howard S. Pyle, W7OE*

REAL TECHNICIAN

3776 Moorpark Avenue
San Jose 28, Calif.

Editor, *QST*:

On the issue of allowing Technician Class holders to operate on a lower band. . . .

The question, I think, is not one of which to allow — 2 or 6 meters — but whether to allow either! Along with quite a few other hams, some Technician holders like myself, I do not want lower frequencies.

There are quite a few Novices who also hold Technician licenses and who will want to use them only after they have failed their General code test. They are mainly the ones who want these extra privileges even though they have done nothing to deserve them! They are seeking only easy operating conditions.

I have never held or ever will hold a Novice license. My sole purpose in amateur radio is to experiment with transmission on high frequencies, which I thought when I obtained it, was the Technician's purpose. I feel that any changes in its privileges would defeat this well-founded idea!

— *Ron Rodd, K6IOM*

IT'S REALLY SO

25 Hilltop Road
Philadelphia 18, Penna.

Editor, *QST*:

For many years now my fellow amateurs and I have been following the activities of the "Podunk Hollow Radio Club" as duly depicted on many covers of your excellent journal, *QST*. For an equal number of years I have been wondering what the significance of said organization might be. Granting the obvious fact that the purpose of the "Podunk Hollow Club" is aptly to demonstrate the foibles of club activities, we yet wonder about the selection of the term "Podunk Hollow" as the surreptitious name of the locale from which the club derives its members.

Having recently completed extensive research into the subject (quite by accident — began and completed fifteen minutes ago), I have discovered the real significance of the term "Podunk Hollow," which has been hidden from the members of the League. At first, one might suppose the term "Podunk" to be employed in the sense meaning countryish, small-townish, or hick. However, my research has disclosed an entirely different definition of the term — or rather the full term "Podunk Hollow."

This evening (the rig being out of commission), I pulled down a rather archaic volume from my father's bookcase,

(*Continued on page 148*)

A.R.R.L. CONVENTIONS

FAR EASTERN PACIFIC DIVISION

Agana, Guam — April 16th–17th

The Marianas Amateur Radio Club is sponsoring the first ARRL convention to be held so far from Stateside. It will be held at Guam on April 16th–17th, and is under the jurisdiction of the Director of the Pacific Division. The convention has been approved by the military and all commands have been urged to coöperate. In conjunction with the convention, the Governor of Guam, Honorable Ford Q. Elvidge, has proclaimed the week of April 11th–17th as Radio Amateur Week of Guam. The program will include talks, papers, and discussions on interference, radio jamming, traffic handling, MARS program, civil defense, antennas, newest amateur equipment, single sideband, on-the-air courtesy, TVI, and harmonic suppression for those who rotate back to the States or foresee the coming of TV out "this-a-way." Civilians must make their own arrangements for quarters and eating. Further details may be had from the Marianas Amateur Radio Club, P. O. Box 145, Agana, Guam.

OREGON STATE

Portland, Oregon — May 7th–8th

The ARRL Oregon State Convention, sponsored by the Oregon Amateur Radio Association, will be held May 7th–8th at the Portland Armory. Preregistration closes on April 25th. Those wishing to sign up early should write Helen M. Wise, W7RVM, 4311 S.E. Salmon St., Portland. Included on the program are lectures, contests, swap and shop, and tours. A fashion show and luncheon is planned for the ladies. The banquet will be held at 4:30 to enable those traveling long distances to attend. Preregistration fees: licensed amateurs, $7.50; nonlicensed, $3.50. Door fee: $8.00 and $4.00 respectively.

COMING A.R.R.L. CONVENTIONS

April 16th–17th — Far Eastern Pacific Division, Agana, Guam

May 7th–8th — Oregon State, Portland, Ore.

May 21st–22nd — Pacific Division, Fresno, Calif.

June 10th–12th — West Gulf Division, Fort Worth, Texas

June 11th–12th — North Dakota State, Bismarck, N. D.

June 11th–12th — Southeastern Division, St. Petersburg, Fla.

August 12th–13th — Roanoke Division, Old Point, Va.

October 8th–9th — Central Division, South Bend, Ind.

October 22nd–23rd — Midwest Division, Omaha, Neb.

Edison Award to W6VFT

Benjamin S. Hamilton, W6VFT, was recipient of the 1954 General Electric Edison Amateur Radio Award at a ceremony dinner held in Washington, D. C., on February 10th.

Congratulations are extended to Benjamin S. Hamilton, W6VFT (*left*), by FCDA Chief Val Peterson after the Edison Award was presented to him by J. M. Lang (*center*), manager of the GE Tube Department.

W6VFT, who resides in La Mesa, Calif., organized a top-notch radio network in San Diego county composed of an active 200-man civil defense radio system. In addition, he planned operational activities, wrote equipment specifications, and laid out the required physical facilities. Furthermore, he established an excellent communications system for the San Diego Chapter of the ARC. Mr. Hamilton serves as a communications officer with the 40th Division National Guard and is also an ARRL Section Emergency Coördinator.

Judges for the award were former Governor Val Peterson of Nebraska, FCDA administrator; Honorable E. M. Webster, FCCommissioner; E. Roland Harriman, president, ARC; and ARRL President Goodwin L. Dosland, WØTSN.

The presentation ceremony was held at the Mayflower Hotel. Principal speaker for the occasion was Mr. Peterson, who paid this tribute to the importance of amateur communications: ". . . No matter how effective an enemy attack is, it can never destroy all of the amateur radio installations — the 120,000 of them — and that is why they are so important to civil defense and to the nation. . . . I am not sure but what the first communications in the first few hours after an attack will be by amateur radio."

A special citation was also given to Carl J. Theis, W8BKH, who designs and builds radio equipment for use by Baptist missionaries in Liberia. Another special citation went to Carter Rogers, W8NCS, who operated continuously for 16 hours when a flash flood rendered the usual communications facilities of Richwood, W. Va., inoperable. In addition, 800 amateurs who participated in emergency operations during Hurricanes Carol, Edna, and Hazel were issued special certificates of recognition.

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

YL Clubs

Recent years have seen the organization of several new YL clubs; we predict the formation of many new ones shortly. This month we'd like to make a start in the project of compiling information about the various existing clubs which are on record with us. If you are a member of a YL club which is "organized" — i.e., has formal name, officers, regular meetings, etc. — and your club does not appear below - please mail us a postcard with information about your organization.

In past departments we have already described two XYL clubs — XYLs of members of the Evansville, Ind., A.R.C., and XYLs of members of the Southwest Missouri A.R.C. If there are others, we'd like to know about them, too.

The Young Ladies' Radio League — International, with a number of affiliated YLRL units. Organized in 1939 by W3MSU, Ethel Smith, then W7FWB; approximately 550 members, all licensed women amateurs; dues $2.00 per year; president, W6CEE, Vada Letcher, 1214-A Franklin, Santa Monica, Calif.; publishes *YL Harmonics* bimonthly; sponsors YL-OM Contest and YLRL Anniversary Party annually; conducts various nets; issues WAS-YL certificate and YL Century Certificate.

Young Ladies' Radio Club of Los Angeles — YLRL-affiliated; organized 1946; 55 members; meets second Saturday of each month at Schabers Cafeteria, 720 S. Hill St., Los Angeles; dues $1.00 per year; president, W6PJU, Mildred Griffin, 1434 So. Olive St., Santa Ana; issues Lad n' Lassie Certificate.

YL Radio Club of San Francisco — a YLRL unit; organized 1954; 18 members; meets third Tuesday of each month at members' homes; dues $4.00 per year for resident members, nonresident $1.00 per year; president, W6QMO, Jeri Bey, 1530 47th Ave., San Francisco 22.

Chicago Unit of the YLRL — organized 1953; 20 members; meets on the fourth Saturday of the month at Gompers Park Field House; no dues; club station is W9DEQ; president, W9SEZ, Eleanor Engebretsen, 4304 No. Avers, Chicago 18, Ill.

The Ladies Amateur Radio Klub (LARK) — a YLRL unit; organized 1952; 28 members; meets first Wednesday of the month at Austin YMCA, 501 No. Central Ave., Chicago; dues $3.00 per year; president W9YBC, Gloria Matuska, 2322 So. 2nd Ave., North Riverside, Ill.; issues LARK certificate.

Long Island Unit YL Radio League — organized 1950; 20 members; meets monthly at members' homes; dues $1.00 per year; president, KN2EBU, Min Jordan.

New York City YLRL — A YLRL unit; reorganized in 1942; 22 licensed members; meets monthly at N. Y. C. Civil Defense Building; dues $1.00 per year; president, W2IQP, Lillian Klarfeld, 148 Leslie St., Newark 8, N. J.

South African Women's Radio Club — 117 members; president, ZS1GT, Daphne Hindes, "Westward Ho," 22 Beta Road, Bakoven, Cape Town, South Africa; publishes YL Beam bimonthly; will soon issue a Worked-ZS YL certificate.

YLRL Club of Milwaukee (Wis.) — organized 1953; 8 members; meets six times a year at members' homes; no dues; president, W9OMZ, Jeanne Pavek, 5776 No. 24th St., Milwaukee 9, Wis.

Even as this copy is being prepared, word arrives from WL7BJD that on Feb. 14th twelve KL7 YLs met in Anchorage for the purpose of organizing an Alaskan YL Club. More details on this at a later date.

The above information is up-to-date as of February, 1955. All of the clubs welcome new members. For further particulars write to the club president.

The officers of each club are decidedly optimistic about the future. They forsee increased membership, greater club activity, and more significant contributions to amateur radio in general.

COMING YL GET-TOGETHERS

April 23rd — W1 YLs, Sheraton Plaza Hotel, Boston. Write W1TRE for details.
May 20th–22nd — LARK Convention, W9 YLs, Allerton Hotel, Chicago. Write W9MYC.
June 24th–27th — First YLRL International Convention, Hotel Miramar, Santa Monica, Calif. W6UHA, general chairman.

Anniversary Party Results

Winners of the YLRL 15th Anniversary Party conducted during the first two week ends of last December are as follows:

'Phone
- First — W3OQF (opg. W3MAX), Barbara Houston — 22,320
- Second — W8IHWX, Lillian Richardson — 17,100
- Third — W4YYJ, Lois Crane — 16,582.5

C.W.
- First — W4YYJ, Lois Crane — 6612.5
- Second — W4HLF, Arlie Hager — 6375
- Second (tie) — W1FTJ, Dorothy Evans — 6375
- Third — W1WPX, Evelyn Chase — 5362.5

'Phone section winner W3OQF has been aiming for top honors since 1951, when she placed third 'phone in the 12th AP. In 1952 she placed third c.w.; in 1953, second 'phone; and this year she'll receive the top prize, a loving cup, from last year's winner, W1FTJ.

♦

Top c.w. scorer in the YLRL 15th Anniversary Party is Lois Crane, W4YYJ, shown at her OM's operating position.

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

All-ham families are so manifold nowadays that they are no longer a novelty. But when father, mother, son, and daughter all have ham tickets, interfamily competition is keen. Nevertheless, the sense of satisfaction and pride that the family experiences is strong. So it is, at least, with the Wiley family of Del Paso Heights, Calif. Dad is W6GKW, mom is K6DPM, and son and daughter are KN6GPZ and K6DPN respectively. XYL Rubie and 12-year-old daughter Lorraine took their Novice exams at the same time, and a few months later passed their General Class exams.

YL contest winning fever is catching, at least in the Crane family of Birmingham, Ala. C.w. section winner W4YYJ will place her cup (received from last year's winner W4RLG) alongside that of her OM, W4ARR, who won last year's YL-OM Contest. A family race is predicted, for a cup must be won three times in order to obtain permanent possession.

Top 'phone scorers by districts: W1VOS 11,542.5, K2IWO 11,857.5, W3MAX 22,320, W4YYJ 16,582.5, W5SPV 3885, W6QGX 7455, W7YWM 15,400, W8HWX 17,100, W9AQB 10,920, WØOMM 11,962, VE3AJR 5400. Certificates have been awarded to each.

Other 'phone scores: W1MCW 6580, W1QON 1072.5, W1RLQ 2700, W1RYJ 367.5, W1UZR 1815, W1WPX 5445; K2DSL 675, W2EEO 1040; W3TYC 607.5; *W4s* BLR 420, CWV 1137.5, HLF 15,840, KYI 13,125, RIG 10,335, SGD, 6250; *W5s* RYX 3697.5, RZJ 1275, TTU 125, WUX 1620, WXY 50; K6ANG 900; *W6s* CEE 1500, EHA 1861.25, GQZ 1200, KER 375, PCA 1155, QOG 4600, QYL 60, UHA 2400, WRT 858; *W7s* HHH 1250, OOY 6660, RVM 5160, SNP 1755, TGG 5940, ULK 7837.5, VYG 1620; *W8s* ATB 2600, DNF 1920, HUX 4320; W9LOY 3375; *WØs* BFW 6037.5, ERR 2625, FVE 3277, JMJ 1260, MRJ 495, ZWL 675. Top c.w. scorers by districts: W1FTJ 6375, K2DXD 1218.75, W3QPJ 3656.25, W4HLF 6375, W5WXY 240, W6PCA 1487.5, W7SYF 187.5, W8HWX 4250, WØFVE 2600, VE3AJR 5040, VE5DZ 605. Certificates have been awarded to each.

Other c.w. scores: *W1s* RLQ 1625, VOS 1125, WPX 5362.5, YNI 438, YYM 2187.5; *K2s* CUQ 500, IWO 120; *W3s* CDQ 45, MAX 1100, TYC 2450; *W4s* BLR 1340, RIG 2250, YYJ 6612.5; W6EYA 481.25; W7VYJ 156.25; W6EHA 600; VE3DDA 400.

Thanks to W6KER, Gilda Shoblo, YLRL vice president, for tabulating and recording contest scores.

QST an International Passport

During a recent trip to Spain, W2YCX, Carolyn (Carlie) Hull, found that her photograph which appeared in *QST* (this department, September, 1952) was her passport to a wonderful time in that country. Some of the hams she met there remembered seeing her picture and consequently accepted her as an old friend in real ham style.

Carolyn recounts:

Meeting Spanish amateurs was more fun to me than any sightseeing. One day I entered a radio store in Madrid, hoping to meet a Spanish ham. Words failed; I pulled out my QSL card. The salesman understood and telephoned EA4BF, Alberto Kirschner. Alberto spoke fluent English and through long subscription to *QST* he knew much about ham radio in the United States. Subsequently, Alberto and his charming family invited me to a gathering of the URE or *Union de Radioaficionados Espanoles* (Union of Spanish Radio Amateurs), and I was able to learn something about amateur radio in Spain.

The URE is the only radio club in that country. EAs are handicapped by the high cost of good equipment and a dearth of components. The legal maximum power input is only 50 watts. These factors force each Spanish ham to use his ingenuity to the limit. He must be a technician as well as operator, and most EAs know their equipment inside out. By the judicious use of antennas and good operating conditions, the EA can hold his own with anyone in working DX; and despite operating difficulties, EAs are typical hams and have the true ham spirit.

There are very few Spanish YLs, and I was not only the sole YL at the meeting, but one of the first American YLs ever to visit them.

A reporter for *Revista de Radio*, the URE's amateur organ, asked me about my personal amateur activities, but no one asked me much about amateur radio in America, because so many of them read *QST*. Indeed, they know much more about us than we do about them!

YLs You May Have Worked

As a result of local newspaper publicity about the Los Angeles Young Ladies' Radio Club, W6LBO, Mary Brandvig, publicity chairman of the club, was selected to appear

on the Groucho Marx radio and TV shows, February 16th and 17th. Mary and her program partner scored high on the quiz show but slipped on the jackpot question. Licensed in 1951, Mary finds her hilltop home at Manhattan Beach ideal for working her favorite band — two meters. She maintains regular schedules with stations up to 200 miles away. She is now serving with W9YBC as cochairman of publicity for the YLRL First International Convention in June. Mary is the XYL of W6EJL and the mother of a junior op.

(Continued on page 144)

• Technical Correspondence —

RE "LOW-IMPEDANCE TRANSMISSION LINES"

17 Random Road
Princeton, N. J.

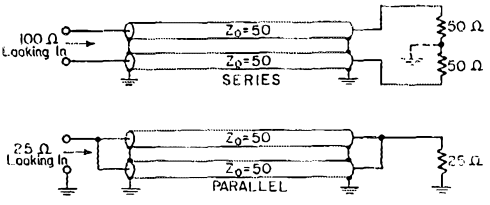
Technical Editor, *QST*:

Under "Technical Correspondence" (page 47) in the February, 1955, issue of *QST*, Lt. John J. Dougherty has a letter which induces me to make certain comments. While it may be true that particular antenna configurations may have influenced some people who were responsible for standardization of the characteristic impedance of transmission lines, I believe the evidence indicates that the choice was made on a much more sophisticated engineering basis. If one fixes the diameter of the outer conductor of a transmission line, it can be shown that — for air dielectric — the attenuation will be a minimum when the characteristic impedance is about 77 ohms. I believe this accounts for the nominal 75-ohm lines.

The standardization on 50-ohm lines is not as clear cut. Prior to standardization, flexible lines were made by filling 75-ohm lines with suitable dielectric material. As at present, these had a dielectric constant of the order of 2.25, which made the lines have a characteristic impedance near 50 ohms. The development of radar and the resulting high peak power further reopened the subject. For a fixed outer conductor and air-dielectric line, the breakdown voltage for a fixed input power is a maximum for a 30-ohm line. From discussions with people who were involved at the time the choice was made, it appears that 50 ohms was selected because it was already quite widely used and was a reasonable compromise between minimum attenuation and maximum power capability.

Near the close of his letter, Lt. Dougherty makes the statement that putting transmission lines in parallel reduces the transmission line losses. This is incorrect as can be shown easily using Lt. Dougherty's example. Suppose a single transmission line is properly terminated by a load and is of such a length that one half of the input power is lost in the line. Now if the load is transformed to one half the original value and two identical lines in parallel are used, the lines will be properly terminated and one half the source power will enter each line. As before, one half the power entering each line will be lost in the line. Obviously, then, each line will absorb one fourth of the source power making the total loss one half, exactly the same as in the case of the single line. The two-line system is capable of handling twice the power of the single line and a lower impedance load can be fed without additional matching means but line loss is unchanged. — *Wendell C. Morrison, W2YCE*

[EDITOR'S NOTE: Several letters have been received questioning the validity of Lt. Dougherty's statements about coaxial lines in "series" and in "parallel." The accompanying sketch may help to explain them further. It should be



obvious that the s.w.r. on the sections of lines will be 1.0 in each case, but the terminating loads are respectively twice and half the Z_0 of the pieces of line.]

MODULATION TRANSFORMERS

San Bruno, Calif.

Technical Editor, *QST*:

In plate-modulated Class C r.f. amplifier service such as we have in a.m. voice applications, there has been needless confusion about the choice of the proper modulation transformer. As long as the transformer is big enough to handle the power, and as long as we don't ask it to work into too high an impedance on its secondary, the only thing we have to worry about is obtaining the proper voltage transformation to make the audio and Class C tubes work correctly.

At the 100 per cent modulation level the peak value of the audio voltage out of the transformer should be just equal to the d.c. value of the plate voltage applied to the Class C stage. Similarly, at 100 per cent modulation we know that the peak value of the audio current component is also just equal to the d.c. plate current of the Class C stage. This current relation follows directly from the fact that the Class C amplifier plate circuit presents the same impedance to the audio source as it does to the d.c. power supply. That is why we calculate this impedance by dividing the d.c. plate voltage by the d.c. plate current.

Now that we know the peak audio voltage wants to be just equal to the d.c. plate voltage at 100 per cent modulation, we can start asking what the modulation transformer does. Basically, it must develop this desired output voltage when the primary of the transformer has the proper voltage present. This is the point where the audio modulator stage gets into the act. In order for the audio modulator tubes to work properly, the audio voltage built up in each plate circuit should be on the order of 70 per cent to 80 per cent of the applied d.c. plate voltage at the maximum signal level. Each half of the primary of the transformer must develop this audio peak voltage since each half has a separate tube across it.

Now if we happen to use the same d.c. plate voltage on the modulator (or audio amplifier) as we do on the Class C r.f. stage, the peak audio voltage at 100 per cent modulation which is developed in each half of the primary of the transformer is 70 per cent to 80 per cent of the d.c. plate voltage involved, and of the peak audio voltage developed in the secondary of the transformer (since the latter is equal to the d.c. plate voltage). This says that the number of turns in one-half the primary of the transformer must be 70 per cent to 80 per cent of the number of turns in the secondary. The number of turns in the full primary of the transformer is twice this, or 140 per cent to 160 per cent of the number of turns in the secondary. This is often stated as a primary to secondary turns ratio of 1.4 or 1.6 to one. Thus the modulation transformer is fully specified provided it is big enough to handle the power.

Note that the modulation transformer was chosen without mentioning the value of d.c. plate current drawn by the Class C stage, or the amount of plate current drawn by the audio amplifier. Also note that nothing was said about the exact impedance placed on the secondary of the transformer or about the impedance which must be presented to the audio amplifier. The fact that the current drawn by the amplifier and the load impedance are not involved in the choice of the modulation transformer is demonstrated daily in the operation of Class C amplifiers. Once a proper modulation transformer has been chosen we change the load on our Class C amplifier freely without in any way disturbing our ability to modulate well and with good quality.

The impedance presented to the secondary of the modulation transformer (or the voltage to current ratio) is dependent upon and will vary with the amount of d.c. plate current drawn by the Class C stage. Because the transformer transforms this impedance to the primary side by the square of the turns ratio, the primary impedance will also vary. It should be noted, however, that the voltage transformation is not upset by the way in which we vary the loading on the secondary of the transformer. This is the familiar behavior of 60-cycle power transformers.

For audio amplifiers used as modulators we don't have to concern ourselves about the particular value of load impedance which is listed on the tube data sheet. As long as the tubes are capable of supplying the desired output power, and as long as the modulation transformer has the right voltage ratio, the tubes will work efficiently and satisfactorily. As indicated above, an audio modulator works efficiently when the peak audio voltage in its plate circuit is some 70 per cent to 80 per cent of the d.c. plate voltage at maximum signal. In Class AB_1 modulators the peak audio voltage is somewhat smaller and may be nearer a 60 per cent figure. — *W. G. Wagener, W6VQD*

1955 V.H.F. Sweepstakes

8th Annual Winter Contest Activity at All-Time High

In 1951, the low point in the history of the Annual V.H.F. Sweepstakes, 299 logs were sent in. Since then, the curve has shown a constant upswing: 365 in 1952, 385 in 1953, 610 in 1954. In the 8th running, January 8 and 9, 1955, the total climbed to 747, and this does not include a handful received after the mailing deadline. In just about any other category you can name, the 1955 V.H.F. SS was also a record-breaker.

Significantly, this came about under strictly normal conditions. Not a contestant reported any real break from conditions, yet in the more densely populated areas the contest ran hot right up through the last minute before midnight Sunday. Where heretofore more than 200 contacts by any one contestant has been a distinct rarity, no less than 15 made or exceeded the 200 mark this year, and quite a few of them turned the trick with just one band, 2 meters. W3IBH was the country's top man from the standpoint of contacts on one band, with 245 on 144 Mc., but it took W2UK's unheard-of section multiplier of 18 to post the country's top score. Tommy worked 176 stations for 6336 points, far exceeding the record of 4104 set by W2SAI, way back in 1950. And W2UK made them all on 144 Mc., and with the band dead! K2CMB's 248 contacts on 144 and 220 was the top in QSOs on more than one band.

How far the 1955 contest exceeded previous marks can be seen from the fact that nine contestants broke the old W2SAI record. As might be expected, most of these were in that hotbed of v.h.f. activity, the stretch of heavily-populated country between New York and Philadelphia, but not all the big scores were made there, by any means. W1UIZ/1, who had the temerity to take to the site used so successfully in past warm-weather contests by W1MHL/1 (Pack Monadnock Mountain, near Peterboro, N. H.) made 216 contacts in 13 sections, for 5603 points, and the No. 3 spot nationally. W1RFU, who *lives* on his mountain, in Wilbraham, Mass., landed in No. 2, with 218 contacts in 13 sections, for 5668. W6WSQ showed what can be done from the Los Angeles area, with 210 contacts on 144 Mc. alone. The lower section multipliers that prevail outside the small-section East kept his score out of the top ten, but his 2100 points belongs right up there with the best of them. The same goes for W8SVI, Fairborn, Ohio, who led all the inlanders with 146 contacts in 7 sections, for 2044 points.

Novices and Technicians were out in force, and there were 15 certificate winners in the newcomer categories. Novices won over-all section awards in Eastern New York and Indiana, and KN6GMV must have set some kind of Novice record with 163 contacts on 2 meters in the Los Angeles Section.

Unlike the spring and fall contests, the SS doesn't give extra credit for use of higher bands than 144 Mc., but 31 contestants worked on 220 Mc. and 14 used 420. W6MMU managed several contacts on 1215, and W7JIP and W7OKV put their 10,000-Mc. gear to work for the party. W7AXS says that the first 220-Mc. work in the Seattle area came off during the contest.

It's the club incentive that makes the V.H.F. Sweepstakes what it is, the fourth-ranking ARRL operating activity, and the club activity was terrific in this year's event. It was a contest between two Philadelphia-area clubs, as often before, but combinations from other areas are gaining ground on the perennial leaders. The South Jersey Radio Association won another gavel award, with the first aggregate of more than 50,000 points in the history of V.H.F. SS competition, leaving their rivals, the York Road Radio

CLUB SCORES

Club	*Aggregate*	*Certificate Winner*
South Jersey Radio Assn.	52,361	W2PAU
York Road Radio Club	33,620	W3IBH
Hartford County Amateur Radio Assn.	29,464	W1VLE
Hampden County Radio Assn.	18,842	W1RFU
Dayton Amateur Radio Assn.	13,715	W8SVI
Windblowers V.H.F. Society	13,010	K2CMB/2
Waltham Amateur Radio Assn.	9242	W2BVU/1
Lakeland Amateur Radio Assn.	6818	W2RGV
Morris Radio Club	6563	K2BI
North Penn Amateur Radio Club	6514	W3TDF
Northeast Radio Club	6158	W3TYX
Lake Success Radio Club	6064	W2BNX/2
El-Ray Amateur Radio Club	3386	W1JSM
Rochester V.H.F. Group	2593	W2UTH
Lockport Amateur Radio Assn.	2548	W2ALR
Stratford Amateur Radio Club	1946	W1VIY
IBM Radio Club	1910	W2MHE
Queen City Emergency Net	1714	W8JSW
Framingham Radio Club	1532	WN1ZWL
Buckeye Shortwave Radio Assn.	1328	W8CEQ
Levittown Amateur Radio Club	1206	W2JUN/2
West Side Radio Club	1088	VE3AIB
Burlington County Radio Club	868	K2DAP
Radiation Lab. Radio Club	780	W3LMC
Albuquerque V.H.F. Club	582	W5FAG
Johnson County Radio Amateurs Club	562	W0s GLN IIJ NNY*
Kenosha Radio Communications Society	364	W9ELO
Greensboro Radio Club	183	W4NHW
Winston-Salem Civil Defense Net	118	W4MRH
Hardin County Amateur Radio Assn.	74	W4WNH

* Three-way tie

The following clubs were also mentioned on less than three valid entries: Aero ARC, Albany ARA, Alma College RC, ARC of Falls Church, Capitol City RC, Chesapeake ARC, DuPage RC, Electric City ARC, Hamden ARA, Hamilton ARC, Kalamazoo ARC, Lake Washington ARC, Lower Columbia ARC, Mid-Island RC, Milford ARC, Milwaukee AREC, Nortown ARC, Ohio Valley ARA, Palo Alto ARA, Portland ARC, Providence RA, Quannappowitt RA, RA of Western New York, RA Open House RC, Sandusky Valley ARC, San Mateo County ARC, Santa Clara County ARA, Staten Island ARA, Steel City ARC, Tri-County RA, Tulsa ARC, Yale ARC, York ARC.

Club, far behind. The fierce competition (a private matter) between the Hampden and Hartford County clubs, "brought out the vote" in the Connecticut Valley, with the Hartford County Amateur Radio Association pulling up a good third in the country. Dayton turned out in force, but lost ground to 5th place from their No. 3 spot of last year.

In the following tabulation, scores are listed by ARRL divisions and sections. Unless otherwise noted, the top scorer in each section receives a certificate award. The highest-scoring Novice and Technician licensee also receives a certificate in each section where at least three such licensees submitted valid contest logs; asterisks denote these winners. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc., B 144 Mc., C 220 Mc., D 420 Mc. and E 1215 Mc. and above. Multiple-operator stations, with calls of participating operators, are shown at the end of each section tabulation.

ATLANTIC DIVISION

E. Pennsylvania

W3IBH...1410-245- 9-B
W3TDF...4270-215-10-AB
W3KKN..3762-209- 9-AB
W3UKI...3472-217- 8-AB
W3TYX..3330-185- 9-B
W3SAO...2576-161- 8-B
W3RZU...1848-132- 7-B
W3PKJ...1722-123- 7-B
W3SOB...1554-111- 7-B
W3UMI...1526-109- 7-B
W3NKD...1488-124- 6-B
W3ARW..1474- 67-11-ABC
W3UMT...1246- 89- 7-B
W3HWV...1200-100- 6-B
W3AJF...1024-128- 4-AB
W3UX...1020-102- 5-B
W3QVK...940- 94- 5-B
W3GRY...860- 86- 5-AB
W3HYJ...840- 60- 7-B
W3MYL...600-100- 3-B
W3VGN...546- 91- 3-B
WN3ZKG*.510- 85- 3-B
W3UZF...498- 83- 3-B
W3DHH...380- 95- 2-B
W3TEC...360- 90- 2-B
W3ULC...342- 57- 3-B
W3HIX...320- 40- 4-B
W3WED...312- 78- 2-B
W3EW...300- 50- 3-B
W3DJ...284- 71- 2-B
W3SMO...280- 70- 2-B
W3IMW...270- 45- 3-B
W3GBT...264- 44- 3-B
W3CLC/3..248- 62- 2-B
W3YIW...220- 55- 2-B
WN3YXC..216- 27- 4-B
W3IND...208- 52- 2-B
WN3ZTB..200- 50- 2-B
W3OIX...188- 47- 2-B
W3WHJ...180- 45- 2-B
W3DYL...160- 40- 2-B
W3EDO...156- 26- 3-B
WN3ZJF/3.150- 25- 3-B
W3VMJ...144- 36- 2-B
W3TEA...140- 35- 2-B
W3VSQ...132- 33- 2-B
W3SQX...124- 31- 2-B
W3WIM...124- 31- 2-B
W3KBB...120- 30- 2-B
W3BNU...100- 25- 2-B
WN3ZNJ...96- 24- 2-B
W3PNL...80- 20- 2-B
W2AFJ/3...68- 17- 2-B
W3FPC...60- 15- 2-B
W3IHF...32- 4- 4-B
W3QVI...28- 14- 1-B
WN3ZXU...26- 13- 1-B
W3YCL...14- 7- 1-B
W3EDU/3 (W3s EDO MMV RAF ZPT, WN3YQJ) 3360-140-12-B
W3UCA/3 (W3s UCA UQC VUF)...656- 82- 4-B

Md.-Del.-D. C.

W3CGV...1750-125- 7-ABCD
W3TOM..1416-118- 6-AB
W3WOD..1080-108- 5-AB
W3LZZ...660- 66- 5-B
W3BYG...472- 59- 4-B
W3ONP...445- 45- 5-B
WN3YLQ..340- 43- 4-B
W3JES...270- 45- 3-AB
W3AHM...252- 42- 3-B
W3OTC...208- 26- 4-A
W3LMC...184- 23- 4-B
W3NH...180- 30- 3-B
W3KMV...176- 22- 4-A
W3HQX...152- 38- 2-B
W3YPW...132- 22- 3-B
W3KLA/3..126- 21- 3-B
W3ZMK...120- 30- 2-B
WN3YZJ...104- 26- 2-B
W3PPY...36- 9- 2-B
W3PGA (W3KLA, WN3ZAQ) 630- 53- 6-B
W3ZIB/3 (W3s JCI LMC RQP SSF WYJ YPW) 464- 58- 4-AB

Southern New Jersey

W2UK...6336-176-18-B
W2PAU...4720-236-10-AB
W2TBD...4480-225-10-B
W2GLV...3636-202- 9-B
W2QED...3573-200- 9-ABCD
W2BLV...3536-221- 8-B
W2NFL...2184-156- 7-B
K2DCF...2160-120- 9-B
W2LBX...1904-119- 8-B
KN2HOD*1840-115- 8-B
W2YRW..1820-130- 7-B
W2JAV...1680-120- 7-B
W2REB...1464-122- 6-B
W2EWN..1152- 96- 6-B
W2DAJ...1130-113- 5-B
W2GQO...1000-100- 5-B
K2JUW....980- 70- 7-B
W2SPY...852- 71- 6-B
W2KHW...848-106- 4-B
W2OQN...824-103- 4-AB
W2EIF...816-102- 4-B
K2JVX...736- 92- 4-B
W2BAY...728- 91- 4-AB
W2ZUL...688- 86- 4-B
W2OSD...654-109- 3-B
W2JRO...648-108- 3-B
W2QRH...642-107- 3-B
W2EGP...630-105- 3-B
W2NSJ...630- 63- 5-B
W2LYL...624-104- 3-B
W2EGQ...576- 72- 4-B
W2HEK...574- 41- 7-B
W2ASG...486- 81- 3-B
W2EFM...486- 81- 3-B
W2ORA...470- 47- 5-AB
W2LFN...390- 65- 3-B
W2EH...350- 35- 5-B
K2DAP...318- 53- 3-B
W2MCZ...306- 51- 3-B
KN2KIQ..296- 74- 2-B
W2VX...282- 47- 3-B
KN2HHO..260- 65- 2-B
KN2INQ..260- 65- 2-B
K2CJK...254- 64- 2-B
KN2JXF..248- 62- 2-B
W2LYD...240- 30- 4-B
W2SDO...240- 60- 2-B
K2DGQ...236- 59- 2-B
W2PFQ...228- 57- 2-B
K2DWY...220- 55- 2-B
W2UCV...204- 51- 2-B
KN2JEI...188- 47- 2-B
K2DFE...180- 30- 3-B
W2RBF...176- 44- 2-B
W2WKI...172- 43- 2-B
K2AIM...168- 42- 2-B
W2UQ...164- 41- 2-B
W2ABQ...160- 40- 2-B
W2DBP...160- 40- 2-B
W2FXT...160- 40- 2-B
W2BDI...156- 39- 2-B
W2PTM...114- 19- 3-B
W2HV...112- 28- 2-B
W2WUP...108- 27- 2-B
W2ONV...84- 21- 2-B
W2SEZ...78- 13- 3-B
W2ZNB...68- 17- 2-B
W2UA...24- 6- 2-B
W2EVR...14- 7- 1-B
K2AFJ...8- 4- 1-B
W2NYY/2 (W2s FCB NYY) 1310- 67-10-B
W2EBW (W2s EBW EVR) 12- 6- 1-B

Western New York

W2ORI...1666-119- 7-B
W2ALR...1416-118- 6-AB
W2WFB...984- 82- 6-B
W2UTH...960- 80- 6-B
K2EPV...652- 82- 4-B
W2ZGC...480- 60- 4-B
K2CBH...450- 77- 3-AB
W2RHQ...396- 66- 3-AB
K2DBB...366- 62- 3-B
W2LXE...280- 70- 2-B
W2UXP...252- 42- 3-BC
KN2HIT*..240- 40- 3-B
KN2INO...222- 37- 3-B
W2QNA...200- 50- 2-B
KN2HJB...192- 48- 2-B
W2CTA...162- 27- 3-B
W2SWC...120- 30- 2-B
KN2IQD...44- 11- 2-B
W2BLP...34- 17- 1-B
W2BYJ...26- 13- 1-B

Western Pennsylvania

W3KXI...470- 47- 5-B
W3KWH (W3s MPK UHM WHY ZDW, WN3s ANX ATG)...612- 51- 6-AB

CENTRAL DIVISION

Illinois

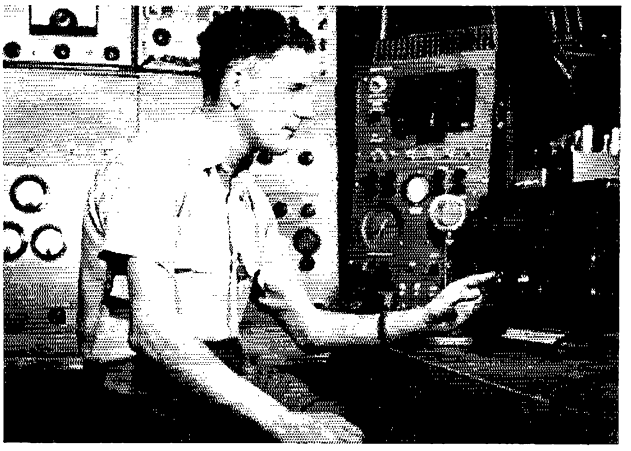
W9EQC...1476-123- 6-BC
W9QXP...1200-100- 6-B
W9ZEX...840- 84- 5-B
W9DRN...736- 92- 4-BC
W9QKM...664- 83- 4-AB
W9IIO...596- 75- 4-B
W9JYG...536- 67- 4-B
W9ALR...520- 65- 4-B
W9USI...440- 55- 4-B
W9MYC...408- 51- 4-B
WN9EGB*.324- 54- 3-B
WN9MBU..252- 42- 3-B
W9KCW...172- 43- 2-B
W9OTV...168- 28- 3-B
W9CRN...140- 35- 2-B
W9ADO...80- 20- 2-B
W9PZP...64- 32- 1-B
WN9GMH..30- 15- 1-B
W9KLD...12- 3- 2-B

Indiana

WN9IOC...355- 36- 5-B
W9BUM...138- 23- 3-B
W9JIY...126- 21- 3-B
W8ILC/9...72- 18- 2-B
W8IPZ/9...32- 8- 2-B

Wisconsin

W9RXS...480- 60- 4-B
W9GJE...328- 41- 4-B
W9ELO...280- 35- 4-B
W9TQ...276- 46- 3-B
W9NVK...232- 29- 4-B
WN9MQW*.216- 36- 3-B
W9ESJ...174- 29- 3-B
W9UJM...156- 26- 3-B
WN9FIW...60- 15- 2-B
W9BTI...40- 20- 1-B
WN9JCI...40- 20- 1-B
W9AAX...38- 19- 1-B
W9UZK...34- 17- 1-B
WN9MPY...32- 16- 1-B
WN9ICM...28- 14- 1-B
WN9JFP...28- 14- 1-B
W9SOF...18- 9- 1-B
WN9FHT...16- 8- 1-B
W9ILR...8- 4- 1-B



♦

A. J. "Tony" Sheppard, VE3DIR, Toronto, made 92 contacts on 144 Mc. in 6 sections, for 1104 points and the Ontario Section award.

♦

DAKOTA DIVISION

South Dakota

WØRSP....24- 6- 2-B

Minnesota

WØDXY....72- 12- 3-B
WØOFY[2]....14- 7- 1-C
WØOFZ[2]....14- 7- 1-C
WØMVP....12- 6- 1-C
WØHPS....10- 5- 1-C
WØIMG....10- 5- 1-C
WØORZ....10- 5- 1-C
WØPYC....10- 5- 1-C
WØHGH....8- 4- 1-C

DELTA DIVISION

Arkansas

W5HEH....12- 6- 1-B

Tennessee

W4HHK...144- 18- 4-B

GREAT LAKES DIVISION

Kentucky

W4VLA....384- 64- 3-B
W4ZPY....56- 14- 2-B
W4WNH....36- 9- 2-B
W4HJQ....32- 8- 2-B
KN4ART....6- 3- 1-B

Michigan

W8PFU...1236-103- 6-B
W8DX....680- 85- 4-B
W8NSH....664- 83- 4-B
W8NOH....480- 40- 6-B
W8UMI....400- 50- 4-B
W8AAF....350- 35- 5-B
W8TGH....285- 48- 3-B
W8DIV....270- 45- 3-B
W8NJH....270- 45- 3-B
W8CVQ....250- 25- 5-B
W8GYU....228- 38- 3-B
W8DDO....222- 37- 3-B
W8JXU....210- 35- 3-B
W8BGY....198- 33- 3-B
W8HRC....192- 32- 3-B
W8ARR....76- 19- 2-B
W8OKT....24- 12- 1-B
WN8QZR/8.22- 11- 1-B

Ohio

W8SVI...2044-146- 7-B
W8LPD...1848-154- 6-ABC
W8HOH...1260-126- 5-B
W8LOF...1224-102- 6-B
W8NRM....736- 92- 4-ABC
W8SRW....700- 50- 7-B
W8HCD....660-110- 3-B
W8BAX....600- 60- 5-BC
WN8QFA*.594- 99- 3-B
W8KOM....588- 98- 3-B
W8KFC....570- 95- 3-B
W8LUZ....570- 95- 3-B
W8FDK....536- 67- 4-B
W8ZCV....527- 88- 3-B
W8HUX....525- 53- 5-B
W88DJ....510- 85- 3-AB
W8IJL....480- 60- 4-B
WN8UMF...476- 60- 4-B
W8LAH....472- 59- 4-B
WN88VW...468- 78- 3-B
W8GFN....438- 73- 3-B
W8ILC....438- 73- 3-B
W8CEQ....416- 62- 4-B
W8LCY....400- 50- 4-B
W8J8W....396- 66- 3-B
W8VQI....392- 49- 4-B
W8HSY....390- 65- 3-B
W8KTM....366- 61- 3-B
W8MCW....360- 90- 2-B
W8MIB....352- 44- 4-B
W8WRN....328- 41- 4-BC
W8BMO....324- 81- 2-BC
W8SEM....272- 68- 2-B
W8MVL....270- 45- 3-B
WN8TXL...258- 43- 3-B
W8MVA....252- 42- 3-B
WN8QIU...246- 41- 3-B
W8NAF....240- 60- 2-B
WN82VU...240- 40- 3-B
W8WUP....236- 59- 2-B
W8IUX....168- 28- 3-B
W8BAJ....164- 41- 2-B
W8JPQ....164- 82- 1-B
W8ODQ....162- 27- 3-B
WN8T8Z...144- 36- 2-B
W8AQT....140- 35- 2-B
W8DPW....138- 69- 1-B
W8NHW....138- 69- 1-B
WN8RKJ...138- 69- 1-B
W8SPU....135- 23- 3-B
W8IPT....132- 66- 1-B
W8ZSK....132- 66- 1-B
WN8RIP...128- 32- 2-B
W8GO....114- 57- 1-B
W88UK....112- 28- 2-B
W8BOV....98- 49- 1-B
W8FV....96- 48- 1-B
WN8UIT....96- 24- 2-B
W8NFG....94- 47- 1-B
W8PLQ....94- 47- 1-B
W8PKS/8...92- 23- 2-B
WN8U8M...92- 23- 2-B
W8MYB....88- 44- 1-B
W8YCP....81- 41- 1-B
W88XT....80- 40- 1-B
W8ZPH....78- 39- 1-B
W8NJS....76- 38- 1-B
W8PFP....76- 38- 1-B
W8PQZ....72- 36- 1-B
W8CEA....70- 35- 1-B
W8KQY....69- 35- 1-B
W8FPZ....68- 34- 1-B
W8DMV....62- 31- 1-B
W8MDK....60- 30- 1-B
W8ZHJ....60- 30- 1-B
WN8RKL...60- 30- 1-B
W8ZOE....58- 29- 1-B
W8NGE....56- 28- 1-B
W8KWB/8..54- 27- 1-B
W8OUW....50- 25- 1-B
W8IFZ....49- 25- 1-B
W3BTP/8..46- 23- 1-B
W8RXM....46- 23- 1-B
W8KDY....44- 22- 1-B
W8ZFM....44- 22- 1-B
W8RKB....42- 21- 1-B
K8WBP....42- 21- 1-B
W8JRN....32- 16- 1-B
W8TH....32- 16- 1-B
WN88DX...32- 16- 1-B
W88GK/8..26- 13- 1-B
W8TDY....24- 12- 1-B
W8YFJ....20- 10- 1-B
W8ARN....14- 7- 1-B
W8INQ....8- 4- 1-C

HUDSON DIVISION

Eastern New York

KN2HPN/2
1184- 74- 8-B
W2PCQ...1072- 67- 8-B
W2MHE...864- 54- 8-B
W2ZBS...800- 50- 8-B
W2AWF...380- 38- 5-B
W2IP....250- 25- 5-B
W2LWI....160- 20- 4-B
W2GPH....112- 28- 2-B
K2CXP (K2s GCI GIA, KN2JXJ)
490- 36- 7-B
K2GCH/2 (K2GCH, KN2HPK)
396- 33- 6-B

N. Y. C.-L. I.

K2IEJ/2..2360-118-10-B
W2FYQ...1596-136- 6-B
W2LID...1320-110- 6-B
KN2IBV/2*
1170- 65- 9-B
W2AOD...1158- 97- 6-B
W2BNX/2.888- 74- 6-B
W2JUN/2..780- 65- 6-B
W2YHP...770- 77- 5-B
W2QAN....768- 64- 6-B
W2DLO....672- 56- 6-B
W2ENW....650- 65- 5-B
W2EEN....640- 64- 5-B
W2JBQ....612- 51- 6-B
W2YSL....496- 62- 4-B
W2IN....480- 60- 4-B
K2DVX....470- 47- 5-B
K2CMV....424- 53- 4-B
W2JGI*....370- 37- 5-B
W2TNF....304- 38- 4-B
W2ODB....276- 46- 3-B
K2GXL....156- 26- 3-B
K2HIC....152- 19- 4-B
K2ESZ....116- 29- 2-B
W2KJC....114- 19- 3-B
W2EXE....104- 13- 4-B
KN2JTS...102- 17- 3-B
W2PIB....84- 14- 3-B
KN2IBI....68- 17- 2-B
W2TUK....64- 32- 1-B
W2SOB....40- 20- 1-B
K2CFB....34- 17- 1-B
KN2IBH....32- 16- 1-B
W2TNI....24- 12- 1-B
K2EUZ....18- 9- 1-B
W2GG*....8- 4- 1-B
KN2GSI....4- 2- 1-B
W2KDO/2 (W2s AZA BNZ FSM JGR KDO KEB KFV, K2EQH)
2170-155- 7-B
W2HJM (W2s HJM JZT)
1106- 79- 7-B
W2RB (W2s RB TUK)
376- 47- 4-B

Northern New Jersey

W2RGV...5544-231-12-ABC
K2CMB/2 4960-248-10-BC
W2AZP...2750-125-11-B
K2BI....2290-115-10-B
K2BC....1488-124- 6-B
W2MM....1458- 81- 9-B
K2CBB...1302- 93- 7-AB
W2DZA...1152- 72- 8-ABC
W2PWX...1080- 54-10-B
W2IMG...960- 80- 6-B
W2ISK....930- 93- 5-B
W2FPM...870- 87- 5-B
W2ZDR...800-100- 4-B

Nearing the top of Pack Monadnock, near Peterboro, N. H., after 4½ hours of pushing, shoveling, and replacing worn-out cross-links. About to make last chain repair is W1UIZ, operator. Onlookers are Butler, Meade and Finan, the last a New Hampshire State fire warden. Fifth member of the expedition was the photographer, W1WID. A total of 216 contacts on 50 and 144 Mc., in 13 sections, netted 5603 points, third highest in the country.

W2CBB....760- 38-10-B
W2IMI....736- 92- 4-B
W2QCY....702- 59- 6-AB
K2DHE....672- 48- 7-B
W2OAE....630- 63- 5-B
K2CSM....600- 60- 5-B
W2PEV....570- 57- 5-B
K2BO....500- 50- 5-B
W2IBM....464- 58- 4-B
W2NUL....416- 52- 4-B
W2RQI....384- 48- 4-B
W2WHY/2.330- 33- 5-B
W2ZKE....276- 46- 3-AB
W2ESC/2..264- 44- 3-B
K2DFS....264- 33- 4-B
K2AIO....240- 40- 3-B
W2FSW....192- 48- 2-B
W2BYR....180- 15- 6-A
W2IDZ....172- 22- 4-AB
W2NYB....148- 19- 4-AB
K2DER....36- 13- 2-B
W2SCV....12- 6- 1-AB
K2DO....11- 8- 1-B
K2CM....10- 4- 2-B
W2JEP....8- 4- 1-B
W2YTH....8- 4- 1-AB
W2YTI....8- 4- 1-A
W2WCM....7- 4- 1-A
KN2GLQ....3- 3- 1-B
W2BDL....2- 1- 1-B
K2AWY (K2s AWY GLQ)
520- 52- 5-AB
KN2KFE (KN2s KFE KNS)
512- 64- 4-B

MIDWEST DIVISION

Iowa

WØUOP....200- 25- 4-B
WØGUD...168- 21- 4-B
WØEMS....144- 18- 4-B
WNØUSQ...28- 7- 2-B

Kansas

WØIIJ[5]....126- 21- 3-B
WØGLN[5]....126- 21- 3-B
W3IH8/Ø....60- 15- 2-B
WØMOX/Ø....60- 10- 3-B

Missouri

WØNNY...128- 21- 3-B
WØIHD....96- 12- 4-B
WØDWB....90- 15- 3-B
WØMOJ....80- 20- 2-B
WØMPX....80- 20- 2-B
WØMAQ....68- 17- 2-B
WNØVFF...68- 17- 2-B
WØMLW....64- 16- 2-B
WNØYUH..64- 16- 2-B

Nebraska

WØHXH....20- 5- 2-B

NEW ENGLAND DIVISION

Connecticut

W1HDQ[6].5681-219-13-
ABCD
W1REZ/1 3336-140-12-B
W1VLE...3201-146-11-B
W1IEO...2840-142-10-B
W1VLH...2568-107-12-B
W1WHO...2280-115-10-B
W1PHR...2096-131- 8-ABD
W1UFV/1 2010-101-10-B
W1TXI....1936-121- 8-B
WN1ANI*.1680-120- 7-B
W1UFW/1.1548- 86- 9-B
W1YDM...1500-125- 6-AB
W1VLK...1400-100- 7-
ABCD
W1SPX...1152- 96- 6-AB
W1HDF...1106- 79- 7-
ABCD
W1RVZ...1078- 77- 7-B
W1KBI....1064- 76- 7-B
W1YOB....940- 94- 5-AB
W1ZDP[5]....900- 90- 5-B
W1VIY....792- 66- 6-B
WN1AQA/1
672- 56- 6-B
W1AW[6,7]..644- 81- 4-AB
W1ANU....616- 77- 4-B
W1HXD....588- 98- 3-AB
W1ULY....544- 68- 4-AB
W1AWV....486- 81- 3-B
W1VLL/1..480- 60- 4-B
W1RMU....450- 75- 3-B
W1VXJ....440- 58- 4-B
W1STU....360- 60- 3-B
W1URC....352- 44- 4-B
W1WRG....312- 52- 3-AB
W1KXM....252- 63- 2-B
WN1AES/1 212- 27- 4-B
W1WRV....208- 52- 2-B
W1WOQ....164- 41- 2-B
WØJNZ/M..153- 27- 3-B
W1ASO....152- 38- 2-B
W1TCW....152- 38- 2-B
W1KHM....148- 37- 2-B
W1WEA....144- 36- 2-B
W1WHR....142- 37- 2-B
WN1CHT...140- 35- 2-B
W1CGD....128- 32- 2-B
W1QJL/1..124- 31- 2-B
W1WYM....124- 31- 2-B
W1WIG....120- 30- 2-B
WN1DGC..120- 30- 2-B
W1GVK....116- 29- 2-B
W1TLO....112- 28- 2-B
WN1DEW..112- 28- 2-B
W1JBK....108- 27- 2-B
W1UQK....108- 27- 2-B
W1UJG....92- 23- 2-B
W1RFJ....88- 44- 1-B
W1OLG....84- 21- 2-B
W1OKT....52- 13- 2-B
W1IKL....48- 24- 1-B
W1ZTY....24- 12- 1-B
W1RON....22- 11- 1-B
W1ORS....16- 8- 1-B
W1BDI[5]....14- 7- 1-B
W1ADW....6- 3- 1-B
W1QAK/1 (W1s EUG LTZ QAK VRR)
3102-142-11-B
W1HCU (W1s BGT HCU)
707- 51- 7-B
W1YU (W1s URD YBZ, W2s BMF IQB, K2GIO)
424- 53- 4-B

(Continued on page 198)

The World Above 50 Mc.

CONDUCTED BY EDWARD P. TILTON, WIHDQ

Is that new beam up? Rig free of bugs? Converter in apple-pie order? Better get set, for there's a big season coming up. The more than 750 logs received following the 8th V.H.F. Sweepstakes show that activity is developing as never before. Auroral DX in January was the best in years. There were fine tropospheric openings in February. Winter sporadic-*E* was more widespread and it lasted longer than in any corresponding period for at least five years. Yes, all the signs are pointing to a spring DX season you won't want to miss. It should be breaking out most any time, now. Will you be ready for it?

The activity picture on 144 Mc. and higher bands is bright, indeed, but we could use several hundred new stations on 50 Mc. There were too few 6-meter men on hand to make the winter sporadic-*E* openings show to good advantage. The winter period is usually over shortly after New Year's Day, but widespread openings were reported through the end of January, and into February in 1955. On January 29th, for instance, W6BWG, San Gabriel, Calif., found the band open at 1555 PST, and was able to work W7DYD, Bothell, Wash., W5MJD, Amarillo, Texas, WØCNM and WØFKY, Grand Junction, Colo., W5KWP, Santa Fe, N. Mex., and W5SIN, Pampa, Texas, in 4½ hours. W5FXN, Austin, Texas, reports an S9-plus signal from W7QNO, Phoenix, Ariz., who was running only 3 watts, and using a 2-element array.

TV DX enthusiasts all over the country had a four-day DX binge beginning the 29th. If sporadic-*E* DX shows on Channels 2 through 6, 50 Mc. is open over the same, or slightly shorter, paths. The hundreds of TV DX hounds have shown us one thing for sure: There is a lot more sporadic-*E* DX than 6-meter men have ever realized, even in the heyday of activity on the band some years back.

Newcomers may not realize how much fun 50-Mc. sporadic-*E* DX can be, nor have much of an idea of when and how it can be worked. As a result, we find nearly all the new v.h.f. activity on 144 Mc. and higher frequencies, with 50 Mc. getting very little play from the new recruits. So, for them, we pass along a little dope on 6-meter possibilities. If you're an old hand at the 6-meter game, skip over to the fine print; there'll be nothing in the next few paragraphs that will be news to you.

By the time this appears in print, there will be just about time for you to get 6-meter gear going, and an antenna up, before the spring DX season gets under way in earnest. Usually the best months are May, June and July, but we've had some good openings as early as the latter part of March, and we can remember hearing West Coast stations in the latter part of April some years ago. The best signals are usually heard at distances of 600 to 1200 miles, but at the peak of the season (June and July) the skip may get as short as 300 miles, or even less. Multiple-hop propagation brings in stations at greater distances, too, making 50-Mc. WAS a definite possibility, from any point in the country.

DX of this sort shows most frequently in the early evening hours, and thus quite a few chances are missed by fellows who tend to operate only late at night. The morning hours are also good,

V.H.F. Sweepstakes expedition up to Capitol Peak, near Olympia, Wash., by members of the Capitol City Radio Club. The sled is loaded with a 1500-watt generator, gas cans, food, blankets, a 6-element beam and two Communicators. Hikers include *W7s* POP RKS PVZ, *WN7s* WGG VXR YCN and two others whose calls are on the way.

WØZJB....48	W5VY....48	W9ZHB....48
WØBJV....48	W5GNQ....46	W9QUV....48
WØCJS....48	W5ONS....45	W9HGE....47
W5AJG....48	W5JTI....44	W9PEK....47
W9ZHL....48	W5ML....44	W9VZP....47
W9OCA....48	W5SFW....44	W9RQM....47
W6OB....48	W5JLY....43	W9ALU....47
WØINI....48	W5JME....43	W9QKM....46
W1HDQ....48	W5VV....42	W9UIA....45
W5MJD....48	W5FAL....41	W9UNS....45
	W5FSC....41	W9MFH....36
W1CLS....46	W5HLD....40	
W1CGY....46	W5HEZ....38	WØQIN....17
W1LLL....46	W5FXN....38	WØDZM....47
W1GJO....45	W5LIU....37	WØNFM....47
W1LSN....44		WØTKX....47
W1HMS....43	W6WNN....48	WØKYF....47
W1DJ....41	W6ANN....45	WØJOL....46
	W6TMI....45	WØHVW....46
W2AMJ....46	W6IWS....41	WØMVG....46
W2MEU....46	W6OVK....40	WØWKB....45
W2RLV....45	W6GCG....35	WØTJF....44
W2IDZ....45	W6BWG....30	WØJHS....43
W2FHJ....44		WØPKD....43
W2GYV....40	W7HEA....47	WØIPI....41
W2QVH....38	W7ERA....47	
W2ZUW....35	W7BQX....47	
	W7FDJ....46	VE3AET....43
W3OJU....46	W7DYD....45	VE3ANY....42
W3NKM....41	W7JRG....44	VE1QZ....34
W3MQU....39	W7BOC....42	VE3AIB....32
W3OTC....38	W7JPA....42	VE1QY....31
W3KMV....38	W7ACD....42	VE3DER....27
W3RUE....37	W7FIV....41	XE1GE....25
W3FPH....35	W7CAM....40	CO6WW....21
W4FBH....46		
W4EQM....44	W8NSS....46	
W4QN....44	W8NQD....45	Calls in bold face are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.
W4FWH....42	W8UZ....45	
W4CPZ....42	W8RFW....45	
W4FLW....42	W8CMS....43	
W4OXC....41	W8SQU....43	
W4MS....40	W8BFQ....42	
W4FNR....39	W8YLS....41	
W4IUJ....38	W8OJN....40	
W4BEN....35	W8LPD....37	

with midafternoon generally a low point. At the start of the season, openings are frequently short and widely scattered, affecting only small areas at any one time, but from late May through July, sessions may last for several hours, and bring in just about every section of the country. Look for skip to open to the east first, then swing around to north-south, with finally to the west before a good opening dies out. We recall comparing notes one morning after a tremendous June splurge, to find that among three of us who had been on the night before, 37 different states had been heard or worked!

The beauty of it all is that it doesn't take high power or large antennas to work the skip when conditions are good. S9-plus reports are common with just a few watts, though of course the high-power man is able to get in a little sooner, and stay a bit longer, than his flea-powered brother. Ten-watt mobiles with quarter-wave whips can work the DX, and the folded-dipole operator is likely to do almost as well as the big-beam man, when things are at their best. Of the 10 hams who have qualified for the special 50-Mc. WAS award offered by ARRL, not one used a kilowatt rig. They did have perseverance, however, and some knowledge of when and where to look for their quarry.

Probably all of them would agree that, in making those 48 contacts, and hundreds of others before and since, they had as much fun as in anything they've ever done in ham radio. Chances are you'll feel the same way about 6 when you've given it a whirl. There will never be a better time to get started than right now!

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

Not all the tropospheric DX is worked in the summer or early fall. The weatherman cooked up a coastal inversion along the Atlantic Seaboard on the night of Feb. 21st that was almost equal to the best that September could produce. It was made to seem all the more exceptional by the presence on 144 Mc. of W1DEO, Cape Elizabeth, Maine, who gave 2-meter men their first contacts with that hard-to-get state for hours on end.

Maine has probably been the most difficult of the New England states for operators down the coast in W2, 3 and 4. It is farthest away, and there has been little consistent activity, with horizontal polarization, and the necessary power, receiver sensitivity and antenna gain to do the job at that distance. If W1DEO keeps up at his present pace, there should be some considerable change in the states-worked standings before long. His best DX on the 21st was W4AO, Falls Church, Va., about 500 miles. This was No. 23 for W4AO.

There's life in the 6-meter band. WØHVW, Pleasant Hill, Mo., managed to work 31 states during 1954, and he heard three others, including Nebraska, which is one of two he needs for 50-Mc. WAS. Gib says that WØs PYK TOQ CKQ and QXT will be on 6 this summer, to help him keep Missouri on the 6-meter map.

Southern New Jersey lost one of its most active v.h.f. stations, and the 420-Mc. band one of its strongest boosters, when W2QED, Seabrook, N. J., closed down for good in February. Ken had been active on 50, 144, 220 and 420 Mc. for more than two years, and had been a potent factor in the 420-Mc. picture along the Atlantic Seaboard for years before that. He was coholder, with W8BFQ, of the 420-Mc. record, 360 miles, for a short time in the summer of 1953, and it was through his efforts that the eastern end of the record was passed on to the next holder.

W2QED never missed a v.h.f. contest, and he kept regular morning and evening schedules with scores of stations, and on several bands. One of these was an all-time record for your conductor, a morning check on 144 (and occasionally up to three other bands) daily, that ran for nearly four years, and close to 1000 contacts.

Stations for hundreds of miles in all directions from Seabrook, N. J., will miss W2QED. But the East's loss is the West's gain, for we understand that Ken is bound for the Los Angeles area, where he will find plenty of opportunity to continue his fine work in the world above 50 Mc.

Two other famous stations are reported to be on the verge of dismantling for major moves. W2UK will be closing down in a few months, and W8BFQ-WJC is reported to be moving southward. It will take a lot of operating and antenna work to fill the gaps left in the v.h.f. bands by the departure of these stalwarts!

Another well-known call about to be heard in a new locality is VE3ANY. Gordon has taken up permanent residence in the Detroit area, and will soon be heard on the v.h.f. bands operating under his old call with a reciprocal permit from FCC.

V.h.f. operators of the Houston area have formed the 144 and Up Club, for the purpose of promoting activity and interest in v.h.f. work. This grew out of a V.H.F. Round-up held last fall. Quarterly contests are planned, the first to begin April 1st. The next meeting of the group is planned for the West Gulf Division ARRL Convention, to be held in Ft. Worth, June 10th to 12th.

We have notes from several groups and individuals this month who make the same plea: "Please let the gang know that we are on the air here, and ask them to turn their beams in our direction once in a while." K4AMX, Winston-Salem, N. C. (formerly W1ACG, Lexington, Mass.), says that he works W4NHW in Greensboro and W4CVQ, Raleigh, N. C., almost nightly, but would like to hear from other stations to the north, west and south. The Winston-Salem C.D. Net operates on 147.15 Mc. each Tuesday and Thursday night at 2000 with W4CPI as control station.

VE6HY writes on behalf of the Calgary Amateur Radio Association that there are about 15 stations on 147.6 Mc. in that area. They would like to hear from W7s who may be within operating range.

The Davidson County (middle Tennessee) 2-Meter Net meets Monday and Thursday at 1930 CST, with W4OEZ, Nashville, as NCS. Alternate is W4TPU. Average number checking in is about 10. Vertical polarization is used in net activities.

K6GKX, Long Beach, Calif., writes that Thursday and Friday nights are set aside for round-tables on 220 and 420 Mc. Use of both bands is on the increase, with W6s SSB ZW OCU and NIT, particularly, deserving credit for their efforts in popularizing these bands.

Anyone for 220 Mc. around Williamsburg, Va.? W8LTE/4 has been operating on 220.1 Mc. with a converted ARC-5, but has found nobody to talk to as yet. A 4X150A with changeable tank circuits for 220 and 420 is in the works.

Have you heard any single sideband on 144 Mc.? Elsewhere we report that W7JRG has finally given up on s.s.b. on 50 Mc., because so few fellows recognize it when 6 is open, but W2JJC, New Market, N. J., has been doing quite well with s.s.b. on 144 Mc. His power level is now about 100 watts output, from a pair of 826s, running in the AB_2 region. W2JJC's best DX so far is W1RFU, and very nice reports are being received from distances up to 100 miles or so in other directions. As almost everyone uses a crystal-controlled converter on 144 Mc., there is no stability problem in receiving the 2-meter s.s.b., and quite a few listeners have reported the readability holding up remarkably well under conditions when a.m. signals are fading into the noise. A few checks your conductor has made with W2JJC indicate that the readability is considerably better than a.m. of comparable power level. Watch for W2JJC on 144.39 Mc.

Should there be an exclusive c.w. assignment in the 144-Mc. band? Quite a few fellows think so, and at least one has petitioned FCC to set aside a segment at the low edge of the band for c.w. operation only. There are several good arguments in favor of such a move, and probably few against it, though talk of such things invariably stirs up a hornet's nest. With the amount of activity now heard in many areas, the QRM problem is getting fairly severe on 2, particularly at the low edge. It takes only a few strong 'phone signals to fill the first 100 or 200 kc., to the point where any DX signal is well-nigh obliterated. Proponents of the c.w. assignment idea say that moving up 100 or 200 kc. would work no hardship on any voice operator (we all have crystals for higher in the band, but we have dropped using them in most cases) but it would help to free a lot of territory for weak-signal DX operation, and make it easier for everyone.

Perhaps the alternative to legislation would be for us to do our rag-chewing above 144.2 Mc., by mutual agreement, and leave the low edge for c.w. DX work and special skeds. Anyone can QSY 200 to 500 kc., usually without any retuning. Let's do it more often, and give everyone a better break.

Remember, please, that the way to get ARRL action for or against a proposal that involves regulation changes is to work through your director, not through the Headquarters office. We'll be glad to hear opinions, but your ARRL director is the only man who can do anything about the matter. Be sure that he knows how you feel.

2-METER STANDINGS

	Call States	Areas	Miles
W1RFU	19	7	1150
W1HDQ	19	8	1020
W1CCH	17	5	670
W1IZY	16	6	750
W1IEO	16	5	475
W1UIZ	15	6	680
W1AZK	14	5	650
W1MNF	14	5	600
W1BCN	14	5	650
W1KCS	14	5	540
W1DJK	13	5	520
W1MMN	10	5	520
W2ORI	23	8	1000
W2UK	23	7	1075
W2NLY	23	7	1050
W2AZL	21	7	1050
W2QED	21	7	1020
W2BLV	19	7	910
W2OPQ	19	6	—
W2DWJ	17	5	632
W2AOC	17	5	600
W2UTH	16	7	880
W2PAU	16	6	740
W2PCQ	16	5	650
W2LHI	16	5	550
W2CFT	15	5	525
W2DFV	15	5	—
W2AMJ	15	5	550
W2QNZ	14	5	400
W2BRV	14	5	590
W3RUE	23	8	950
W3NKM	19	7	660
W3IBH	19	7	650
W3BNC	18	7	750
W3FPH	18	7	—
W3TDF	17	6	720
W3KWL	16	7	720
W3LNA	16	7	720
W3TDF	16	5	570
W3GKP	15	6	800
W4HHK	26	8	1020
W4AO	23	7	950
W4PCT	20	8	—
W4JFV	18	7	830
W4MKJ	16	7	665
W4UMF	15	6	600
W4OXC	14	7	500
W4JHC	14	5	720
W4WCB	14	5	740
W4TCR	14	5	720
W4UBY	14	5	435
W4IKZ	13	5	720
W4JFU	13	5	720
W4ZBU	10	5	800
W4UDQ	10	5	850
W4DWU	8	6	625
W4TLA	7	4	850
W5RCI	21	7	925
W5JTI	19	7	1000
W5QNL	10	5	1400
W5CVW	10	5	1180
W5AJG	10	4	1260
W5MWW	9	4	570
W5ML	9	3	700
W5ABN	9	3	780
W5ERD	8	3	570
W5VX	7	4	—
W5VY	7	3	1200
W5FEK	7	3	580
W5ONS	7	2	950
W6ZL	3	3	1400
W6WSQ	3	3	1390
W6BAZ	3	2	320
W6NLZ	3	2	360
W6MMU	2	2	240
W6GCG	2	2	210
W6QAC	2	2	200
W6EXH	2	2	193
W7VMP	4	3	417
W7JU	3	2	247
W7LEE	3	2	240
W7YZU	3	2	240
W7JUO	2	2	140
W7RAP	2	1	165
W8BFQ	29	8	850
W8WXV	28	8	1200
W8WJC	25	8	775
W8RMH	22	8	690
W8DX	22	7	675
W8SRW	20	8	850
W8RVI	20	7	—
W8WRN	20	8	670
W8BAX	20	8	685
W8JWV	18	8	650
W8EP	18	7	800
W8ZCV	17	7	970
W8RWW	17	7	630
W8WBE	16	7	830
W9EHX	23	7	725
W9FVJ	22	8	850
W9EQC	22	8	820
W9KLR	21	7	690
W9BPV	20	7	1000
W9UCH	20	7	750
W9KPS	19	7	680
W9MUD	19	7	640
W9REM	19	6	—
W9LF	19	7	—
W9ALU	18	7	800
W9JGA	18	6	720
W9WOK	17	6	600
W9ZHL	17	6	—
W9MBI	16	7	660
W9BOV	15	6	—
W9LEE	15	6	780
W9DSP	15	6	760
W9JNZ	15	6	560
W9DDG	14	6	700
W9FAN	14	7	680
W9QKM	14	6	620
W9GAB	14	6	570
W9UIA	12	7	540
W9ZAD	11	5	700
W9GTA	11	5	540
W9JBF	10	5	760
WØEMS	26	8	1175
WØIHD	24	7	870
WØGUD	22	7	1065
WØONQ	17	6	1090
WØINI	14	6	830
WØOAC	14	5	725
WØTJF	13	4	—
WØZJB	12	7	1097
WØWGZ	11	5	760
VE3AIB	20	8	890
VE3DIR	18	7	790
VE3BQN	14	7	790
VE3DER	13	7	800
VE3BPB	12	6	715
VE2AOK	12	5	550
VE3AQG	11	7	800
VE1QY	11	4	900
VE7FJ	2	1	365

Corrections, September V.H.F. Party Report

Following publication of the results of the September V.H.F. Party in January *QST*, we heard from several contestants whose work was improperly reported, or skipped entirely. Two Iowa logs never showed up at all, and both of them were the best that the participants had ever sent in. So, belatedly, we announce that WØGUD was top man in that section, with 78 contacts in 11 sections, for 858 points. WØEMS ran him a close second. And we did W7RT wrong in crediting him with exactly half his score. His multiplier was 4 instead of 2, bringing his total to 212, and moving him to third place in the Washington Section.

OES Notes

W1KCS, Providence, R. I. — Antennas for 50, 144, 220 and 420 Mc. back up after heavy damage in last fall's hurricanes. Results in V.H.F. SS best on record. Note to those needing Rhode Island QSLs: W1KCS now has stock, and will supply to all stations worked, upon receipt of QSL or note giving date of contact.

W2UTH, Victor, N. Y. — 144-Mc. signal of W1HDQ, 260 miles, heard every Saturday morning on schedule through winter. No complete failures, though sometimes too weak for effective two-way communication.

W2UXP, Webster, N. Y. — Having fine QSOs on 220 Mc. with W2POM, W2MHU and K2CEH. Tripler-amplifier for 432 Mc., with 9903s, finished and crystal-controlled converter well along.

W3UQJ, York, Penna. — A winter of regular operation on 220 Mc. has indicated that good year-round results could be obtained on that band if more stations were using it. Coverage seems to be comparable to that generally obtained on 144 Mc. Even very low power does well if a good antenna system is used. Schedules have been kept regularly with W4UMF, Arlington, Va., over 80 miles of irregular terrain, using only 8 watts.

(*Continued on page 142*)

Simulated Emergency Test—1954 Model

Genuine Emergencies Compete with Emergency-Preparedness Plans To Make the 1954 SET Realistic

BY GEORGE HART, W1NJM

THE SET had a lot of competition this year, especially in the East. Those AREC groups who were not girding for the next hurricane were recovering from the last one. In Indiana, a tornado or two wiped out a couple of towns and all SET plans with it. In other places also, Old Dame Nature coöperated pretty well with us, this year, to take the "simulated" out of SET, and put the gang to the real test.

Many of the AREC organizations so afflicted simply did not feel like putting on an SET on top of all their other labors in connection with the real emergency, and we don't blame them. Others submitted the regular SET form, but crossed out the word "simulated" and reported their operation in the real emergency. After giving the matter some thought, we have decided that those who did this should certainly receive credit for participating in the SET. After all, what can be better practice for operating in an emergency than operating in an emergency?

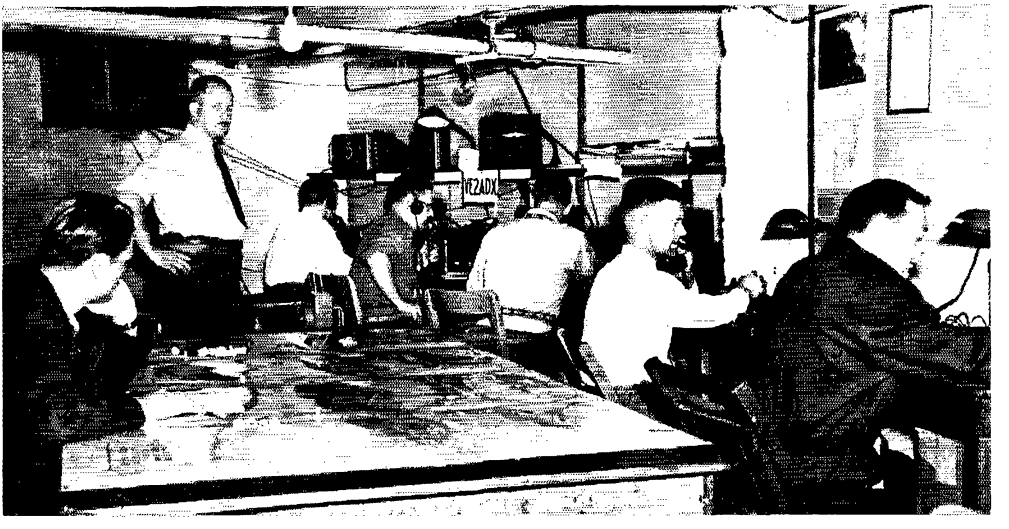
All this hullabaloo, of course, put a crimp in our over-all SET participation. Of our 1700-odd ECs, 142 reported participation in the SET. Fifty-eight of these chose to conduct their SETs at dates other than the October 9th–10th week end, ranging from October 3, 1954, to February 22, 1955. Several ECs indicated that no SET was held because they felt it unnecessary in view of regular drills in their emergency program.

Twenty-nine groups bettered their 1953 score, and twenty-four fell short. This makes 53 who had an SET in 1953 who repeated the process in 1954, leaving 89 new reporting groups. This about follows the pattern of previous years participation of repeaters and new groups in the SET.

Traffic on the long-haul circuits was light, due to the decrease in participation and the increasing tendency of AREC groups to take advantage of the latitude in dates. Seventy-seven ECs reported their SET participation, or lack of it, by radio. All but one of these were received at Headquarters by radio.

The Test Emergency Alert, an innovation in our annual SET, went over "like a lead balloon." The transmission was made from W1AW only, by 'phone at 2030 EST on October 9th, on four National Calling and Emergency 'phone frequencies (3875, 7250, 14,225, 21,400 kc.) and at 2100 EST by c.w. at 18 w.p.m. on four NCE c.w. frequencies (3550, 7100, 14,050, 21,050 kc.). Sixteen amateurs reported reception of the message. Six of them sent in 100% correct copies after having confirmed reception by radio as instructed in the TEA message itself. The winnahs: W1BDI, W1CRW, W4BAQ, W4YZE, W8CCN, WØNIY. Three amateurs sent messages confirming reception, but the mail copies turned out to be incomplete: W4COY, W8AQ, VE2HD. W4ERK's copy, by mail only, was also imperfect. The following confirmed reception by radio but did not send in copy: W1CWX, W1LKP, W1-

This is the communications control center for the city of St. Lambert, Que., as it was operated during the SET. It is operated under the call VE2ADX, of the South Shore Amateur Radio Club. There are four amateurs in the picture: EC VE2KG (standing) and seated, starting from the left, VE2TE, VE2CA and VE2NY.



QMB, W4BUA, W4CZR, W4WXZ. We thank all for participating in this test; you all rate honorable mention and an E for Effort even if you didn't copy 100%. Many of those who copied the TEA did so only because they left receivers tuned to one or the other of the NCE frequencies all the time, to be sure not to miss it. Many others reported monitoring for hours at a time without success.

Maybe we're just obstinate, but we still think the TEA is a worth-while part of the SET. What do you think? At the moment, we're planning to try it again in 1955, but we can be talked out of it.

Here's the annual breakdown of the SET by participating groups: Figures in parentheses are comparative figures from last year:

Total reports of activity: 142 (180)
AREC members in areas reported: 3635 (5534)
Total known participation: 2252 (2522)
Mobiles & portables: 999 (1149)
Fixed stations on emerg. power — 164 (200)
Messages from participants to ECs — 1365 (1841)
EC radio reports to ARRL: 77 (116)
Total points: 18,369

Abilene, Texas (W5VFH)[1]	104
Adams, Brown, Pike & Schuyler Counties, Ill. (W9AEX)[2]	80
Albany Co., N. Y. (W2AWF)[33]	201
Allen Co., Ind. (W9BEM)	216
Amesbury, Mass. (W1ICU)[3,33]	77
Asotin Co., Wash. (W7HDT)	41
Auburn-Opelika, Ala. (W5ONL/4)[4]	105
Bakersfield and East Kern Co., Calif. (W6TXM)[5,33]	94
Beckham Co., Okla. (W5UCK)[6,33]	149
Bedford, Mass. (W1RSY)[7]	190
Belleville, N. J. (W2JYW)[8]	49
Belleville Dist., Ont. (VE3AUU)[6,33]	74
Bergen Co., N. J. (W2CVF)[3,33]	984
Berks Co., Pa. (W3BN)	141
Berrien Co., Mich. (W8FGB)[33]	145
Bibb Co., Ga. (W4LXE)[32]	—
Billings, Mont., area (W7KGF)	133
Bloomfield, N. J. (W2ZPD)[6]	113
Bozeman, Mont. (W7ED)[9]	55
Bristol, Tenn.-Va. (W4IYI)[33]	122
Broward Co., Fla. (W4PPR)[33]	184
Burlington Co., N. J. (W2UA)[32]	—
Carlton & Pine Co., Minn. (WØIRJ)[10]	44
Cedar Rapids, Iowa (WØHDX)[11,33]	307
Centinella Valley, Calif. (W6OI)[12]	107
Chambly, Laprairie, Vercheres Counties, Que. (VE2KG)[13,33]	315
Charleston, S. C. (W4TWW)[14]	—
Clinton Co., Ind. (W9SKP)	114
Cobb Co., Ga. (W4WRV)	95
Columbia Co., Fla. (W4YNM)	64
Colusa, Calif. (K6CFZ)	25
Cuyahoga Co., Ohio (W8AJH)	402
Dade Co., Fla. (W4IYT)[33]	415
Daytona Beach, Fla. (W4RWM)[2]	74
Daviess Co., Ky. (W4VJV)	86
Douglas Co., Minn. (WØGTX)	81
Duluth, Minn. (WØEJG)[6,33]	191
Dutchess Co., N. Y. (W2HZZ)	135
Duval Co., Fla. (W4UHY)[6]	161
E. Los Angeles, Calif. (W6RNN)[15]	107
Elko Co., Nev. (W7PEW)	47
Erie Co., Pa. (W3QN)[6,33]	229
Everett, Mass. (W1PJ)[16]	92
Fanwood, N. J. (W2HXP)	61
Fort Worth, Texas (W5CVA)[17]	484
Framingham, Mass. (W1MEG)	60
Frederick, Md. (W3WN)[18]	54
Fresno Co., Calif. (W6JPU)	75
Fulton & DeKalb counties, Ga. (W4LXR)	240
Genessee Co., Mich. (W8FPO)	150
Goose Bay Area, Labrador (VO6U)[16]	80
Great Falls, Mont. (W7DSS)	129
Groveland, Mass. (W1MRQ)[33]	45
Hamden, Conn. (W1NFG)[19]	193
Hampton, Va. (W4AJA)[20]	86
Harford Co., Md. (W3LDD)	87
Haverhill, Mass. (W1SIX)	141
Hobbs, N. M. (W5CEE)	45
Howard Co., Ind. (W9DKR)[33]	68
Huntsville, Ala. (W4TKL)	130
Iroquois Co., Ill. (W9HKA)	32
Jackson, Tenn. (W4AYQ)[32]	—
Johnson Co., Ind. (W9KNM)[21]	27
Kingsport, Tenn. (W4CBU)[6]	167
Lake Co., Ohio (W8OXS)	132
Laurle, Mont. (W7LBK)	122
Lawrence Co., Ind. (W9WHL)	21
Long Beach, Calif. (W6QGT)[22]	298
Lucas Co., Ohio (W8HNP)[33]	379
Mamaroneck, N. Y. (K2ASQ)[23]	68
Manchester, Conn. (W1FSH)	98
Manitowoc Co., Wis. (W9RKT)[24]	87
Marion, Monongalia, Preston Counties, W. Va. (W8JWX)	63
Marshall Co., Ind. (W9AYB)	37
McKean Co., Pa. (W3LQQ)	29
McKenzie, Tenn. (W4BQG)[25]	36
Mecklenburg Co., N. C. (W4ZQB)	198
Medford & vicinity, Ore. (W7ISP)[25]	50
Memphis & vicinity, Tenn. (W4BAQ)[33]	283
Menominee & vicinity, Mich. (W8QGQ)	64
Merced, Calif. (W6ZRJ)[32]	—
Mercer Co., Pa. (W3CJF)	44
Mitchell, S. Dak. (WØGCP)[32]	—
Monroe, La. (W5MWE)	75
Monroe Co., N. Y. (W2QY)	111
Morgan Co. & vicinity, Ala. (W4BFM)[33]	66
Morgan Co., Ind. (W9DUD)	37
Nassau Co., N. Y. (W2GI)[26,33]	1049
New Bedford, Mass. (W1AVY)	38
New Orleans, La. (W5INL)[2]	88

(Continued on page 136)

[1] Nov. 9. [2] Oct. 12. [3] Oct. 13. [4] Nov. 7. [5] Oct. 22. [6] Oct. 17. [7] Aug. 31 & Sept. 11, credit for participation in Hurricanes Carol and Edna. [8] Oct. 19. [9] Feb. 22, 1955. [10] Oct. 27. [11] Oct. 24. [12] Oct. 26. [13] Oct. 15. [14] Asst. EC making report; no points calculated. [15] Oct. 21. [16] Oct. 14. [17] Oct. 31; [18] Oct. 15, credit for participation in Hurricane Hazel. [19] Oct. 28, 29 & 30. [20] Credit for hurricane participation, Sept. 10–11. [21] Credit for participation in tornado emergency, Oct. 11. [22] Oct. 18. [23] Oct. 25. [24] Oct. 3. [25] Oct. 11. [26] Oct. 9–17, combined report of all ECs in Nassau Co. [27] Nov. 1, [28] Oct. 23. [29] Oct. 30. [30] Oct. 16. [31] Oct. 4. [32] Reported active, but no point total calculated. [33] Bettered last year's score.

♦

The Amesbury, Mass., control station was set up at the School Street Fire Station. That's W1RYJ at the mike, with W1ZFZ on her right and EC W1ICU on her left. Standing, l. to r., are W1DOX and W1UIL.

♦

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD/9

How:

We came to the end of the business portion of our first post-DX Test club meeting and the boys sat back for the usual informal finale of our monthly get-together. Inasmuch as two of our gang were being evicted by their landlords, tonight's discussion appropriately was titled "How to Select a DX QTH."

Chairman Bandspread McSwindle, who has 715 feet of 20 meters on the dial of his homebrew superhet, first called upon Cunningham Plotch, our most recently established 200-country man. Cunningham's explanation for his shack's location was disappointing: "Shucks, the XYL liked all the closet space."

McSwindle then tackled Skeds Stamplicker, a guy who earned his DXCC the hard way with 12.3 watts input and a scratchy receiver volume control. Skeds' reply didn't bring the house down, either: "Gee, the best pizzeria in town is right across the street and they don't deliver."

Next came the uninspiring lowdown on why Bugbeater Butterby has a shack on the top floor of a bowling alley: "Won a suit against the place for bruises suffered while working as a pinboy." Also how come Svishy Svensen keeps his station in the back of his fish store: "The tuna vat makes a good ground for an 80-meter vertical." (A paradox becoming evident was that all these birds with crummy QTHs were the most active and eager DX men in the club!)

Well, we all began to realize that we were getting nowhere speedily. The discussion was turning out to be as constructive as a rubber crutch. But just as disgusted Chairman McSwindle was about to adjourn the session and forget the whole thing, in walked Acres O'Green, late to another meeting as usual.

Now everybody knew that Achy had the best DX QTH in the club. Brother, *what* a spot. And, sure enough, when Bandspread asked him about it Acres described in glorious detail how he went about selecting such a marvelous location. He had called in seven communications engineers who took noise and f.s. readings all over the place. The ground conductivity was investigated by three other specialists. Surveyors checked the elevation and general topography for miles in every direction. Acres left nothing to chance and no propagational pebble remained unturned.

After several months of such monkey business Acres built a bungalow on the stake and installed a classy shack. All his pains were worth the effort — man, did that boy *get out*. Any old time Achy tapped his key or whispered into his mike the ZC3s and VQ9s came back on their hands and knees.

O'Green concluded his lecture with the orthodox "Any questions?" and somebody up front came through with the natural one: "Say, Achy, tell us how many multipliers you piled up in the Test, huh?" Our guest of honor by default scratched his chin, thought a moment, then looked uncomfortable.

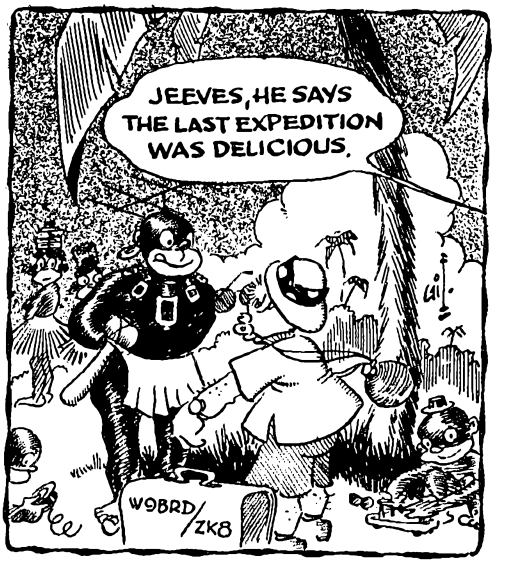
"Well, fellows — ah-h — decided to do a little rebuilding, you know. That was in 1952, come to think of it. Then somebody loaned me a couple of LP records and I kinda got hopped up on hi-fi. Haven't gotten around to finishing up the rig. And that reminds me — I've just come from my monthly meeting of the Beebop Lovers of East Podunk. I'm president, you know, and the club wanted me to tell you birds to get your darned harmonics the heck off WOOF-FM on Sunday afternoons. . . ."

Bandspread McSwindle himself led the sturdy little band that picked up Acres O'Green, handed him his Homburg and neatly heaved him out the door.

What:

But, as McSwindle observed on the way home from that meeting, O'Green will be back. They *always* come back. And sure enough, Achy could be heard going after ZD8AA and PJ2MA on 20 and 40 with his exciter the following night.

Some of the vast treasure hoard on Cocos Island was freely ladled out by TI9MHB beginning early in February. Not material wealth, that is, but QSOs by the thousands, contacts with one of the rarest entities on the ARRL DXCC Countries List. W6MHB officiated in this charity, ably assisted by a Viking rig, NC-183 and HQ-120 receivers, and a few bulky spools of hard-drawn copper. TI9MHB aimed



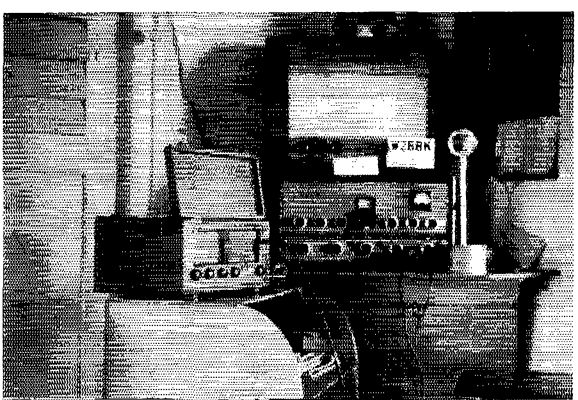
* *New Mailing Address:* Effective immediately, please mail all reports of DX activity to DX Editor Newkirk's new address: 4128 North Tripp Ave., Chicago 41, Illinois.

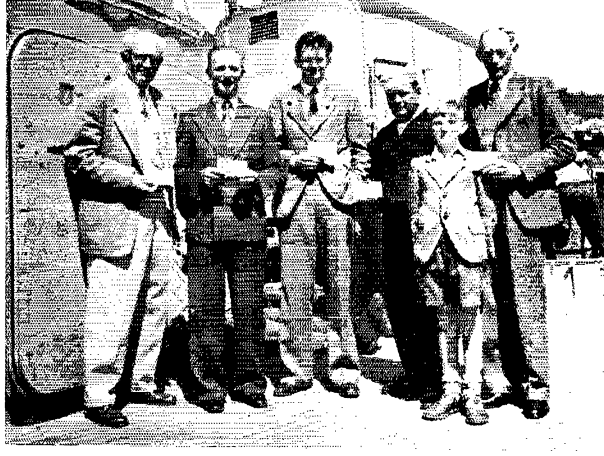
for 10,000 A1 and A3 QSOs on 10 through 160 meters and was operated in ideal maximum-contacts-per-hour fashion. Whether or not the hunt for cached doubloons and pieces of eight pays off, the hamming aspect of this venture stands an unqualified success.

Twenty 'phone, now, if you please. CR7CF 20–21, ET2US (183) 17–18, HZ2AEH 17, TF5SV (114) 15–22, VPs 2KM (197) 17, 8AQ (100) 23–0, VQ8AR (150) 14–20 and YI2AM (145) 12–14 leveled W4CBQ off at 108 . . . . . New p.p. 810s and ZD3BFC (109) 23 made it 162 for W9BVX . . . . . W9WHM raised EA9AR (325) 20–21, FP8AP (348) 21, GD3ENK (190–200) 15–18, HKØAI (150) 21, KS4AW (225) 7, 3V8BL (225) 21 and 4X4AS (150) 0 to reach No. 105 . . . . . VO6U mentions ST2DB 20–21, VP2DA (121) 22, VQs 2DT (187) 19–22, 3ES 18–19, ZB1CM (134) 15–20 and 3V8AS (195) 19–21 . . . . . So. Calif. DX Club's *Bulletin* recommends 14-Mc. A3ers CR6AC (126) 21, CS3AC (183) 20, EAs 8AI (175) 15, 9AP 15, 9DQ (135) 10, EL2X (109) 21, FB8BM (199), FD8AA (175) 21, FF8BB (137) 23, FQ8AK (130) 21–22, GDs 3IBQ (155) 15, 6IA (150) 16, KB6AQ (274) 1, KP6AK (217) 0–1, KR6AZ (277) 1, MP4QAH (140) 15, OE13JM (124) 15–16, OQ5GM (130) 21–22, PI1J (166) 6 just Holland, SVØWK (150) 15, VK9RH (137) 18–19, VPs 2DL 5AE (146) 21 of Turks, VQs 2FU 18, 3RJB (142) 20, 6LQ (150) 5, 8CB (100) 6–15, YU1s AD (142) 15, GM (113) 15–16, ZC3AC (160) 11, ZDs 4BF (115) 23, 9AC (140) 19–20, ZP5s DY (210) 1, GF (195) 1, IB (144) 0, ZSs 2MI (150) 20 of Marion Isle, 7A 7B 8E 9F, 4S7YL (142) 14–15, 5As 1TA (196) 0–1, 4TL (146) 16–17 and 4TR (125) 16 . . . . . West Gulf DX Club's *DX Bulletin* spills the 'phone beans on 20-meter men CR5NC (199) 23, EA8s BA (152) 14, BQ (130) 19–20, FE8AE, FL8AI (150) 16–17, FM7s WF (127) 21–22, WN (124) 15–16, FY7YE (115–150) 21–22, GC6FQ (158) 15, M1B, TG9MB (155) 16, UA3CR (132) 15, VK9OK (155) 7, VP8s galore, questionable VQ1MP 21–22, YS1MS (167) 16, ZB1AJX (109) 18, ZDs 4BR (116) 22, 9AB (170) 23, ZS8I (100–340) and 4X4GB (109) 20 . . . . . *Newark News* Radio Club slapped headphones on 14-Mc. voicers CEØAD, CN2AD (115), CR6AJ, DU1AL 15–16, EAs 9BC (265), ØAB (110) 22, EL9A (240), FB8BN 22, FF8AL, FO8AK, FQ8AW, GC4LI, HI6EC, KAs by the mitful, KAØIJ (190) 23 of Iwo Jima, KGs 4AR 6FAA, KR6s AF 23, KS PW, KT1WX (190), KV4AQ, MP4KAC 14, OD5AB, OQ5s EB (135), EC FF (110), FO GM OH (250) 20, RU (230), OQØDZ, PJ2s AF AK AO 2, AP (160), CH (141) 19, TG9AJ, VPs 1AB 2LF 7NN, VQ4AQ (163) 19, VRs 4LP 6AC (320) 20–21 of Pitcairn, VS2s CT 12, EB 16, YNs 1AFM 4CB (205), 4DQ (227), ZEs 2KI 2KN 20, 4JA, ZS3s AH E, 4X4DK, 5As 1TC (170), 2TZ (150) 17–18 and 4TY (150), all these times Greenwich.

Twenty c.w. emerged from the annual ARRL DX Test battered but unbowed. CR5s AF JB (78) 20, DUs 1CV (65), 7SV (27) 0, FG7XB (28), SVØWL (90) 13, UB5KBE (60) 14, VS2CR (42) 14–15 and VU2EJ (50) swapped notes with W8EV . . . . . DL4ZC collected FB8BR (50–100) 16–18, VQ3CF 15, YV5DE 15 and ZS9I 19 . . . . . Choice plums CT3AB (35) 9–20, DU1DR 15, EL2s P (47) 15–19, X 19, FF8AJ, FP8AP (25–73) 13, FQ8AX, FR7ZA (18) 16, HR1AT 19, KC6CG (52) 17, MDs 5FA 7AB 17, VP7MI 20, VQ5EK (30) 14–19, VSs 1FE 1GK 2EG 15, VU2s CP JP (80) 15–16, YS1O 17–18 and ZD4BQ (78) 18–21 are among ZD6BX's harvest . . . . . W2HSZ, confidant of Count U. R. Kuntries, did well with CRs 4AL 6AI (59) 21, 6CJ (11) 19, 7LU, FF8BF, FM7WM, FQ8AG, OQ5HI, OX3UD, TF3MB, VQs 2AS (72) 19, 2JN 4FG, YN1PM, ZD4BM (80) 18, ZE3JL (35) 19–20 and ZS3AH to reach postwar 154 . . . . . FB8BE (61), KW6BB (104), LB1LF (21), ST2GB (10–76) 20, VQ3s FN (54–68) 20, JTW (23) and ZS7D (7–28) 19 worked W9TGY to 138/110 . . . . . It's 121/107 at W9UKG thanks to EL2C (80) 22, ET3S (84) 20, FY7YE (35) 13, HA5KBA (64) 17, SP3PK (20) 15 and a ZD4. OY4XX (20) 17 got away . . . . . W9AMM did a grab on EL9A, Togoland's FD8AA (10–94) 14–17, KAs 2USA 9MF, JAs 3AF 3FG 6AD 8AQ, OQ5CP (50) 21, SP2KAC, SVØWO and ZB2A (40) 18–19 . . . . . EA9AP (19) 16–19, IT1TAI (70) 19, OD5AV (30) 5, OX3SL (60) 17, VQ4FK (5) 19, YI2AM (60–80) 15–21, ZB1JRK (7) 20–21, 9S4AX (2–12) 15–19 and others fell prey to W4TFB . . . . . W4ZAE's new cube quad will have trouble improving on CR6CZ (30) 21, FF8BB (21–68) 19, FM7WP (14–22) 15, KR6KS (15), VP2GW and ZE6JB . . . . . W4JBQ caught EAs 6AF of Balearics, 9DF, OQ5GU (9) 23, YO4CR, ZE3JO and a ZS7 for a 112/88 total . . . . . At K6ENX we find OA4ED (15) 1, PJ2AD (50), TF3KG (30–70) 19–21, VP8BF (60) 1 and VS6CR (30) 1 . . . . . EA8s BC BF (40) 21–22, GC2CNC, HP1BR, OY2Z (55), SP3PK, TF5SV (40) 22, VQ2HR (29) 10 and ZB2I (10–30) 19–21 brought W3UXX past the century . . . . . I5LV (95) 20, VQ8AY (58) 18 and ZD6EF (55) 19 looked mighty good to W4EPA . . . . . CR7CN (10–69) 21, ET3GB (10–55) 18, KA2USA, OY2A (5–75) 16, SV1AB (60) 19, VQ2W (50) 20, YO3RF (61) 17 and ZB1CH (67) 22 were booked by K2BZT . . . . . W5VIR worked FF8CG (40) 23–0, JA3BB, KM6AX (15) 21–0, VP8s AQ (80) 0–2 and BD (40) 2–13; heard CPs 3CA (29), 5EK (88), HK1TH (39), HZ1AB (88), IS1CXF, LZ1KPZ (88), MB9BJ (90), OD5s AX LC (30), ZB1KQ and 4X4BN (54) as W5VIR/2 . . . . . CRs 6CZ (38) 21, 7AN (17) 20, an EA6, F9YP/FC (60) 19 and ZD6BX (50) 19 answered W1WAI . . . . . Climbing to 108, W1OJR settled on many of the aforementioned as well as CR6CW (18) 21, EA8BK (15) 17, EL5B (37) 20, ET2PA (55) 18, FA9VE (65) 18, I1BLF/Trieste (55) 17, SP8KAF (25) 16, VQ4BNU (18) 19, YO8CF (52) 13, ZC4RX (30) 17, ZS3s B (50) 21, K (32) 18, 3V8AN (45) 13 and 5A4TX (75) 17. Vic notes that former neighbor and ardent DX man W1RY now signs W8RQ as a Michigander . . . . . Log-snooping hither and yon, at *W1PWK:* FG7, FM7s, VP7NX. *W2GVZ:* FB8, Jan Mayen, MP4QAJ (58), a ZD7. *W2OLU:* FY7, VE8s, VP6RG, ZB1. *W2QBB:* EA8, HC1LE (60) 22. *W2ZGB:* ET3, KJ6AZ (110) 22–23, KW6, ZD4. *W3AXT:* F9QV/FC, VQ6LQ, ZE5JA. *W4EPA:* ET3LF (20–50) 17–20, ZD4, ZS3E (95) 21. *W6OWD/1:* HB9QQ/MM (25) 19, KV4AA (90) 12. *W6LRU:* VR3A (85) 17. *K6AAW:* FO8AB (20) 2, JAs 1 through 8, VP4LZ (10) 23–0. *W7EWR:* oodles of KAs, CX2AM 3, PJ2AJ. *W8DLZ:* CR6AR (12), TF5, ZD4. *WØVFM:* SP9, TF3, YV5FV (88) 22. *F7ER:* heard AP2Q (18) 12. *VO6U:* VP1AA (1) 23, ZC4JA 13 . . . . . WGDXC 20-meter A1 goodies: CE7AA (52) 3, CR6CS (60 (18, EAs 8AX (42) 14, ØAC (10) 21–23, FE8AE, FF8AP (62) 21–22, FL8AI, FM7WQ (63) 0, FO8AM (70) 3–4, GC2FZC (50) 19, HB1MX/HE (35) 14, KG6GX (83) 2, KT1WX (80) 18–19, LUs 1ZG (15) 2, 6ZT (35) 22, M1L (58) 16, MP4BBL (79) 14–15, OD5AI (62) 15, OQ5BQ (49) 22, SP3AN (80) 14, VPs 3VN (90) 19, 8AX (72) 0–1, VQs 2AB (60) 21,

FP8AK/VP2, operated by W2BBK on Tortola, Leewards, B. W. I., from February 2nd through 4th, helped prime the gang for the appearance of TI9MHB, Cocos, a week later. Doc and the XYL visited at the domicile of VP2VA (shown here with W2BBK) where the FP8AK/VP2 Viking, S-72 and 80-meter half-wave ticked off about 150 QSOs on 80 and 40, plus a half dozen or so on 20 and 75 'phone. W2BBK looks forward to DXpeditionary work from other spots and welcomes inquiries from DXers interested in accompanying him. Game?





The 1955 U. S. Antarctic Expedition buttoned up aboard *U.S.S. Atka* and left New Zealand for southern adventure in early January with W2ZK as the only ham included. Just before sailing, this photo was snapped of (l. to r.) W2ZK, ZL2JF, ZL2ASL, chief radiop Dehetre of *Atka* radio NMBT, ZL2ASL's jr. op, and ex-ZL2GO, father of ZL2ASL. It will be W2ZK's third Antarctic ordeal, for Bud is a veteran of the 1934–1935 and 1946–1947 Byrd explorations. He well knows what it's like to spend "three days and nights on the roof of an auto tractor in pitch darkness at 70 degrees below." We'll take a mild spring in good old U. S. A.!

♦

2DA (0) 20, 2GW (5) 0, 4AQ (5) 20, 4RF (82) 18–19, ZDs 2DCP (42) 20–21, 3BFC (1) 23–0, ZP4ZQ (59) 22, ZS3s AB (30) 20, HX (52) 22, P (67) 19, 4X4DK (141) 15, 5As 2TZ (90) 0, 3TT (13) 13 and 4ET (40) 14 . . . . SCDXC volunteers CN2AD (60) 14, EA8AB (12) 17, FW8AB (80) 3, I5SV (45) 15, LX1AP (15) 16, MP4QAH (60) 15–16, OY2XX (22), VQ8CB 15, VS2CR (42) 14–15, YI2AM (60) 15–16 and 4S7YL (42) 7 who is rumored to have several beautiful daughters . . . . G2RO at the keys of VLØRO (Nauru) and VQ8AY raised numerous eyebrows; so did VR2AB/A in the Tokelaus.

Forty c.w. keeps ridin' high. K6ENX (see Whence) went to town with CR9s AF (40) 15–16, AI (20) 16, DU1DR (30) 16, JZØDN (28) 15–16 of Biak, KC6CG (25) 16, LUs 2ZI (30) 7, 7ZO (40) 7, OX3AY (20) 14, VPs 7NG (15) 2, 7NX (10) 1, 8AZ (30) 4, 8BE (25) 7, 8BH (25) 2, VSs 1FE (30) 15, 2CR (15) 16, 2EL (45) 17, 6CG (40) 14–15, 6CT (30) 17, 6DD (35) 16, YS1O (30) 3, YU3BC (20) 16, YV5DE (50) 11, ZSs 7D (20) 15, 7J (20) 15, plus cuties AI1BC (10) and KD6AT (25) 15. (AI1 is the MARS-AF prefix for Japan — what goes?) AC4NC and VK9DB escaped . . . . EA6AF 23, HH3DL 22 with ex-VP7SL at the key, KG6FAA 13, PJ2AN 3, VPs 1AA 13, 7NM 23, OT G6UT at the key of ZS1RG 3 and 4X4FW 2 greeted W4YZC . . . . W1WAI captured EA9s AP (9) 23, DF (21) 22, FG7XB (39) 2–3, FM7WP (13) 23, HR1JZ (20) and others . . . . YV5DE 6, ZC6AEH 17–18, ZD6BX 19 and 4X4DE 21 gave in to DL4ZC . . . . K6EC clashed with CE3DZ (11), CN8GB (12), a CR9, VP8s AY (37), BD (22), several VSs and ZSs. Ev's neighbor, W6KJR, contacted KC6AI (30) and KR6KS (22) . . . . CR6AI (8) 22, F9YP/FC (18) 22, GC3KAV (20) 0, HA5BT (19) 23, LZ1KAA (23) 1, SP6WF (7) 22, ZE3JP (31) 2, ZS3HX (10) 5 and 3V8BL (24) 22 were annexed by W4YHD. Jim heard UA2KAW, UB5KKA and UF6KAF (34) 21 but they weren't having any . . . . HKØAI (18) 1–2, HR1MC, LUs 4ZI 7ZM, TG9AZ, VR2CG (45) 18 and a ZS3 succumbed to W3AXT . . . . FP8AK/VP2 was No. 188 for FA8RJ, thanks to the good offices of W2HSZ. The latter also worked CR7CI (3) 4–5, CT2BO (30) 4–5, EA9AP, EL2X, FAs 3OA 9VN, GC3KBG, HC1LE, OQ5GU and myriad YUs . . . . DU7SV, FP8AP, JAs 1AS 1CB 1KM 2LC 8AE ØCG, W5GAX/KG6 and VP1AA (1) 3 QSOd W5CAY . . . . Items at random, *W4TFB:* VQ4RF (15) 5. *W5VIR:* JA1AFF 14, KR6OY 14, TI2s BX 2, PZ 4, VP7NN. *K6DVB:* a DU, JA1s AA CR EU, KG6GX, *W7VWS:* JA3FG, with his new Viking Adventurer. *VO6U:* I1BNU/Trieste 2–3. *ZD6BX:* JA1VE, VQ2DA, a VS2 . . . . Club 7-Mc. luck, *WGDXC:* FKS8AZ (7) 1, FM7WD (20) 5, FO8AK (80) 7, HC4MG (34) 13, HK4BP (22) 5, OQ5CP (15) 2–4, ST2AR (3) 22, UB5KAB (15) 3, ZD2DCP (5) 23, ZE3JL (30) 20 and 9S4AX (7) 21. *SCDXC:* CRs 4AL (1) 2–3, 5AQ (10) 1, 7AL (10) 15–16, HA5HR (12) 15, HB1LF (12) 7, KJ6FAA, LUØZB, OY7ML (13) 16, SP9s KAD (2) 15–16, KXS (12) 15 and SU1BR (20) 0–1.

Forty 'phone is *murder* but still there are hardy souls undaunted. Radio Moscow continues to simultaneously and steadily erupt on 7230, 7240, 7270 and 7290 kc. in the W/K A3 spectrum, with several other frequencies used in would-be 'phone-DX ranges below 7200 kc. NNRC reports CE3PV 10, CN8MS, CP3RC, DU9VL, EA8BC, EL2X 8, HH2s GL (167) 12, RM (165) 12, JAs 1EU 1VP 2AL 2AS 2BX 2FA 2FR 4EQ 6IZ, KJ6FAA (230) 5, TG9s, VPs in number, VK/ZLs and YN4CB as among those banging away in the A3 Test section.

Eighty c.w., however, is right in the groove. KP4KD agrees, what with CN8s BJ (25) 22, MI (25) 22, CT2BO (10) 22–23, EL2X (5) 23, FAs 8BG (5) 7–8, 9RW (8) 7, KL7AWB (10) 7, LZ1KDP (5) 23–0, SP2BO (5) 20, YO3AR (20) 5–6, YUs 1AD (3) 23, 3IG (20) 5 and ZC4JA (15) 3 . . . . FA3TL, FY7YC, HA5KBA, HB1MX/HE, LU1ZS, OE2JG, PJ2AA, SP5FM, TI2BX, VP8BD, YUs 2BNO 3ABC 3HB 4GR, ZB1BF and ZD2DCP didn't elude W3AXT . . . . Among W4TFB's lengthy list we spot FA8DA (8) 6, KM6AX (3) 7, ZLs 1AO 1BY 1CI 3GQ 3QX 4IE and 9S4AX (5) 6. The Zedders peaked from 7 to 8 on the Greenwich clock, all near the low edge . . . . GD3UB, YO6AL (6) 4, YU2BOP (a jazz man?) and ZB1BF (12) 4 clicked with K2BZT . . . . More 3.5-Mc. luck here and there, at *W1WAI:* VP9BL, a 9S4. *W2IVS:* KM6, LU2, ZK1BG (12) 1; heard DU7SV (21) 5, UB5CF (11) 1. *W4YOK:* EL2, FA9, VP7NX, YV5BJ. *W4YZC:* CT2, VP7. *K6AAW:* KL7, KM6. *VO6U:* FA8DA, YV5BG . . . . SCDXC and WGDXC sources add 80-meter candidates HB1AQ/HE (30) 7, JA1CR (6) 12, LZ1KAA (7) 1, SP3AK (12) 8, SU1SW (8) 15, VPs 7NM (10) 8, 8BH (8) 1, XE1OE (20) 8 and YU4AA (2) 7. Don't snicker at that XE entry — have *you* got a Mexico QSL on 3.5 Mc.?

Fifteen 'phone crawled out of wintry doldrums to give W9HYG a pile of ZSs, CN8CS (25) 19, CR6BH (230) 17, CX5AF (241) 22, HC1FK (224) 18, OA5G (251) 16, TI7ES (265) 19, OQ5RU (160) 19, VPs 6TR (250) 17, 5AE (214) 13, ZE2KR (130) 14 and ZL1BY (226) 15 . . . . W5VIR cornered CP5EK 22, CX1GG 17, EL2X 17, HCIs LW 22, PL 19, HP3FL 22, HR1EM 18, OA4s C 1, CC 23, PJ2s AA 21, AO 16, TI2s ACM 22, BX 23, GC 21, VPs 1GG 22, 5DX 18, 5SC 15, 8AQ 23, YN1AA 23 and YV4BV 22 . . . . DU7SV, KA9MF, KR6AF, KW6BB, OQ5GM, ZS3s AB and BC returned the compliments of W7AHX . . . . W6NJU's new 21-Mc. rotary impaled CE3II, KG4AC, YV5EC, VKs 2AMD 4TN, ZLs 1OF 2BN 2IJ 2RC 4GC and 4HE . . . . Observing opprobrious treatment of the U. S. 21-Mc. A3 band limits on the parts of many Test participants, W6ZZ racked up CE, DU, EL, KA2KC, KG6GX, many KH6s, KJ6AB, KL7s AOL BFP, KV4BD, LU1EQ, VP1 and VP5. VP7NX, VR2CG, ZL2LV, ZS6s ABK CV DW and ZO . . . . 21-Mc. 'phones CN8s HV MM, EA8BQ, OK1KAI, OQ5EL, ZDs 3BFC 6BX 9AC (225) 16–17 and ZC4JA are specified by NNRC, SCDXC and WGDXC organs . . . . The latter organization denotes c.w. performance by 15-meter men FA8RJ (30) 18, I1BLF/Trieste (67) 17, ZE3JL (40) 18 and ZS3K (35) 17 . . . . More code stuff from W5VIR: DU7SV (110) 23–1, FA8DA 17, KA2KS 22, KG4AN 22, OQ5s GU 16, RU 20, VPs 5SC 14, 7NM 14, VQ2HR (80) 20 and YV5BX 16 . . . . FY7YC (5) and VP8BD (215) were 21-Mc. radiotelegraphers checked off by W8DLZ.

Ten 'phone appears on the verge of something or other but we had better not hold our breaths. Anyway, ZLs, other Oceanians and Africans are sneaking signals into North America at odd intervals. The NNRC boys found north-south paths open for CE2HJ, HC1KV, TIs 2BX (480), 3LA (480) 17, VP1AP (260) 17 and XE1IQ.

One-sixty c.w. produced a good many multipliers for February and March ARRL Test contestants. Regular participants in Transatlantic Test doings found the going slow but gratifying. This assortment of DX is reported available: EI9J, G2s AJ HKU, G3s BKF BLA ERN ETP

DU6RG competes with DU6IV for honors as the most active DXer among Iloilo City's half dozen amateurs. (*Photo via DU7SV*)

FMZ GGN GM HDB HQK HRW IZK JBM/A JEA JED JJZ JML JMS JNO JOJ JVI JVK PU, G4NS, G5s JU LQ PU RI, G6s GM HD LB, G8s PG PU QZ WF, GC3HFE, GIs 3HCG 3IOS 5UR, GMs 2BUD 3EHI 3HDP 3HRZ, HB9CM, HK4DP, HR1LW, KP4s CC DV KD, KV4AA, LU3EL, OA5G, OD5LX, OKs 1AEH 1AJB 1HI 1KTI 2KHS 3AS 3DG 3MR, TA3AA, TI2s BX WR, VPs 4LZ 7NG 7NM, VS6s CQ CZ, YU1GM, YV5DE, ZC4s FB GF JA RX XA, ZLs 1BY 3AB and 3RB. DL1FF had no 1.8-Mc. rig authorization and could only listen, doing fast and furious logging. SWLs J. L. Hall, R. and W. Iball did fine reporting as did groups sparked by Ws 1BB and 3RGQ ._._._ One-sixty good fortune at this shack and that shack, at *W1WY:* EI Gs KP4 KV4 VP7 YV5. *W1ZL:* G KV4 TI VP7 YV5. *W2QHH:* EI KP4 OK1 TI VP7. *W3EIS:* G HB9 KV4 OK1 TI VP7 YV5. *W3RGQ:* OK1 and others. *W4KFC:* ZL1, others. *W9FIM:* KP4 VP7 YV5. *W9PNE:* G KV4 TI VP7 YV5, 2 ZLs. *KP4KD:* G LU3 TI YV5 and EL2X cross-band to 80 meters ._._._ Seasonal atmospherics reach North America beginning this month and 160-meter activity will drop. But bear in mind that cold quiet nights are developing south of the equator — the LU and ZL season really extends into the U. S. A. summer.

Where:

W1RDV, who keeps his eye on IARU QSL bureau developments, advises that Dominica Islanders can receive all QSLs via VP2DA. Also, that VQ5-bound cards can be addressed to P.O. Box 1803, Kampala, Uganda ._._._ WØPRM now undertakes U. S. and Canada QSL chores for 9S4AX, spelling W1NWO in a task well done. Full QSO data plus stamped self-addressed envelopes are required ._._._ W8ROV (ex-XU8ROV), who distributed rare Lanchow, China, QSOs during November of 1945, welcomes QSL inquiries at the address to follow ._._._ G2MI of RSGB emphasizes that new postal regulations call for higher postages on overseas mail. To avoid return or delay of your packs of RSGB-bound QSL cards make certain that sufficient postage is attached ._._._ ZS6FN acts as QSL manager for Marion Islander ZS2MI at P.O. Box 7243, Johannesburg. "Contacts will be confirmed on a QSL-for-QSL basis and return postage [IRCs] should be included if direct return QSL is desired. I receive ZS2MI's log over the air weekly." ._._._ New IRTS (Eire) QSL bureau address: I. Morris, EI6U, 9 Shanrath Rd., Whitehall, Co. Dublin ._._._ XE1BI of LMRE debunks XG6A operation, adding that XE1 XE2 and XE3 are Mexico's only regular call-area prefixes. XE5 XE6 and XEØ represent special permits. No XG-prefixed ham calls have been assigned ._._._ More debunking — SVØWO thumbs down SV1AZ "on Crete." Greek nationals SV1s AB and SP have the only such. Incidentally, over a dozen SVØ calls are active in Greece and all can be QSLd via Hq. JUSMAGG, APO 206, New York, N. Y. "It is possible that American civilians will be allowed to operate here sometime this year. If so, Rhodes, Salonika and Crete should be well represented." SVØWO lists SVØs AS KS WX and WY as n.g. ._._._ W6UED has it that LU9AH handles only *outbound* Argentine Antarctic QSLs. Incoming confirmations for LU "Z" stations should go via the Argentine society (RCA) ._._._ Ex-VP8AZ (G3IJZ) stresses that all VP8s can be QSLd via RSGB or % Postmaster, Port Stanley, Falkland Islands. The VP8 mail proposition continues a tough one ._._._ For the alphabetical digest to follow, many thanks to W1s MX OJR RB UED, W2s CR GT TXB, K2ENO, W3s AXT SOH, W4s CBQ EPA KFC YHD YOK YZC, W6s AM DZZ OWD/1 TI UED, K6EC, W8DLZ, W9s CFT EU GVZ, WØVFM, NCDXC, NNRC, SCDXC and WGDXC:

CE7ZU (QSL via CE3OQ) ._._._ **CO7PG,** Box 58, Camaguey, Cuba ._._._ **CR6CW,** Box 1400, Luanda, Angola ._._._ **EA9DE** (QSL via EA2CA) ._._._ **ET3MB,** Box 114, Addis Ababa, Ethiopia ._._._ **ET3TRC,** P.O. Box 1047, Addis Ababa, Ethiopia ._._._ **F7DO,** E. J. Doyle, 16 Rue Levy, Alphandery, Chaumont, Haute-Marne, France ._._._ **F7ER** (QSL via F7DZ) ._._._ **F9YP/FC,** Claude Garcia, Calvi, Corsica ._._._ **FA3LY,** R. Forin, 25 Marceau, Oran, Algeria ._._._ **FB8BM,**

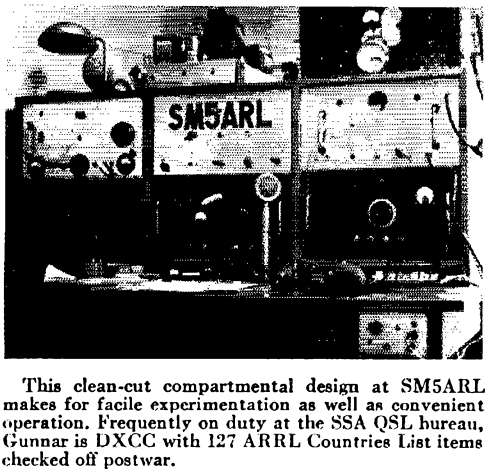
At inspection ready, the DXpeditionary kit of K6EUV. Revamped BC-458, BC-454, and indispensable accessories squeeze into the solidly built case at upper left. This layout was scheduled for action on Gibraltar as ZB2N but, "The best-laid schemes o' mice and men aft gang a-gley." See Whence.

Box 806, Tananarive, Madagascar ._._._ **FD8AA,** Box 185, Lome, French Togoland ._._._ ex-**FF8AZ,** Sgt. H. Josse, Chateau de Pas, Centre d'Essais en Vol, Bretigny-sur-Orge, Seine-et-Oise, France ._._._ **FP8AK/VP2** (QSL via W2BBK) ._._._ **HA5KBA** (QSL via W3AXT) ._._._ **HC1ER,** M/Sgt. E. Rodriguez, USAF Mission, % U. S. Embassy, Quito, Ecuador ._._._ **HK4BQ,** Box 728, Medellin, Colombia ._._._ **HR2HA,** H. Auler, San Pedro de Sul, Honduras, C.A. ._._._ **KG4AV,** A. Babine, Box 55, Navy 115, FPO, New York, N. Y. ._._._ ex-**KR6LE** (QSL to OA5G) ._._._ **KS4AW,** J. Hancock, Swan Island via Tampa, Fla. ._._._ **LB1LF** (QSL via NRRL) ._._._ **LU1ZT,** P. A. Zotelo, Destacamento Naval, Bahia Luna, Islas Shetland del Sur, Antartica Argentina ._._._ **M1L** (QSL via M1B) ._._._ **MP4BAM,** Umm Said, QPC Ltd., Qatar, Persian Gulf ._._._ **OA5G,** G. L. Starkey, Apartado 1229, Lima, Peru ._._._ **OQ5CP,** Box 392, Elisabethville, Belgian Congo ._._._ **OX3PW,** 1B Pforr-Weiss, Frederiksdal Loranstation, Greenland ._._._ ex-**OY2B,** R. Bugatsch, Gormsgade 25 blomsterforr., Copenhagen, Denmark ._._._ **SM8BWO** (QSL via SSA) ._._._ **ST2GB,** RAF, Khartoum, Sudan ._._._ **SVØWO,** Lt. Col. L. Kruse, JUSMAGG, APO 206, New York, N. Y. ._._._ **TI9MHB** (QSL via NCDXC, P.O. Box 75, Oakland, Calif., or via ARRL) ._._._ **VE8QL** (QSL via VE3BQL) ._._._ ex-**VK9WZ,** 4 Liston St., Parkside, S.A., Australia ._._._ **VP8AY,** 7 Drury St., Port Stanley, Falkland Islands ._._._ ex-**VP8AZ,** M. J. Faulkner, G3IZJ, 13 Lovatt St., Newport Pagnell, Bucks., England ._._._ **VP8BD,** B. Taylor, FIDS Base A, via Port Stanley, Falkland Islands ._._._ ex-**VP8BE,** B. Weeks, 55 Robins Lane, Frome, Somerset, England ._._._ **VP9BZ,** T. Wingo, RMC, Navy

138, FPO, New York, N. Y. _ ._ ._ VS2BD, E. B. Powell, P.O. Box 600, Penang, Malaya _ ._ ._ VS2EG, Box 57, Ipoh, Malaya _ ._ ._ VS2EL, 68B Jalan Kuantan, Kuala Lumpur, Malaya _ ._ ._ XE5PA, M. S. Boer, 1116 Palm Terrace, Pasadena 6, Calif. _ ._ ._ ex-XU8MI (QSL to K6ENX) _ ._ ._ ex-XU8ROV (QSL to W8ROV) _ ._ ._ ZB1JRK, J. R. Killeen, Sgts. Mess, RAF, Luqa, Malta _ ._ ._ ex-ZC4JA-VU2CA (QSL to G3CAA) _ ._ ._ ex-ZC4FB, E. H. Ross, War Office Wireless Stn., Beaumanor Pk., Loughborough, Leics., England _ ._ ._ ZD4BM, B. A. Wilbraham, P.O. Box 260, Takoradi, Gold Coast _ ._ ._ ZS2MI (QSL via ZS6FN) _ ._ ._ ZS3DX, H. A Beukes, Posbus 348, Keetmanshoop, S.W. Africa _ ._ ._ ZS7L, J. Perry, Mbabane, Swaziland, U. of S. A. _ ._ ._ 9S4AX (QSL via WØPRM).

Whence:

Asia — From HZ1AB (W6CRV): "Latest estimate of the number of QSOs by this station in the past two years is about 50,000, most of these between June of '53 and June of '54 when the station was on about 20 hours a day. About QSLs — we have ordered new ones which should be here any day. When they get here, QSL bureaus can expect batches as soon as we get them made out." HZ1AB's current schedule allows for 14-Mc. work from 1030 to 2200, 7 Mc. around 2100-0200, 3.5 Mc. (infrequently) at 0200, and 21 Mc. at about 1600, all times GMT. Ron had a pair of 750TLs and a rhombic schemed up for the DX Test ._ ._ ._ MP4QAH confirms to W6AM that there is no legit MP4ABW. OM Mould has been scrounging around to replace gear lost in a recent shack fire. Jeeves trusts we didn't jinx Tony with those MP4QAH photos in Dec., 1954, *QST*. MP4QAH now owns a VS9 label for Trucial Oman operation ._ ._ ._ W9EU notes that MP4BAM previously signed G8JX and VS1GF ._ ._ ._ G3FQX



This clean-cut compartmental design at SM5ARL makes for facile experimentation as well as convenient operation. Frequently on duty at the SSA QSL bureau, Gunnar is DXCC with 127 ARRL Countries List items checked off postwar.

heads for Cyprus and a ZC4 label but W4SWN, stationed at Famagusta for some time now, is ineligible for a ZC4 call ._ ._ ._ OVARA's *Ether Waves*, W4KVX editing DX, has info that G3IDC (ex-MP4BAB-VS9GT) is packing a 25-watter along on a G2RO-like DXcursion to include stops in ZC4 VS9 4S7 VS2 VS6 VS1 ZL VK and AP2 in that order. Rarer side-stops are contemplated and the jaunt should wind up around the end of this month. Frequencies to watch are 7025, 14,025, 14,090 and 21,025 kc. ._ ._ ._ ex-XU8ROV now stalks 7-Mc. DX as W8ROV ._ ._ ._ Club Asiatic tidbits. *WGDXC:* MP4BBL, who likes 14.079 kc. between 1400 and 1500 GMT, is dreaming up a beam to help him cut the 20-meter mustard. *SCDXC:* Ex-4S7XG's 1600 Ceylon QSOs now have been QSLd. JA8BC is one of the few JAs authorized to work the 80-meter band.

Africa — Additional Ethiopian info from W4KFC: ET3S has signed VE calls 3AWQ 4NS and 8NY. With ET3 activity now in high gear the boys will put club station ET3TRC on several bands before long. ET3S looks for 14-Mc. A3 and A1 customers from 1700 to 2100 GMT, needing a dozen states to finish WAS. For the information of those who prefer their ET3 QSLs direct, Ethiopia-U. S airmail costs an equivalent 32 cents ._ ._ ._ W1PWK, who answered all SWL cards while operating CN8EG, tells of an instance where this policy really paid off. His first VU2 QSO and QSL came from a grateful ex-SWL to whom he had previously sent a fast reception verification ._ ._ ._ W4EPA learned that ET3LF, who has spent the past eight years in Ethiopia, worked 65 ARRL DXCC List countries in his first 40 days on the air ._ ._ ._ ZD6BX still seeks North American 3600-kc. QSOs around 0500 GMT. Vic exhausted his QSL supply and must rely on homebrew cards until new stock arrives. ZD6BX passed the 130-country mark with his 1955 goal set at 200 ._ ._ ._ Club African reports, *SCDXC:* Fifty roaming U. S. electronicians may produce some future ZD7 hamming. ZD3BFC has been scheduling G3CC on 14,104 kc. around 1700 GMT. *WGDXC:* ST2NW is off to VS5 climes. Lack of portable gear is all that keeps ZS5NZ from trying ZS7 ZS8 and ZS9 DXpeditioning.

Oceania — Writing from New Zealand just before he departed for Antarctica with this year's Byrd Expedition, W2ZK states that it is extremely doubtful that ham activities will be carried on from the frozen bases. MARS call sign A2ZK/MM was assigned to Bud for use aboard *USS Atka*. The 1955 bases will be set up in the Bay of Wales area where KC4USA operated amateur bands in 1939 and 1940 ._ ._ ._ W2AIS, of ZC8 and KH6 renown, dropped into Hawaii for a fast visit ._ ._ ._ W9PUH, whose favorite amateur band is 1215 Mc., writes from the Philippines that chances of U. S.-personnel licensing there appear as dim as ever. The closest approach is MARS operation at Clark AFB ._ ._ ._ Via VK6MK, W3JNN and W1WPO we learn that ex-VK1JC's Heard Island log inadvertently was destroyed by fire. A bad break — no more VK1JC QSLs can be forthcoming ._ ._ ._ With an assist from W6MUR, further research at the Hq. DXCC desk establishes that the islands of Fakaofo, Nukunono and Atafu should be included in the Tokelaus but that Manihiki, Rakahanga, Penrhyn (Tongareva) and Pukapuka (Danger) are to be counted as among the Cook group ._ ._ ._ Club Oceania items. *WGDXC:* VK9WZ closed down in favor of possible VK5WZ work. KP6AK works KH6OR and KH6SL around 0200 GMT on 14,128 or 14,245 kc. JZØDN of Biak likes 7-Mc. hamming around 0300 GMT. VK9YT reached Ohio on his Stateside travel itinerary. *SCDXC:* The VK/ZL gang reports that nonamateur ham-band interference continues grim Down Under. VR6AC struggles to get out with QRP on 14,320 kc. while awaiting higher power; fellow VR6s AW and AY operate Pitcairn Radio ZBP on 8 and 12 Mc. but do no hamming.

Europe — U. S. military personnel currently licensed for operation in Greece include SVØWs A I J K L M N O P Q R S and T. SVØWJ is the call of the Air Attache Radio Club in Athens ._ ._ ._ Many authorities (and we use the term flaccidly) have arisen as concerns purported Albanian hamming. One thing is certain: A ZA call sign ranks high on the list of phoney prefixes favored by Continental bootleg artists. Anyway, SP3AN told ZC4FB of his aspirations toward a ZA DXpedition this year (how

(Continued on page 134)

Meet the Famagusta Gang, half the ham population of Cyprus. Front, l. to r., ZC4s GF JJ CA and MW; rear, ZC4PB, an SWL, ZC4s LW FB and CK. These boys have fought QRM on all DX bands from 160 through 10 meters. ZC4s CA and FB are closing stations for return to the United Kingdom.

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
R. L. WHITE, W1WPO, Asst. Comm. Mgr., C.W.
PHIL SIMMONS, W1ZDP, Communications Asst.

GEORGE HART, W1NJM, Natl. Emerg. Coördinator
ELLEN WHITE, W1YYM, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, W1ZJE, Administrative Aide

The survey of Region I (FCDA) facilities is in progress and the Civil Defense Radio Test mentioned in December *QST* is to take place on April 30th. Tentative plans for traffic (making fullest use of RACES frequencies) are to be completed at a March meeting of ROs and SECs of New York, New Jersey and New England. All amateurs in these states are urged to find out from their EC, RO, SEC or SCM if necessary: (1) Any radio test details too late for this issue of *QST*. (2) How they can take part or assist. (3) How to get registered with the AREC or signed up to help under any applicable RACES plans.

RACES Progress. It has been some time since we reported the number of approved RACES plans. FCC's latest Annual Report indicated 89 such plans approved during the fiscal year that ended last June 30th, also 754 RACES stations had been authorized. As of the *end of 1954* we are informed by the Federal Civil Defense Administration that 165 RACES plans now have been approved, another 76 in just the last six months. Besides this we're advised that 55 more are under study. The latest figure on amateur station RACES authorizations (December 31, 1954) indicates 1254 RACES station authorizations then had been issued. A full fledged nationwide test of stand-by radio communications dedicated to civil defense purposes is planned to accompany the coming June 14th–15th general c.d. alert. Amateurs not identified in RACES or AREC should make local inquiry of Radio Officers and ARRL ECs to register facilities and ask where they may serve in connection with this and future calls for civil defense emergency or natural disaster radio circuits.

Directory of School Amateur Radio Clubs. A new 1955 directory lists detailed information on 109 high school clubs with active stations, 26 additional stations identified with schools and college stations identified with the prep school net and a college amateur net. This must be announced as *available to other schools* that in asking for the directory, will furnish data for a listing of their own. Give your school club name, its station call, address, officers' names, bands operated, whether schedule is desired, days and hours desired, frequency used, number of club members, number of licensed operators, and dues. This High School Club Directory is not available from ARRL, but from Department of Health, Education, and Welfare, Mr. Willis C. Brown, W3HB, Specialist for Aviation Education, Office of Education, Washington 25, D. C.

Taking Stock. There are a good many ways to review progress as an individual amateur operator. Post mortems after Field Day or other activities enable us to improve procedure and know-how and to plan which bands to work next time. In "taking stock" we feel each amateur should consider whether he has or can take a part in a local AREC-RACES program, holds ARRL appointments to constructive ends, reports in his Section Net, etc. Only thus does the individual derive the benefits reflected from an *organized* amateur radio which carries more than casual implications.

The Detroit Amateur Radio Association stressed this principle of review-and-action in its QMN Bulletin recently. President Moline, W8GB, delineated five points to be checked by club member amateurs looking to individual and group progress in Amateur Radio. Resolutions suggested by the DARA treatment:

(1) To come to club meetings often, with a purpose to make the club a better one and meetings interesting and enjoyable.

(2) To check safety features of one's rig, from a.c. outlet to antenna, providing against hidden hazards.

(3) To help newcomers to our hobby, particularly those younger and less experienced.

(4) To complete shielding on TVI treatment of every transmitter, so all can operate without bothering decent versions of the one-eyed monster.

(5) To ask one's self, "what am I doing in amateur radio that has public service to country, state or community or our *organized* amateur radio."

♦

Early in February, we got together with some Civil Defense "brass" to discuss RACES matters in general and the forthcoming FCDA Region I RACES test in particular. During the noon hour, W1BDI lined us up in front of "ole 38" and took this snapshot. From left to right are the following: John Huntoon, W1LVQ, ARRL Assistant Secretary; Vincent T. Kenney, W2BGO, N. Y. State C.D. Radio Officer and chairman of the Northeastern States Civil Defense Amateur Radio Alliance; Charles E. Dewey, W8LBM, from National FCDA Headquarters in Battle Creek, Mich.; George Hart, W1NJM, ARRL NEC; James E. Fair, FCDA Region I Communications Officer.

Check Rigs and WWV To Avoid Off-Frequency Citations. W2FE (OO) reported early this year that "A lot of W and K stations are observed working phone beyond the 14.2-14.3 Mc. limits. Stations in the 14.1–14.2 sector were heard calling CQ 15, so apparently some of their multiplier stages are radiating from a poorly-shielded amplifier." According to OO reports the calibrations of 15-meter phone band edges are not appropriately checked back against WWV by some of the operators with VFOs.

Stations newly on the air (especially Novices) may well request some amateurs they work to listen for *their exact harmonic* to see if the harmonics, especially the third, are being heard at any distance. A grid-dip or absorption frequency meter can show up such defects in your equipment too. We mention this since OOs still report hearing WN harmonics quite plentiful.

A.R.R.L. ACTIVITIES CALENDAR

Apr. 1st: CP Qualifying Run — W6OWP
Apr. 13th: CP Qualifying Run — W1AW
Apr. 16th-17th: CD QSO Party (c.w.)
Apr. 23rd-24th: CD QSO Party ('phone)
May 7th: CP Qualifying Run — W6OWP
May 12th: CP Qualifying Run — W1AW
June 3rd: CP Qualifying Run — W6OWP
June 11th-12th: V.H.F. QSO Party
June 17th: CP Qualifying Run — W1AW
June 25th-26th: ARRL Field Day
July 2nd: CP Qualifying Run — W6OWP
July 11th: CP Qualifying Run — W1AW
July 16th-17th: CD QSO Party (c.w.)
July 23rd-24th: CD QSO Party ('phone)
Aug. 5th: CP Qualifying Run — W6OWP
Aug. 16th: CP Qualifying Run — W1AW

We also learn indirectly that one Novice was allegedly taken in by a mail approach (for cash money) *resembling* an off frequency citation from one of the FCC monitoring stations. Asking for money with citations is something *not* in the FCC pattern of such notices. See pars. 12.153–4–5 of our regulations for what to do about citations; also note that FCC penalties following an unsuccessful history of regulation observance generally take the form of a direct "suspension of license" where required, not a fine! Cash penalties are provided in Sections 501 and 502 of the Communications Act upon conviction by the Justice Department of willful violations. Regarding harmonics, ARRL Official Observers are doing all they can to help fellow amateurs keep out of trouble. In addition, amateurs actively operating are requested to especially watch the harmonic shadows of our bands, especially those falling in non-amateur territory so they can check themselves and others. By notification to a brother amateur of a signal heard out of the bands, either by message or postal card, any amateurs having unduly strong harmonics may be assisted to avoid an FCC notice.

Ready for Field Day? For some months the activities calendar has carried the announcement of Field Day dates, June 25th–26th. That is not so many weeks away now. We therefore suggest that all hands plan for early completion of any new gear to be tested in this year's Field Day. Year 'round use of emergency-portable and mobile gear is of course to be highly recommended. Devices in daily use are conditioned for surest stand-by dependability when the chips are down. A rig on the shelf has greater likelihood of requiring work to repair it as well as time to rewire it and get the hang of the controls.

So get your gear in use ahead of time and in any event plan to test it in intensive operation come FD! Don't miss getting in the fun *this year*. Log forms for report of ARRL Field Day stations will become available about the last week in May. A letter or radiogram will bring yours gratis. All affiliated clubs have already received complete copies of the Field Day rules which will be re-run in June *QST*. C u FD? — *F. E. H.*

JANUARY CD QSO PARTIES

A far-western trio, composed of W6LDR, W7BSU and W7PCZ, showed other ARRL appointment holders a thing or two in the January c.w. CD Party, Los Angeles ORS W6LDR setting the pace with 316 QSOs in 63 sections. The 'phone party was another contest-type workout; easterners W4FV, W2AEE and W4TVO lead the voicesters.

The highest scores follow. Figures after each call indicate score, number of contacts and number of ARRL sections worked. Final and complete results will appear in the April CD Bulletin.

C.W.

W6LDR	180,747–316–63	W2ZVW	83,780–277–59
W7BSU	158,880–292–60	W1WPO	81,875–290–55
W7PCZ	155,736–309–56	K6AUZ/6	81,487–182–49
W1EOB	126,900–416–60	W8LHV	79,800–273–57
W4KFC	126,600–415–60	W3VOS	74,725–300–49
W1MX	126,300–414–60	W1AW	73,700–261–55
W8YHM	121,440–242–55	W1JTD	73,425–260–55
W4PNK	108,300–380–57	VE7QC	73,008–156–52
W8NOH	102,175–330–61	W2IVU	72,850–307–47
W4YZC[1]	100,925–360–55	W3PWN	71,910–301–47
W1RAN	98,610–340–57	W6CRT	71,094–151–51
W4IA	94,620–325–57	W2FEB	70,200–270–52
W9KLD	93,240–330–56	W7VIU	66,915–163–45
W1WEF	92,310–356–51	WØVBQ	66,120–227–57
W4BZE	91,530–334–54	W6CHV	63,342–127–54
WØRDN	90,160–322–56	W4UOA	61,215–226–53
W2IVS	90,060–309–57	WØIUB	61,005–249–49
W1TYQ	89,305–337–53		

'PHONE

W4FV	23,680–123–37	W8IFX	15,050– 86–35
W2AEE	23,560–124–38	W4BQG	14,400– 80–36
W4TVO	22,050–126–35	W8PBX	13,800– 92–30
W8NOH	18,975–110–33	W2ICE	11,560– 68–34
W1CRW	18,910–122–31	W9ZRP	11,550– 74–30
W3MWL[2]	18,400–112–32	W6CHV	11,100– 46–25
W2ZVW	18,240–107–32	W5IWJ	11,055– 63–33
W9KDV[1]	18,150–110–33	W5MFX	10,500– 65–30
W4YE	16,050–100–30	W4LK	10,260– 76–27
W8ZJM	15,810– 87–34		

[1] Multiple-operator station. W3ULI, opr.

Our next CD Parties are coming up this month. Any holder of an ARRL appointment or office will be eligible to take part. If you're interested in organized operating activities and do not already hold an appointment, see the list in the booklet *Operating an Amateur Radio Station* or the *Handbook* and decide which appointment suits your interest and qualifications. Then write your SCM or the ARRL Communications Department for complete information on how to qualify for the appointment of your choosing.

W1AW OPERATING NOTE

Effective April 24, 1955, all W1AW operation as detailed on page 71, March *QST*, will change to *Eastern Daylight Saving Time*. This means that to copy code practice, bulletins, etc., you will have to listen one hour earlier by your clock if you are in areas which remain on standard time. Similarly, all general operation shown in the chart on page 70, September 1954 *QST*, will be conducted on EDST instead of EST until further notice. The complete W1AW summer schedule of operations will appear in the Operating News section of May *QST*.

This year's winner of General Electric's Edison Award, as noted elsewhere in this issue of *QST*, is Ben Hamilton, W6VFT, SEC for our San Diego Section and RACES Radio Officer for San Diego County, Calif. We had the opportunity to visit Ben and inspect part of his installation last summer. The award was presented at the customary exercises in Washington on Feb. 10th.

Make no mistake about it, such recognition does not come easily. Ben was selected from a considerable number of candidates, after careful screening of the qualifications of each. While his selection was a signal honor to W6VFT, it is also an honor, by reflection, to all of us amateurs who have devoted our efforts toward civil defense work; and that means most of the AREC. In fact, the principal speaker at the presentation was Val Peterson, FCDA administrator, who paid high tribute to amateur radio, and indicated that in the event of an atomic attack it was quite possible that RACES might be the first and *only* means of communication in the immediate post-attack period.

Does that frighten you a little? It should. It should frighten all of us out of any complacency or lethargy we might be experiencing and get us going toward a bigger and better RACES through our own AREC. Because, just as the Edison Award to W6VFT for civil defense (RACES) work is a tribute by implication to all of us, the responsibility of being prepared to provide the *first and only* immediate post-attack communication is a serious and sobering one

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W9UQT reports on the work done by amateurs in the ice storm which centered about Clinton, Ill., on December 30th. The storm lasted about 24 hours, and work done was principally on behalf of the Illinois Central Railroad, who asked the amateurs to help. W9KRH/9 was set up at the ICRR depot for the period of the emergency, manned by W9KRH, W9KXN, W9PEK and W9VHD. Some 40 railroad traffic items were handled by amateur radio that could not be handled any other way. As usual, the Illinois Emergency Net went into operation almost immediately on 3940 kc. There was full coöperation of all net members standing by, ready to help when possible. Doc mentions the work of W9KXN as especially noteworthy, and also commends W9WHH and W9OOL for their untiring efforts in relaying and keeping the frequency cleared. The following were also logged as having participated: *W9s* AEZ AJK ATJ BCY BUH CNB CSW DJG DKA DNL ESB FEV FTB FVL GET IAD IBI JLL JRQ KAY KCW KCX KRH KXN LDU LFY LHS LWH LXD MNR OFI OKI OOL PEK PLY PNK PSQ PSP QLR RNM RUW TCE TCX TH TUC UQT UUS UWC UWG VGM VHD VQC VSX VT WHH WXK YCS ZEN.

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Members of the Huntsville (Ala.) Amateur Radio Club turned out on Feb. 1st when a tornado struck Normal, a small community north of Huntsville, and took the control stations for the Highway Patrol, city police and sheriff off the air. Promptly at the scene of principal damage, in the vicinity of Alabama Agricultural and Medical Institute, were *W4s* AQB BJL/m BSN FOG HHU WOF/m YQE/m ZSB and KN4AIL. All but one of these are AREC members. First news of the damage was brought from the affected area to the city by amateur radio.

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Amateurs in South Dakota joined forces with law-enforcement agencies in late January to help track down a bank robber. W9OOZ and other members of the Sioux Falls Amateur Radio Club spread the alarm along four states following the bank robbery at Harrisburg, S. Dak., requesting that all amateurs notify their local police and the small towns notify their garages and filling stations in the area. Although the robber hasn't been caught yet, amateurs received high praise from the sheriff of Minnehaha County for their efforts.

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Another instance of amateurs assisting in highway accidents. On October 18th, W2GKP received an emergency call from W2BRP/m on 10 meters at the scene of an automobile accident on the West Side Highway in New York City. W2BRP requested an ambulance via W2GKP. The ambulance arrived on the scene within three minutes.

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"During the afternoon of Feb. 6th there was a weather warning for possible tornadoes in the area covering most of middle Georgia. As EC of Houston County, Ga., I started a net on 3995 kc. to keep a frequency clear in case of an emergency — also to gather weather information. W9RV/4 alternated with me as net control." — *W5RDP/4, EC, Houston Co., Ga.*

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On Feb. 5th, the police chief of Dartmouth, Mass., called for volunteers to assist in searching for a missing seven-year-old boy. Local amateurs turned out to assist, under direction of Assistant EC W1WGN. New Bedford mobiles W1s AGG AZY and ZPE also responded. W1CDO acted as relay station in New Bedford. From Fairhaven, mobiles W1s AWH ONK and ZHC responded, with W1APN for fixed relay. W1BMQ was also on hand with his mobile from Dartmouth. The amateur mobiles coöperated with Dartmouth Police, the Dartmouth Fire Department, the CAP and the Coast Guard in providing thorough communications coverage of the search area. The story has a sad ending — the boy's body was recovered from the bottom of Padanaram Harbor — but amateurs were on the job to do what they could, as usual. — *W1AVY, EC, New Bedford, Mass.*

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Tennessee SEC W4RRV tells us that for some time he has wished to do something to encourage the Novice licensee to become actively interested in emergency work. Now he's done something about it. On Feb. 2d, the Tennessee Novice Emergency Net came into existence on 3737 kc. The net will have only Novices for members, except for the NCS, who will hold appointment as an EC and will be General Class or better. Within the AREC organization, the net will act as a unit under its EC, with the latter issuing AREC member cards. W4RRV figures on an almost complete turnover every six months as Novices get their General Class licenses and "graduate" to their local AREC units as full-participating members.

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Fifteen SECs reported December activities of 4620 AREC members, to wind up our 1954 season. Two new sections, Missouri and Minnesota, put in their appearance in December reports, making it 31 sections heard from during 1954, a total of 178 SEC reports received during the year. This compares favorably with the figures for 1953 and 1952: in 1952, 204 reports were received from 29 sections, and in 1953 154 reports were received from 25 sections.

One-hundred-percenters: Western N. Y., N.Y.C.-L.I., E. Fla., Wisconsin, S. Dak. *Eleven reports:* Colo. *Ten re-*

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

C. W.		*'PHONE*	
3550	14,050	3875	14,225
7100	21,050	7250	21,400
	28,100		29,640

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

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050 14,060; *'phone* — 3765, 14,160, 28,250 kc.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

ports: Los Angeles, W. Fla. *Nine reports:* E. Bay. *Eight:* W. Va., Tenn. *Seven:* Georgia. *Six:* N. Texas, Montana, San Joaquin Valley. *Five:* Nevada, New Mexico. *Four:* Alaska. *Three:* Ontario, Ariz., Vt. *Two:* Nebraska, Ore., Louisiana, Alabama. *One:* Saskatchewan, Idaho, Md.-Del.-D.C., Okla., Mo., Minn.

SCM W9RQM says his SEC, W9OVO, has reported EC activities 46 consecutive months, and he thinks that's a record. Any challengers?

RACES News

Amateurs in the New England States, New York and New Jersey (FCDA Region I), will be readying themselves for the April 30th test of RACES facilities to be held in that FCDA Region. If you live in Region I (above states), it behooves you to get signed up in your local AREC or/and RACES group with a view to contributing your strength to this display of amateur radio potential. The First Region is just a guinea pig, to give FCDA an idea what can be expected of amateurs and RACES in the forthcoming June 14th-15th nationwide exercise. Organizers in other regions please take note that *your region is not being left out.* While there will be no other FCDA-sponsored tests on that date, the capability of amateurs in RACES in your region will be judged on the basis of the performance of amateurs in Region I, and plans for the June nationwide test made accordingly. So this April 30th test is not a signal for you to relax and let Region I do it, but a notice to make sure your region can make as good a showing as Region I in any test of your RACES facilities, real or fancied.

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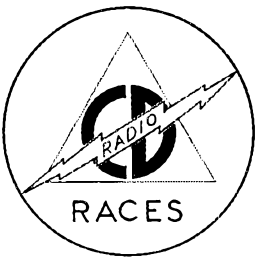
Some time ago ARRL sponsored, at FCDA request, a competition to design a RACES emblem, to be adopted as the official RACES emblem by FCDA. Many suggestions were received and sent down to FCDA for consideration. After extensive deliberation, a design most nearly following one suggested by W1JMY was adopted and promulgated as the official RACES insignia as of March 4, 1954. We don't believe we have ever reproduced this emblem in *QST*. Note that there is room for inclusion of the name of a city or county (or even a state) at the top of the emblem, and such inclusion is contemplated. This emblem can be used by RACES personnel in the same manner as the regular civil defense insignia, as prescribed by FCDA regulations on July 12, 1952. We wish to express belated thanks to all amateurs who submitted a design, some of them at considerable trouble.



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The Warning and Communications Office of FCDA now has Charles E. Dewey, W8LBM, formerly WØLBM of Jefferson City, Mo., on its staff to implement the RACES program. Charlie is no stranger to us, having participated with us in the week-long FCDA Communications Conference at Olney, Md., in 1951. He is also no stranger to RACES, having served as RACES state radio officer for Missouri. Another amateur will soon be on the FCDA staff to assist Charlie in this work, so we can look for some progress from that level, and additional material from time to time for this column. Other amateurs at FCDA headquarters, not necessarily having any connection with RACES, are Communications Specialists W4KCZ (ex-K3FBG, W9KCZ, VO4AC, 9EMC), W4DLA (ex-W3SEI, W2SEI), W8UTQ (ex-W4CGK, KL7YT), and Electronics Engineer W3UH (ex-W5UH).

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In the future, we'll endeavor to include items on RACES under this subhead. This will include, but not be restricted to, information coming out of FCDA Headquarters each month. Short items from the field will be welcomed and will be reproduced herewith after editorial consideration concerning their suitability. Let us hear what's going on in your RACES unit.

These amateurs in Georgetown, S. C., were among the first to feel the impact of Hurricane Hazel as she swept inland last October. From left to right, kneeling: W4KTI, W4ZGP; standing: W4DYP, K4ADP, W4FTN.

GROUP CODE INSTRUCTION

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

BRIEFS

Propagation tests to determine the possibility of maintaining continuous reliable communication on 2, 6, 75, 80 and 160 meters are being conducted in New York, New England and New Jersey, each week end from 1800 EST Friday to 1800 Saturday. Sponsored by amateurs at Rensselaer Polytechnic Institute, the tests are expected to furnish valuable data to the services performed by amateur radio as well as amateur communications in general. The following frequencies are being used: 1815, 3509.5, and 3993 kc.; and 53.5 and 145.47 Mc. Persons interested in participating are requested to contact Roger Salaman, Hunt II, RPI, Troy, New York.

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The WAM award will be made to any amateur submitting confirmation of two-way radio contact with all sixteen counties in Maine any time after 12:01 A.M. January 1, 1955. Inquiries or petitions for awards should be addressed to the Portland Amateur Wireless Association, 97 State Street, Portland, Maine.

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A "Ground-Wave Contest" was held November 20, 1954, by the Breezeshooter's group, W3SIR reports. Competition for contacts was scored for winners in four zones, Zones 1-2-3-4 being, respectively, in 25-, 50-, 75- and 100-mile concentric circles centered on Pittsburgh, Penna. Winners and their scores: W3QYF 164, W3SJK 156, W3VUZ 125 in Zone 1; W8FRV 96 in Zone 2; W3WJF/3 81 in Zone 3; W8GAB 176 in Zone 4.

TRAFFIC TOPICS

We thought that this month a few data from the new Net Directory might be of interest. It's quite a production, consisting of 14 multilithed pages and registering 357 net names as of December 15, 1954 — the biggest Net Directory we've put out yet. These 357 net names are registered on 193 frequency channels throughout six amateur bands. As usual, the 3.5–4.0 Mc. band carries the brunt of the net load, with 101 frequency channels being utilized by 233 nets in that band. This is slightly less than 5 kc. per channel. The 3.5–3.7 Mc. segment uses 47 channels (4.25 kc. per channel) and the 3.8–4.0 Mc. segment used 41 channels (4.88 kc. per channel). There are 12 channels used in the 160-meter band, 9 on forty c.w., 36 on ten, 7 on six and 27 on two meters.

Of the 357 registered net names, 304 indicated their purpose. There were 237 nets which indicated a single purpose; the others indicated dual or triple purposes. Of the single-purpose nets, 118 were devoted to traffic, 111 to emergency preparedness, and 8 to rag-chewing. There are also 47 nets devoted to both traffic and emergency work, 11 to traffic and rag-chewing, 7 to emergency and rag-chewing, and 2 to traffic, emergency and rag-chewing. This means that 178 nets can be called traffic nets, 167 can be called emergency nets, and 28 can be called rag-chewing nets.

The net directory is now available free of charge upon request, and we hope that net organizers, participants and potential participants will make the best possible use of it.

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There still seems to be some confusion regarding counting of net traffic. As usual, ARRL has set a standard, and this standard is followed throughout the National Traffic System. Whether or not your net follows that standard is up to you, of course. In the past, we have assumed that net traffic reported in this column has followed the League's simple net traffic counting system. If such has not always been the case, then there has been little or no basis for comparison between the traffic totals of the various nets reported.

The net traffic is that traffic handled by the net *in directed session*. It is *not* the traffic total of each station in the net; it is *not* the total of all traffic reported into the net. It is purely and simply the number of message *handlings* between the time of net call-up and QNF. If a message is sent from one net station to another, at the direction of the NCS, and properly QSLd at the receiving station, that's one point. The net traffic total is simply the number of times this process is repeated during a net session. The same message cannot be counted twice unless it is sent and received twice in the net.

It would help if we all followed this simple and logical procedure. Let's not get net traffic counting mixed up with individual station traffic totals.

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Miscellaneous January net reports: College Net — 63 stations called in, 12 messages handled. Early Bird Transcontinental 'Phone Net — 813 messages. North Texas Oklahoma Section Net — 319 messages, 979 check-ins. Transcontinental Relay Net — 31 sessions, five stations, traffic total of 1260. Transcontinental 'Phone Net (1st Dist.) — 16 stations, traffic total 1817.

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WØLJW sends in an amusing little story. It seems his QTH is afflicted with severe line noise. One evening in participating in TLCN (Iowa NTS Section Net), he discovered there was traffic for his city. He called WØCGY on the landline to ask his assistance, only to learn that CGY's transmitter was out of operation. They got the traffic through, though. WØCGY did the receiving, called the "breaks" to his XYL who relayed them over the landline to WØLJW, who did the breaking and asking for repeats. WØLJW says "everything went fine except for the NCS, WØBLH, who thought we were slightly nuts."

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WN5GQN reports the organization of a net for Novices in Texas. It is called the Texas Novice Traffic Net (TNT) and operates on 7191 kc. at 1900 CST on Tuesdays. Dave (WN5GQN) says all Novices are welcome and gives the following threefold purpose of the net: (1) to provide an opportunity for Novices to learn correct operating procedure; (2) for public service; (3) one of very few organized Novice activities.

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National Traffic System. Conditions continue being unkind to us. NTS nets have been beset with the worst kinds of difficulties because of the long skip setting in at about 1900 local time each evening. Someone not too familiar with organized traffic work recently asked us why we were so unadaptable, why we didn't simply handle our traffic at a different time, just as the DX man adapts himself to working DX at a different time when conditions demand it. Well, to some extent we have done this. The independent net without any system can do it easily, provided a new net time is convenient to its members. But NTS must operate in chronological sequence; its nets telescope into each other. One of the main purposes of NTS is to work together as a national system, and you can't do this when every net operates at a different time, handles traffic from and for all over the map, and pays no slight attention to when other units of the same system operate, or where, or what they do.

These "bad" conditions, however, tend to lead us in this direction. A section net, because it can hear distant stations but not its own, either becomes a net taking in a lot of territory, or it moves to an earlier meeting time. No doubt about it, the present state of the radio spectrum is conducive to hodgepodge in traffic systems. What are we going to do about it?

Nothing. Just wait. Just continue doing the best we can and wait for conditions to get back to where they used to be when NTS was first put into operation. Maybe then, too, we can return to a more normal and uniform NTS time schedule.

January Reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation*
EAN	20	529	0.82	26.4	90%
CAN	21	664	0.68	31.6	97
PAN	26	1012	0.81	38.9	96
1RN	23 *	144	0.28	6.2	85
2RN	52	266	0.25	5.1	89
3RN	41	216	0.51	5.3	82
4RN	42	176	0.38	4.0	29
RN5	44	486	0.65	11.0	62
RN6	30 **	181		6	
RN7	40	136		3.4	36
8RN	32	128		4	7
TEN	68	1886		27.7	64
TRN	35	104	0.31	3	76
Sections***	402	2005		5	
TCC (Eastern)		239			
TCC (Central)		587			
TCC (Pacific)		256			
Summary	876	9015	EAN	9.1	CAN
Record	876	9015		12.1	

Late Reports:

NEB (Nebr.) (Nov.)	27	215	8
NEB (Nebr.) (Dec.)	27	268	9.9
MCN (Conn.)	26	249	9.6

* Out of 26 sessions held

** Out of 47 sessions held

*** Section nets reporting: NEB (Nebr.); TLCN (Iowa); QKS & QKS-SS (Kans.); CN (Conn.); ILN (Ill.); Tenn. Regular and Tenn. Early; AENB & AENP (Ala.); SCN (Calif.); WSN (Wash.); KYN (Ky.); Minn. 'Phone.

Several NTSers have asked us how we calculate the "rate" above, and a couple of managers have disagreed that the way we do it indicates anything. The "rate" is the number of messages handled per minute during the busiest session of the month. It indicates the net's efficiency "under load." We apply it only to NTS regional and area nets, since the achievement of a high rate of traffic handling is perhaps of less importance at section level where the main objective is representation. Accuracy, of course, is paramount at *any* speed.

W2LPJ reports that the early session of 2RN at 1815 EST is handling most of the traffic. The dragnet is out for a new 3RN manager, with W3ONB wishing to be relieved; we ought to have one by this time. Arkansas and Mississippi remain problems on RN5; new RN5 certificates have been issued to W4TYU, W4WOG, W5CAF, and W5MXQ. RN7 is completely without representation from Saskatchewan and Alberta, and during January had very little from Montana and Alaska. New 8RN certificates have been issued to W8s ILP LHV and MQQ. W9UNJ has difficulty in getting NCS reports in 9RN, thus the lack of statistics above; W4KKW, W9CCO, K4FBW and K9FCA have earned 9RN certificates. VE3AUU is a newcomer to the TRN roster.

TCC continues to function with the usual difficulties, mostly brought about by the need for additional personnel and inability of existing operators to make contact with their TCC schedules. W8UPB, for Eastern Area TCC, reports that there were 34 TCC QNIs into area nets during January, with W8DQG handling the greatest amount of traffic. He needs two regulars, one on Tuesday to relay traffic to PAN via direct schedule, and one on Monday (late) to receive traffic from PAN. Other schedules are functioning, but many of them are irregular. W9JUJ, for Central Area TCC, reports that schedules are working nicely, but whenever missed the station concerned makes direct contact with the Pacific Area Net to clear traffic. In the Pacific Area, W6HC reports that all TCC stations are active, but having difficulties. WØEKQ handled the most traffic (102). The latest Pacific Area TCC roster shows W6UTV deleted and W6PKL/Ø added to the list.

There are still some openings in the TCC roster. Write W8UPB, W9JUJ or W6HC, if interested.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for January traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	112	1138	751	326	2327
WØBDR	1	1071	1053	15	2140
KA2FC	328	842	777	65	2012
KØAIR	19	927	892	36	1874
W3WIQ	73	845	790	45	1753
W7BA	12	865	845	18	1740
W5IGU	35	1652	18	12	1717
WØSCA	2	853	846	2	1703
W9JUJ	21	777	711	28	1537
W4PFC	6	620	600	15	1241
W9NZZ	270	463	0	460	1193
W7PGY	51	517	488	29	1085
W9DQ	18	519	433	104	1074
W2KEB	53	561	306	96	1016
WØCPI	6	482	425	57	970
W7APF	15	471	470	1	957
K4WBG	186	255	413	22	876
WØGAR	18	372	371	9	770
W4PL	7	372	344	20	743
W2KFV	28	401	254	37	720
W6YDK	20	339	251	88	698
W6SWP	53	307	240	63	663
W7VAZ	20	319	302	17	658
W5KPB	5	311	237	62	615
W3WV	21	330	211	36	598
W9TT	3	328	260	0	591
W2LPJ	23	269	239	53	584
W7FRU	4	283	214	69	570
W9VBZ	58	263	201	35	557
W5BKH	8	270	210	68	556
W5MSH	3	276	276	0	555
W4PJU	17	259	231	29	536
W6GGY	7	240	280	6	533
WØPZO	5	266	258	3	532
W2RUF	23	275	168	55	521
W4UHA	166	181	165	1	513
K2BJS	22	241	224	25	512
W3CVE	275	118	53	65	511
W5MN	14	246	215	29	504
W4YIP/6	2	315	65	120	502
Late Reports:					
W7FRU (Dec.)	8	759	617	138	1522
W7WAT (Dec.)	35	240	229	14	518

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6IAB	59	1552	1384	168	3163
KR6KS	213	809	682	127	1831
KA2GE	124	629	547	82	1382
K4FDY	33	761	523	15	1332
KA7SL	334	181	106	696	1317
K4WAR	221	430	528	123	1302
KA2AK	337	363	296	67	1063
K9FCA	0	394	491	22	907
KØWBB	19	435	407	28	889
W6BSD	28	376	340	26	770
K6WAY	30	247	260	21	558
K6FDG	87	217	147	60	511

BPL for 100 or more *originations-plus deliveries:*

W4HDR	209	W6CMN	118	KA2WW	102
KA2HQ	187	VO6AH	117	W4PVD	101
W3ELI	150	W9AA	114	K3WBJ	100
VE2CA	136	WØGBJ	108	Late Report:	
K5FFB	119	K2HZR	102	K2BJS	
W4DVR	118	W9PQA	102	(Nov.)	108

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: W1BDI, K1WAB, W2LPJ, W2RUF, W4DVR, W4PJU, K6FCY, W6ZRJ, W8FYO, W8RO, W9TT, WØFQR, WØKQD, WØTQD, KA2HQ.

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.

NONDIRECTIONAL CQs?

When W1WPO heard a TI2 calling "CQ NO USA" on 7 Mc. one evening recently, he moved near the Costa Rican's frequency and called "CQ NO TI2." The TI2 promptly called W1WPO and a friendly rag chew resulted . . . W1VG reports use of nondirectional CQs with ringing success. Three times in a row Pete called "CQ NO ASIA" and sure enough, no Asians replied!

ELECTION NOTICE

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

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

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

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

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

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

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

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

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

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

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Yukon*	Apr. 15, 1955	W. R. Williamson	Mar. 17, 1949
West Indies	Apr. 15, 1955	William Werner	Aug. 15, 1952
Utah	Apr. 15, 1955	Floyd L. Hinshaw	Feb. 18, 1954
Nebraska	Apr. 15, 1955	Floyd B. Campbell	Aug. 15, 1954
Saskatchewan*	Apr. 15, 1955	Harold R. Horn	Dec. 15, 1954
Colorado	Apr. 15, 1955	Karl Brueggeman	Feb. 16, 1955
Maine	Apr. 15, 1955	Bernard Seamon	Apr. 16, 1955
Wyoming	Apr. 15, 1955	Wallace J. Ritter	June 15, 1955
Eastern Pennsylvania	Apr. 15, 1955	W. H. Wiand	June 15, 1955
San Joaquin Valley	Apr. 15, 1955	Edward L. Bewley	June 15, 1955
South Dakota	Apr. 15, 1955	J. W. Sikorski	July 2, 1955
New York City–Long Island	May 16, 1955	Carleton L. Coleman	July 31, 1955
Eastern Florida	June 15, 1955	John W. Hollister	Aug. 14, 1955
San Francisco	June 15, 1955	Walter A. Buckley	Aug. 14, 1955
Southern New Jersey	June 15, 1955	Herbert C. Brooks	Aug. 26, 1955
West Virginia	July 15, 1955	Albert H. Hix	Sept. 18, 1955

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

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH....258	W3BES....248	W8NBK...246
W6VFR....254	G2PL....247	W6SYG....245
W6AM....252	W3GHD...246	PY2CK....245
W6ENV....251	W6MEK...246	W2AGW...244
W8HGW...251	W6SN....246	W3JTC....244
WØYXO...250		W3KT....244

Radiotelephone

PY2CK....238	W1JCX....215	W9RRI....210
W1FH....230	W1MCW...215	SM5KP....207
VQ4ERR...226	NE1AC....215	W3JNN....206
ZS6BW....221	W1NWO...214	W6DI....205
	W8HGW...214	

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

NEW MEMBERS

W1TYQ....133	W8CCJ....104	W8HMI....100
CN8EG....113	WØYZO....104	W9EU....100
W9GNU....107	PAØHJK...103	PAØFAB...100
	W6OX8....101	

Radiotelephone

W8MWL....111	W4IIB....101	W5SFT....100
LU8BS....102	W2FZO....100	W8VQD....100

ENDORSEMENTS

CE3AG....234	W2UWD...168	W4OSU....130
W3EPV....230	W5MET...161	W9NN....130
W6SAI....223	PAØRC....161	EA4BH....130
W6TI....220	W1JNV....160	OZ8S8....129
W8BKP....220	G3DOG....160	W5KBU....128
W6DI....211	W7AJS....154	W4QCW....122
W8DAW....211	W9RQM....152	W2ZGB....120
W8WZ....201	ON4MS....152	VE7YR....120
G3DO....201	W3ECR....148	G6VC....118
ZS6FN....195	W8MFR....147	K2BZT....117
W2BJ....192	W6BUO....146	W7PZ....116
W2EMW...192	W3AZG....139	W8MWL....115
W7HIA....192	W2GVD....136	W1NHJ....114
W8MPW...190	W2ESO....131	W1RB....114
EA2CA....182	WØWFS....131	W3NCF....112
W3KQF....181	W1ODW....130	W2SUC....111
W5KUJ....180	W4GHP....130	W6SWG....111
W6LDJ....174	W4HYW...130	W1MTG....110
W3LVF....170		W8ILG....110

Radiotelephone

W6AM....201	W9JJF....163	G2ML....150
ZL2GX....183	F9HF....161	W6GVM....141
EA2CA....181	W8DMD...160	W5KBU....120
ZS6FN....171	LU4DMG..160	W8VDJ....120

W/VE/VO Call Area and Continental Leaders

W4BPD....241	VE2WW...181	VE8AW....160
W5MIS....243	VE3QD....210	VO6EP....190
W7AMX...240	VE4RO....223	4X4RE....210
WØNDA...240	VE5QZ....140	ZS6BW....229
VE1HG....150	VE6GD....108	ZL2GX....235
	VE7HC....209	

Radiotelephone

W2APU....202	WØAIW....175	VE4RO....120
W4HA....177	VE1CR....120	VE7ZM....140
W5HGP....205	VE2WW...102	OD5AB....154
W7HIA....181	VE3KF....163	ZL1HY....190

ELECTION RESULTS

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

Minnesota	Charles M. Bove, WØMXC	Feb. 17, 1955
Oregon	Edward F. Conyngham, W7ESJ	Mar. 1, 1955
Manitoba	John Polmark, VE4HL	Mar. 2, 1955
British Columbia	Peter M. McIntyre, VE7JT	Mar. 13, 1955
Santa Barbara	William B. Farwell, W6QIW	Apr. 12, 1955
Southern Texas	Morley Bartholomew, W5QDX	Apr. 29, 1955

See special notice in New England Division this month concerning Western Massachusetts.

In the Hawaii Section of the Pacific Division, Mr. Samuel H. Lewbel, KH6AED, and Mr. Richard L. Hoyt, KH6AVO, were nominated. Mr. Lewbel received 96 votes and Mr. Hoyt received 42 votes. Mr. Lewbel's term of office began Feb. 3, 1955.

In the Mississippi Section of the Delta Division, Mr. Julian G. Blakely, W5WZY, and Mr. A. C. McKinney, W5JR, were nominated. Mr. Blakely received 75 votes and Mr. McKinney received 71 votes. Mr. Blakely's term of office began Mar. 8, 1955.

In the Missouri Section of the Midwest Division, Mr. James W. Hoover, WØGEP, and Mr. Gerald N. McReynolds, WØMFB, were nominated. Mr. Hoover received 178 votes and Mr. McReynolds received 144 votes. Mr. Hoover's term of office began Mar. 1, 1955.

In the Western Pennsylvania Section of the Atlantic Division, Mr. Richard M. Heck, W3NCD, and Mr. Anthony J. Mroczka, W3UHN, were nominated. Mr. Heck received 253 votes and Mr. Mroczka received 162 votes. Mr. Heck's term of office began Mar. 17, 1955.

In the Maryland-Delaware-District of Columbia Section of the Atlantic Division, Mr. J. W. Gore, W3PRL, Mr. Harold E. Archer, W3SKK, and Mr. W. Lloyd Carter, W3UWO, were nominated. Mr. Gore received 204 votes, Mr. Archer received 191 votes, and Mr. Carter received 175 votes. Mr. Gore's term of office began Mar. 21, 1955.

BRIEFS

The Tri-County Amateur Radio Club of Brattleboro, Vt., is offering a handsome certificate to any amateur submitting proof (QSLs or Vermont QSO Party logs) of two-way communication with amateurs in 13 of Vermont's 14 counties. Send confirmations to Ray N. Flood, W1FPS, 2 Marlboro Avenue, Brattleboro, Vt. See page 100 for details on the Vermont QSO Party, scheduled for Apr. 9th–10th.

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Amateur radio in the Wisconsin area is looked upon by educators as being a vital educational experience. As reported by W9OTL, at a Milwaukee meeting of the Wisconsin Education Association in November, 1953, a group of teachers organized the Amateur Radio Section of the WEA and set up plans for the Wisconsin Educator's Phone Net. This basic organization has coördinated the efforts of state school amateur radio clubs. Its individual members have demonstrated amateur radio to thousands of students with the result that several new school radio clubs have been organized and dozens of students licensed. To help train Novices in code and message handling, 3735 kc. is used as a net frequency at 1220 CST and 1630 CST on all school days. The spot 3850 kc. will continue as the WEA's 'phone net frequency at 1000 CST Saturday and 1530 CST on the second and fourth Friday of each school month.

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 April 13th 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 W6OWP only* will be transmitted on April 1st at 2100 PST on 3590 and 7138 kc.

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

Code-practice transmissions will be made from W1AW each evening at 2130 EST through April 23rd; after that date they will be at 2130 *EDST*. 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 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.

Date	Subject of Practice Text from February *QST*
Apr. 5th:	*A C.W. Man's Control Unit*, p. 11
Apr. 7th:	*A Crystal-Controlled 144-Mc. Converter. . .* , p. 15
Apr. 11th:	*A Variable Bandwidth Filter*, p. 17
Apr. 15th:	*A Three-Bandmultiplier-Driver*, p. 20
Apr. 18th:	*Remote End-Fed Antenna. . .* , p. 24
Apr. 21st:	*A Loudspeaker Enclosure. . .* , p. 26
Apr. 26th:	*A Steerable Array for 7 and 14 Mc.*, p. 28
Apr. 29th:	*Meet "Junior" — He's No Lidl*, p. 31

• 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, W. H. Wiand, W3BIP — SEC: IGW. RM: AXA. PAM: PYF. E. Pa. Nets: 3610, 3850 kc. The following clubs report new officers for 1955: Electric City ARC elected LCK, pres.; OST, vice-pres.; NNH, secy.; LJT, treas. Northeast RC of Philadelphia elected VOC, pres.; TYX, vice-pres.; MYL, treas.; K2JUW, rec. secy.; DYL, corr. secy.; KIW, DWR, HYJ, CLC, and JQP, exec. board. South Philly (SPARK) elected QLZ, pres.; FZR, vice-pres.; VSD, secy.; ZMO, treas. ARK, Pottstown ARA president and a newly-appointed OO, came up with a suggestion that is worth the attention of all clubs dealing with the training of Novices. In monitoring the Novice bands with the aid of two receivers, one tuned to the fundamental, the other tuned to the second harmonic frequency, ARK has found not only strong harmonic radiation from many in the Novice bands but a surprising amount of stations calling CQ in vain on the "out-of-the-amateur-band" second-harmonic frequency without a trace of these stations on the expected fundamental frequency. This leads Jack to believe that these stations are in need of training in the use of a grid-dip oscillator or absorption-type wavemeter. Also, further training in the proper methods of antenna-to-transmitter coupling. All clubs might include this in their Novice training program. These stations need our help. It's up to those of us with the know-how to give all the help possible. BES and EAN report attending the joint meeting of the FRC/PVRC in Washington where about 80 turned out to hear about FO8AJ and Navassar expeditions. JNQ says he lost 15 pounds while "batching it." PYF is home again after a three-week business trip that took him through Texas and Oklahoma. CUL also is back home after enjoying a fine trip to Florida. During the January 18th Aurora opening, TDF worked Illinois on 2 meters to bring his total states worked to seventeen. In answer to many queries regarding the forthcoming SCM election, yours truly will bow out in favor of someone with more time to devote to the job. My sincere thanks for your coöperation and good luck to my successor. Traffic: (Jan.) W3CUL 2327, BFF 180, ELI 155, OK 121, UKJ 116, OZV 108, TEJ 102, VVV 95, QLZ 94, WUE 88, DUI 58, AXA 50, UOE 45, GES 42, GIY 26, PYF 23, YAZ 21, KCG 11, JNQ 7, PVY 7, UUA 2, BES 1. (Dec.) W3AXA 124, ABT 6, EAN 4.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Arthur W. Plummer, W3EQK — TDV, SJF, and NUV will be trying for the 21,000-Mc. record this year and also are going to try 30,000 Mc. NUV will be on 420-Mc. TV before long. The ARA officers are VAM, pres.; YRK, vice-pres.; NZT, secy.-treas.; OXL, act. mgr.; and RAH, net comm. mgr. The ARA also passed a motion that a year's subscription to *QST* shall be awarded to the club winner of any ARRL-sponsored contest. PQ sends the SCM a very kind letter which we now publicly acknowledge. FU reports a fine ESARC meeting at Cy's place on the Snow Hill Road Jan. 28th at which a swell General Electric movie was shown. Maurice Mowbray, the blind radio and TV serviceman of Federalsburg, Md., is sporting the call AAR and a *Viking II*. JM, FU, VCN, BSV, and BM are active with s.s.b. AED is stirring up mobile interest with his new rig. The ESARC's big winter meeting was held at the English Grill in Salisbury Feb. 25th. WN3AKT and WN3AKU have been added to the Washington County rolls with the help of VAM, radio instructor at the Hagerstown High School. Harford County, through the efforts of LDD and Paul Seward, CDRO for the County, expects to get a Viking II and an NC183-D. LDD got his S-40 back in operation again. 8CPN still is on night instruction duty for Philco. 9QOI broke into the Harford County Net with a potent signal, it is reported. CVE reports 5OSZ and 6BMW approved as TCRN members. KL7ATO/9, ex-9EBL, who is a TCRN operator, is now 9NQW. K3WBJ uses BC-610, HRO-60, and three-element beam on 20, Viking II and HRO-M with Windham on 40, and Viking I with HQ-140X and 800-ft. long wire on 80 meters. 1SDO, chief operator at the Army Medical Center, operates MARS nets plus CS3AC and OE13USA Mon. through Sat. on 20 meters. RV is now operating OK on 54,520 kc. HUA, pastor of the Northwestern Presbyterian Church in Washington, D. C., as well as Current Moderator of the Presbytery in D. C., is active again after a lay-off of several years and is on 40-meter 'phone. PPK has a new receiver and is on 20 meters. Brig. Gen. Heaton, Commanding General of Walter Reed Hospital, the Army Medical Center, is studying code and theory in preparation for the exam for a ham ticket. All the operators at K3WBJ, as well as the trustee, Walter Reed Hospital Chief Chaplain, Lt. Col. A. V. Bradley, WVI, are teaching 75 patients and duty personnel who are interested in becoming hams! TLU has been assigned to full time duty at WBJ. PQ formerly was 9PQ and also held 8KRT and 3HRQ. WAF finally made WAS. EEB has been helping WN3AHW to get on the air. KCY has just purchased a Johnson Viking Adventurer and OSF has one on order. QCB says he is attending a school where he is getting 37 weeks of training in 30 days! CDQ reports she was on 20-meter c.w. during the month of January. The Washington Radio Club has code classes going again and PZA is being reactivated. TGF reports the DuPont High School in Wilmington, through the efforts of WBZ, now has some Novice licensees. Thus far the licensed hams in the P. S. DuPont High School are W3WBZ, WDA, WCY, and TGF. Novices are WN3ARE and WN3ASB. ECP has been lining up some 6- and 2-meter equipment. With his new 60-watt Ranger BYI has worked OE1FF, OZ7OM, DL2WW, PAØDV, GM3JXR, PY5PG, EA9AP, G3JTC, KZ5DK, and LU5G, as well as OA5G and others. Other low-power specialists in the area are IXJ, TDV, and OEJ. VZM is installing a four-element wide-spaced beam with a 40-ft. boom on a 70-ft. tower. HEC raised his 20-meter beam to 60 feet. Your SCM, EQK, wants to take this opportunity to thank all for their interest in ARRL and their good wishes and kind remarks. Traffic: (Jan.) W3WV 598, CVE 511, K3WBJ 360, W3PKC 242, UE 169, RV 82, ECP 53, GRB 38, PQ 17, HC 15, CQS 9, JZY 7, EQK 5, OYX 5, NNX 4, WKB 4, WAF 2. (Dec.) W3MCG 85, ECP 18, OYX 11, TGF 1.

SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2BG — PAM: ZI. K2JIG, ex-3BOX, is now located in Glassboro and is at present on 20-meter c.w. K2GYM received his General Class ticket and K2ARP and W2HEK are consistent operators in Salem County. K2GKV, Pennsgrove, promises to keep us posted on news from that area. 5DYG, ex-2DGN, is now located in Tulsa, Okla. Look for Russ on 40 meters. SJRA members enjoyed a talk presented at their January meeting by 3SHY, assisted by 3EOZ, entitled "Single Sideband Techniques." K2EY, ex-3OS, Westmont, is on 10 meters. SDB urged all SJRA DXers to take part in the International DX Contest. UAE, Trenton, is operating on 75-meter 'phone. BAY is building a 10-meter vertical. The new QTH of 9RQK/2 is Lawrenceville. SUG, Milford, reports activities curtailed because of business and travel. K2HZR made RPL again this month. The 10th Annual Old Timers Nite Round-Up and the 25th Anniversary of DVRA will be held Apr. 23rd at the Hotel Stacy Trent, Trenton, N. J. Contact ZI for details. ZQ is net control of the N. J. 75-meter Net which meets Sun. at 0900 on 3900 kc. Glad to have VU (Lt. Col. Kale) back in the U. S. The Burlington County Radio Club station, K2KED, is holding regular drills on 2 and 10 meters. A big increase of activity reports (Form 1) is greatly appreciated. Keep up the good work. Traffic: (Jan.) W2RG 163, K2HZR 155, W2ZVW 58, ZI 38, YRW 19, K2BG 17. (Dec.) W2ZVW 131, K2CPR 5.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — Asst. SCM: Jeanne Walker, 2BTB. SEC: UTH/FRL. RM: RUF. PAMs: GSS and NAI. NYS meets on 3616 kc. at 6:30 P.M. and 3925 kc. at 7 P.M.; NYSS on 3595 kc. at 8 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 at 3 P.M. Are you an AREC member? It is important that your EC have your registration and know when you are available for emergency work. Register NOW. RAWNY now is licensed under the call PE in memory of one of its founders and a charter member. First project of the new ARAT is a course for Novices instructed by OUJ. CARS also is holding classes in code and theory under the direction of GDI. RPO spoke

at a KBT meeting on "TVI Filters." PGU made DXCC and WAC. K2DYB is organizing a 6-meter AREC net in Madison County. UHI spoke at an ARAT meeting on S.S.B. and JUL on Power Supplies for the Beginner. The Elmira ARA was guided on a tour of the Hickling station by D. Hamilton. The RARA v.h.f. group met at the home of K2CEH. K2s DXY and GVU helped QHH put up a skywire 50-ft. high. GBX has been appointed OBS. K2s CEH, DYC, and EVJ are OES. UTH/FRL renewed as SEC. SJV and UTH again are appointed as Asst. Directors, Atlantic Division. V.h.f. enthusiasts in the Syracuse Area are forming a v.h.f. club. Contact RHQ for details. UFI lost 144,220 and 420-Mc. beams in a recent storm. HAX, VLV, UFI, and K2EPH are on 420 Mc. The KBT meeting was devoted to a discussion of "Operation and Uses of Oscilloscopes." K2CUQ graduated 3 pupils from the Novice training class. EMW finally received a QSL from Heard Is. ALR addressed RAWNY on "Amateur Test Equipment." UXP has 832 final into a sixteen-element beam on 220 Mc. K2DVC built a 15-meter beam per Jan. *QST* but redesigned it to also work on 20 meters. 1UHL/2, KN2s JVH, IMI, and JVG are trying to establish an amateur radio club at the U. of Rochester. Stations in Oswego, Fulton, Auburn, Cortland, Watertown, Rome, Utica, Oneida, and Syracuse are requested to contact CYD, Onondaga Co. EC, to establish contact for Red Cross traffic between these cities and Onondaga Co. Red Cross Hq. Remember the Western New York Hamfest May 21st, sponsored by the RARA, at Dowd Post, American Legion, Route 31, West of Rochester City Line. KN2s JJT and IXB are new stations on 2 meters. UHI, PPL, JUL, and AFY are on s.s.b. UTH has a "V" beam directed at Europe. CZT has a new Ranger. RGA is active on 15-meter 'phone working Gs, Fs, and ONs with 60 watts. PPR remote controls his rig from the bedroom. GUR dropped the "N." KWF is a new call in Rochester. At the RARA "Ladies Nite" meeting C. A. Kinsley, of Eastman Kodak, spoke on "Traveling with your Color Camera," and QCF on Color TV. Traffic: (Jan.) W2RUF 521, ZRC 160, DXV 150, OE 117, DSS 59, K2DSR 56, DJN 36, W2UTH 21, QHH 20, RQF 20, FEB 12, K2CUQ 11, W2EMW 5. (Dec.) W2DXV 120, GBX 56, LXE 54, CPN 4.

WESTERN PENNSYLVANIA — SCM, R. M. Heck, W3NCD — SEC: GEG. RMs: UHN, GEG, and NUG. PAMs: AER and LXE. The W. Pa. Traffic Net meets at 7 P.M. 3585 kc. and reports for January show 241 stations reporting and 108 messages handled. In the Pennsylvania County QSO Contest, sponsored by the Western Pennsylvania Amateur Radio Club Council, top scorers and award winners were KUN, State award; GJY, Western Penna. award; and AXA, Eastern Penna. award. The RAE is starting its second session of code and theory classes at the YMCA. On 10 meters are RVG, YKE, and YWL. OIH visited LIT and tried out his 75-meter s.s.b. YKE's brother, Doug, and pal, VNB, have joined the USAF. Guests at a recent RAE meeting were 1KW and 8BDV. The MCRA's code classes, conducted by GEG assisted by other club members, are attended by approximately 40 persons. The South Hills Brass Pounders and Modulators elected QNI, pres.; QWW, vice-pres.; LDB, secy.; WFR, treas. VKS, the hamfest chairman, has high hopes of making the Aug. 7th affair the best ever. OUG is on 10 meters. 8UMR is putting up a 60-ft. mast for 10- and 15-meter antennas. KLP is a 10-meter fan. WEJ is on 10 and 40 meters. QYF and NCP both have 62-ft. masts and are on 10 meters. SJK worked Alaska on 15 meters. KWY is on 40 meters. The Breeze Shooters Net meets Mon. at 8 P.M. on 29 Mc. and has a hamfest scheduled for May 22nd. The Bucktail Amateur Radio Club (YDW) Net meets Mon. at 6:30 P.M. on 29,080 kc. WHO resigned as vice-president and SUL will fill the balance of the term. WEL is on 80-meter c.w.; RMX is 10-meter mobile; TCP is building test equipment, also radio-controlled planes; NMJ is on 80-meter c.w.; RVS, Cameron County EC and c.d. Radio Officer, is sporting a new Ranger; KUN is on 80-meter c.w.; SUL is mobile on 10 and 80 meters; TYC was active in the YLRL C.W. Contest; IIX is hard at work on 15-meter dipole, crystal grinding, s.s.b. exciter and various projects for the club station, YDW. ZKY has the Naval Reserve call N4KHB. OGN is recovering from an operation. NGZ is completing a crystal 10-meter converter. WII, on 40 meters, has finished a cathode modulator with 6S17, 6Y6. VEE is building a crystal calibrator. Traffic: W3WIQ 1753, LMM 207, OEZ 99, LXQ 92, YA 76, UHN 59, KUN 56, VKD 24, NMJ 23, GJY 20, NCD 19, NUG 18, KNQ 15, UTR 10, AEV 6, SIJ 6, UTX 4, PWN 2.

CENTRAL DIVISION

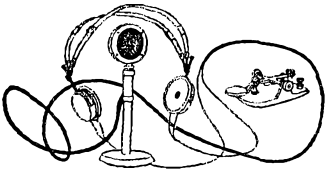
ILLINOIS — SCM, George T. Schreiber, W9YIX. Section nets: ILN c.w., 3515 kc. Mon. through Sat.; IEN 'phone, 3940 kc. RMs: BUK and MRQ. PAM: UQT. EC: HOA. EC Cook County: HPG. Club elections: Hamfesters — GVO, pres.; PCB, vice-pres.; YNV, treas.; IGC, fin. secy.; IWR, sgt. at arms; ECY, rec. secy.; WOL, FCO, AVH, KNP, and DKA, directors. Tri-Town Amateur Radio Club — ABI, pres.; KKN, secy.; and Novice FRZ, treas. Oak Park and River Forest Amateur Radio Club — BWV, pres.; KOR, secy.; KAJ, treas.; and ZFH, act. mgr. AA built up a suppressor grid modulator for his RK-20 for a little 'phone ragchewing. SXL did some shielding on his TV set and killed a lot of QRM to his ham rig. He received his Old Timers Club certificate. We hear the gang in Peoria has started a city net on 1883 kc. An ILN contact is needed there, fellows, and we will carry your traffic out. GUW, ODT, and AQP are enthusiastic boosters of s.s.b. and plan higher power. HJS sticks to lower-powered mobile and has fun. New Novice calls are LYB and LYC. New OOs are ERU, PVD, and KKN. DO, AA, and K9FCA made BPL. USI is working hard at his OBS duties, both on 40 and 2 meters, with good response from his "customers." FRP and GBT renewed OPS appointments; the latter has had continuous service since 1938. FRP, SME, CEE, and YIX renewed ORS appointments. VWJ is rebuilding his rig and enjoys IEN. Our sympathy to ICF, who lost his mother. BA is NCS and KPW alternate for the 10th Air Force MARS Net. A group of the after-midnight ragchewers on 40-meter 'phone sprang a surprise visit on DA. They included BNZ, ZGV, QBB, MCM, ERR, and TNH. PHE had a little beam trouble. DRN deplores the fact that there are so few stations on 432 Mc. So far he has heard and worked AGM, ZQT, and EFD. OO TAL observes that some of us are getting careless with out-of-band operation on 160 meters. KN2KNL/9, stationed at the Ground Observers Detachment in Chicago, is the first Novice "K" call we have heard from. BRD is changing QTH again. Watch for it at the heading of his DX column. SKR still is experimenting with loaded dipoles. Congrats to NIU on the new jr. operator. KQK built a citizen's band transmitter for a neighborhood juvenile to control a boat model. EYG was issued certificate No. 62 by the St. Clair Amateur Radio Club for working ten St. Clair County stations. KQL is the new trustee for the Sangamon Valley Radio Club station. He, with PRN, GOJ, and ERC, have established a strictly walkie-talkie defense net in Springfield. CQC has gone to a kw. on all bands, including DX. PXT, stung by inactivity, built a Heathkit rig to keep his hand in. OAL is teaching the XYL the code. YLU enjoys 160 meters with an Elmac. MTQ finally licked the parasitics and now is on all bands with an 813. Fifteen meters looks good to GTI and he and EWR have a contest all their own. JEC says his rig for 420 Mc. looks like part of a space ship. ULB is going to write President Ike regarding TV sets causing trouble to his ham rig. NN is running out of wall space for certificates. His latest is D.U.F. Amateurs in the northwest suburbs of Chicago are checking a Novice who drops the "N" in his call and slips into the forbidden portions of the band with a VFO. YIX is accused of having ghost writers of this dope. But it isn't true, fellows; send in your items not later than the fifth of the month and see. PGW gets better reports, he claims, from his mobile rig than ATH does on his home equipment. Traffic: (Jan.) W9DO 1074, K9FCA 907, W9AA 244, IDA 149, USA 118, SME 77, OR 56, QQG 44, STZ 31, LXJ 29, VHD 28, YIX 27, MRQ 25, BUK 18, FRP 16, PHE 12, BRD 11, BA 8, HPG 4, NIU 2. (Dec.) W9IDA 316, OR 218, UVM 17.

INDIANA — SCM, George H. Graue, W9BKJ — Section Nets: IFN 3910 kc. daily 0900 and 1730 CST; QIN 3656 kc. Mon. through Sat. 1600, 1730, and 2200 CST; RFN 3656 kc. Sun. 0900. CYC is on the air again with an entire new station. JUJ is active on three nets. NZZ still is QRL with Arctic skeds. TT received a BPL medallion. 8IQJ/9 has a new Viking II with VFO. WWT has applied for OBS appointment. WRO's modulator transformer blew up again. QYQ has a new s.s.b. exciter. AYP and JWI have new Johnson mobile rigs. DOK was host to an Explorer B. S. Troop. RBX took the commercial class exams. GDL is the cabin station of STC. AZF is on 75-meter 'phone. DKR has a new VFO. HLY is working 20 meters with cubical quad per Jan. *QST*. DGA enjoyed his first CD 'Phone Party. NH still is working DX on 160 meters. PPS is one of the operators at YB. UNT received a Viking II for Christmas. HMR is assembling a Viking II. IOH reports there is ham gear on 147.3 Mc. at State Police Post at Charleston for c.d. work. CCARC officers are LSG, pres.; DKC, vice-pres.; IRT, secy.-treas. IRT is Clark County EC. DFW, HRY, LSG, IRT, and WNI have new rigs on the air. N9NHV is new in Jeffersonville. Mike and Key Club officers are UWT, pres.; UVD, vice-pres.; VCA, secy.-treas. FXY, Martinsville High School station, assisted for exams N9NFB, NCK, and NPS. ISC is new at Columbia City. New at Sullivan is RAM. BSZ has resigned as EC for Grant County. DNA donated a ditto machine to the LCARC for club bulletins. ZYP built a new VFO. Newly-elected officers of TARS are DGA, pres.; UMS, vice-pres.; OVB, secy.; and RBV, treas. TARS's new meeting place is at the Community Center, Eighth and Main St. HQF has 127 confirmed on DXCC. DGA has 123, and EHU has 96. DPE is headed for K7-Land. ZZY is rebuilding. DL4CT-9MXE was named Airman of the Month in DL-Land. DIR has been nominated for Air Academy at Denver. FFH is an ensign in the Navy. RIV has new 75A-3. LDB is trying to organize a club at the high school in Elwood. DQI has dropped the "N" and is 2-meter mobile. CKD is new in Indianapolis. HMS has dropped the "N." N9LCQ is new in Griffith. WKN is building a new final. ACN has a new Sky King. EHZ is building an s.s.b. slicer. OFD has a new 500-watt final. WWT reports total traffic for RFN as 195; YIP for IFN with a total of 182. Traffic: W9JUJ 1537, NZZ 1193,

(*Continued on page 84*)

(No. 3 of a Series)

WHAT IS A MICROVOLT?



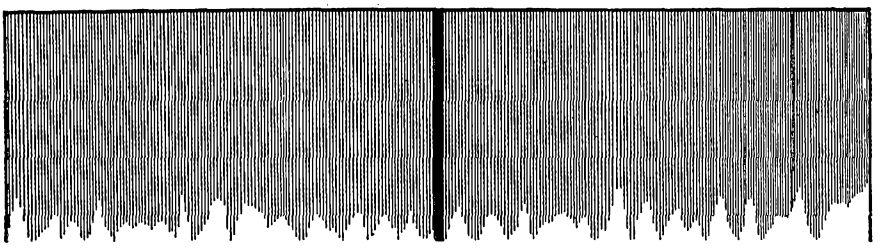
A MICROVOLT of r.f. across the antenna terminals produces an audible and quieting carrier on a sensitive receiver (A) under laboratory conditions with a signal generator producing the microvolt. The receiver is then placed in an amateur station.

A less sensitive receiver (B) in the same station under identical operating conditions produces a quieter and more audible received signal than receiver (A).

What is the difference? The noise figure could be better in (B) but when measured (A) is found to be superior.

The answer, of course, is selectivity. Consider a segment of frequency with a signal in its center. (Fig. 1) The grass on both sides of the signal is noise, mainly man-made and well above the thermal noise of the first r.f. stage.

Fig. 1



Consider selectivity as a window. The narrower the window, the greater the selectivity. By placing the signal in the center of the window, receivers (A) and (B) are Figures 2 and 3 respectively.

Fig. 2

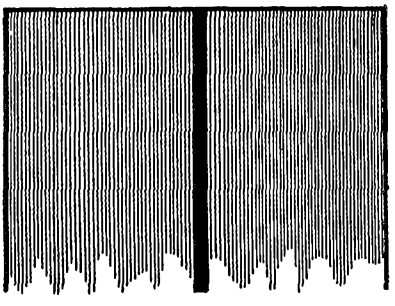
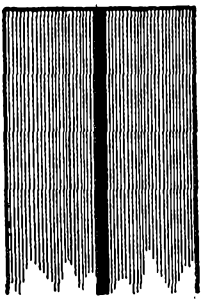


Fig. 3



Receiver (A) window contains the wanted signal plus a lot of useless noise. (B) window contains mainly signal. (B) will have the greater operating sensitivity, since most of its accepted spectrum is signal.

Below 30 Mc. the noise figure of a receiver is seldom realized due to man-made noise. Selectivity, therefore, is the important function in the majority of cases with the noise figure not so important.

At UHF noise figure is a good measure of operating sensitivity since a given receiver may utilize its i.f. gain until the amplified thermal noise of its own first stages becomes objectionable. Man-made noise at these frequencies is low enough to permit this condition.

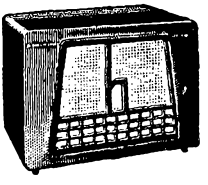
The criterion then for a good communications receiver becomes one of excellent selectivity with sensitivity or noise figure of secondary importance, depending upon the operating frequency.

Robert Kurth, W9CDO

Bill Halligan, Jr.

W. J. Halligan W9AC

for **hallicrafters**



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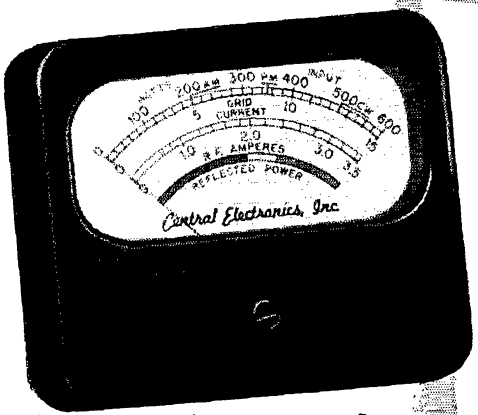

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- Reads power input directly in watts
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- Instantly reads output in RF amperes — no lagging thermocouple
- Indicates reflected power caused by mismatched load
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. . . and switch the meter to any position while transmitting!

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CENTRAL ELECTRONICS takes pride in presenting a product of intensive research — the new Multiphase 600L Broadband* Linear. "It is destined to change the entire concept of RF amplifier design in the military, commercial and amateur fields." There are no tuning controls, servos or moving parts other than bandswitch.

- Single 813 in Class AB_2.
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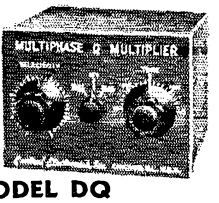

MODEL DQ

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NEW MULTIPHASE "Q" MULTIPLIER AVAILABLE THREE WAYS

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MODELS

MODEL AQ

"Q" MULTIPLIER for installation in Model A Slicer. Includes new front panel. Power-IF cable plugs into accessory socket.
Wired . . . $29.50 Kit . . . $22.50

MODEL DQ

Desk Model "Q" MULTIPLIER for use with any receiver having 450 to 500 KC IF. In attractive case 5½" W, 4" H, 5" D, with connecting power-IF cable. Power requirements, 225 to 300 VDC at 12 ma., 6.3 V at .6 amps, can be secured from receiver. Can provide added selectivity and BFO for mobile SSB or CW reception.
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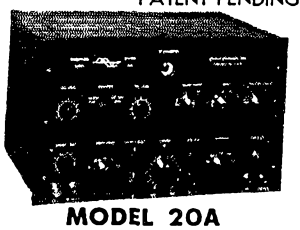
MODEL B

Sideband Slicer, same as Model A Slicer but includes built-in "Q" MULTIPLIER. AP-1 not needed.
Wired $99.50
Kit $69.50



MODEL 20A

- **20 Watts Peak Envelope Output SSB, AM, PM and CW**
- **Completely Bandswitched 160 thru 10 Meters**
- **Magic Eye Carrier Null and Peak Modulation Indicator**

Choice of grey table model, grey or black wrinkle finish rack model.

Wired and tested **$249.50**
Complete kit **$199.50**

458 CONVERSION KIT

Basic 458 Conversion Parts Kit, 15 to 160 meters, with dial, etc. $15.00
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NEW — FOR 10 METERS

MODEL 458-10 xtal controlled converter package to extend 458 VFO into 10 meter band. For use with above 458 Conversion Kits.
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Check These Features
NOW IN BOTH MODELS

- **Perfected Voice-Controlled Break-in on SSB, AM, PM.**
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- **40 DB or More Suppression** of unwanted sideband.

SIDEBAND SLICER
MODEL A IMPROVES ANY RECEIVER

Upper or lower sideband reception of SSB, AM, PM and CW at the flip of a switch. Cuts QRM in half. Exalted carrier method eliminates distortion caused by selective fading. Easily connected into any receiver having 450-500 KC IF. Built-in power supply. Reduces or eliminates interference from 15 KC TV receiver sweep harmonics.

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Plug-in IF stage — used with Slicer, allows receiver to be switched back to normal.
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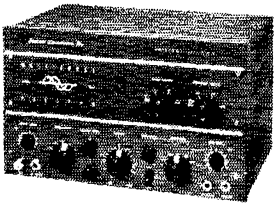
Combined AP-1 and xtal mixer. Allows Slicer to be used with receivers having 50, 85, 100, 915 KC and other IF systems. One xtal suffices for most receivers. **$17.50**



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SUCCESSOR TO THE POPULAR MODEL 10A

- **10 Watts Peak Envelope Output SSB, AM, PM and CW**
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Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.
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QT-1 ANTI-TRIP UNIT

Perfected Voice Operated Break-in with loudspeaker. Prevents loud signals, heterodynes and static from tripping the voice break-in circuit. All electronic — no relays. Plugs into socket inside 20A or 10B Exciter.
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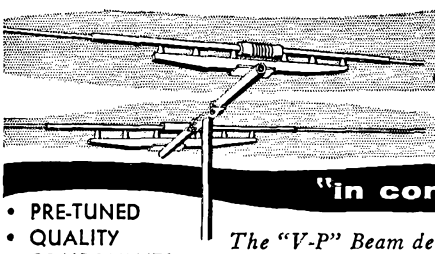

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- PRE-TUNED
- QUALITY COMPONENTS
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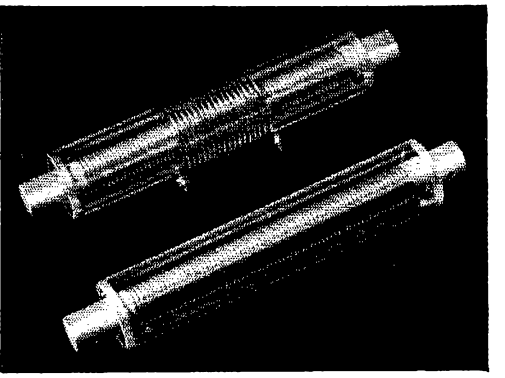

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Texas Electronic Sup., Inc.
Beaumont:
Montague Radio Distr. Co.
Corpus Christi:
Electronic Equip. & Eng. Co.
Dallas:
Adleta Co.
Crabtree's Whlse Radio Co.
Ra — Tel Co.
Houston:
Busacker Elec. Equip. Co., Inc.
San Angelo:
Gunter Wholesale Co.
San Antonio:
Lamp's Electronics, Ltd.
Waco:
Hargis Co., Inc.
Wichita Falls:
Clark & Gose Radio Supply.

UTAH

Ogden:
Iverson Electric Supply.
Tri-State Electronic Supply.
Salt Lake City:
Standard Supply Co.

VERMONT

White River Junction:
Electronic Supply, Inc.

VIRGINIA

Norfolk:
Radio Equipment Co.
Richmond:
Radio Supply Co., Inc.

WASHINGTON

Everett:
Pringle Wholesale Co.
Tacoma:
C & G Radio Supply Co.

WEST VIRGINIA

Charleston:
Hicks Radio Supply.

WISCONSIN

Fond Du Lac:
Harris Radio Corp.
Milwaukee:
Radio Parts Co., Inc.

DISTRICT OF COLUMBIA

Washington:
Capitol Radio Wholesalers, Inc.
Kenyon Radio Supply Co.

ALASKA

Anchorage:
Yukon Radio Supply, Inc.
Juneau:
Alaska Radio Supply Co.

CANADA

Calgary, Alberta:
Smalley's Radio, Ltd.

COSTA RICA

San Jose:
R. Castro & Cia., Ltd.

HAWAII

Honolulu:
Radio Television Corp.
Radio Whsle & Supply Co.

(*Continued from page 78*)

TT 591, UQP 194, WWT 160, PQA 158, JBQ 133, W8IQJ/9 131, W9WRO 120, QYQ 88, EHZ 85, TG 60, ZRP 59, CTF 53, ZYK 49, TQC 46, NTA 44, BKJ 42, SCT 38, SKT 37, YB 37, AYP 31, VNV 31, YIP 29, DOK 26, SVL 26, RBX 20. CMT 17, QR 17, CEA 16, FGX 14, BDP 10, CC 10, EGQ 8, GDL 8, AXF 7, YVS 6, DKR 5, DGA 4, HLY 4, PIN 4, UWU 4, BXG 3, NH 3, LFW 2, PPS 1.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAMs: ESJ and GMY. RMs: IXA, RTP, and UNJ. Nets: BEN, 3950 kc., 6 P.M. daily; WIN, 3625 kc., 6 P.M. daily; WPN, 3950 kc., 1215 Mon.-Sat., 0930 Sun. Wisconsin mobile and c.d. frequency: 29,620 kc. WIN operation was moved up to 5:30 P.M. to beat the long skip. VBZ has a new "short" beam for 14 Mc. ESJ has been toying with a 6J6 on 432 Mc. Net certificates (BEN) were issued to OVE and HHJ. We trust that by this time IXA has recovered from the attack of virus pneumonia which put him out of business for a while. CCO now has coax feed on his 80-meter antenna. UTV has a new c.w. rig with 80 watts to a pair of 807s. 80-meter DX worked by RKP includes PAØ, DL1, G, VP1, KV4, KP4, VP7, and ZL. RQK is looking for Wisconsin stations on 14-Mc. 'phone while at school in New Jersey. QXE moved to Minnesota and is now a WØ. Net certificates (WPN) were issued to LEE, LUQ, FXW, BTN, and YFU. SAA reports 1049 QNI in December. New officers of the Racine Megacycle Club are BVG, pres.; LXY, vice-pres.; YZA, secy.-treas. They plan to equip the Racine six agency c.d. truck with gear for RACES operation. The M. & M. Club held its Charter Night party Jan. 29th. CCO is now NCS on WIN Wed. SZL is director of communications for Racine c.d. SDK has a new SX-96 receiver. FCF QSOed ZHE/M in Madison via 6IJU on 21 Mc. FLARC (Madison) elected as new officers RBI, pres.; LNM, vice-pres.; YWI, secy.; MQK, treas.; and DIG, INO, and HHR, directors. LHR has a B7 W 5100 transmitter and HQ-140X receiver. OVO has been working 21 Mc. with his mobile. Traffic: W9VBZ 557, ESJ 232, CXY 176, IXA 67, SAA 63, CCO 59, RTP 57, UIM 50, UTV 24, LAG 19, FFC 9, RQM 9, GMY 8, IQW 8, IIU 7, KWJ 6, RKP 5, SZR 3, OVO 2, RQK 1.

DAKOTA DIVISION

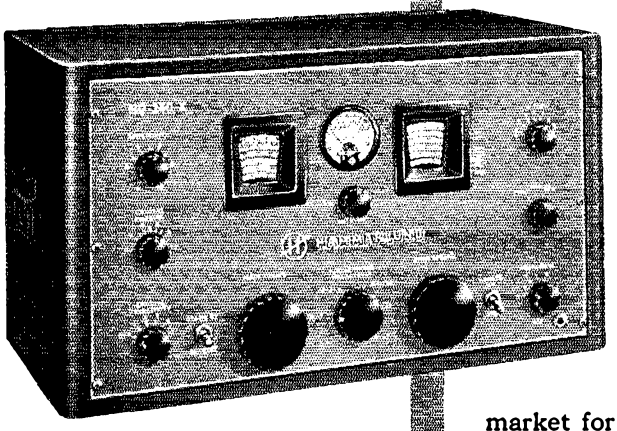
NORTH DAKOTA — SCM, Earl C. Kirkeby, WØHNV — The Lake Region Amateur Radio Club at its last regular meeting formulated plans for a code and theory class for Novices, to be held in Devil's Lake. The members also are working on a club 2-meter project. We wish them much luck as there is very little 2-meter activity in the State at present. The Sioux Amateur Assn., at Grand Forks, has purchased a kw. transmitter from a government agency and is busy converting it to the ham bands. We are sorry to say that this will be our last report as SCM. We just don't have the time to devote to the job that it deserves. Thanks to all those faithful boys who reported every month. Traffic: WØFVG 37, BFM 11.

SOUTH DAKOTA — SCM, J. W. Sikorski, WØRRN — Asst. SCMs: Earl Shirley, ØYQR, and Martha Shirley, ØZWL. SEC: GCP. PAMs: GDE, BNA, NEO, and PRL. RM: SMV. DVB and EQN registered with the AREC from Lead. SMV won the SFARC 7-Mc. WAS Contest, with HON, BLZ, PHR, RRN, OOZ, and RWE also winning prizes. Officers for '55 of the Prairie Dog ARC are HFE, pres.; ZVV, vice-pres.; EUJ, secy.-treas.; THF, chief operator; RLA, custodian; GDE, publicity; SCT, editor. The PDARC received an inquiry about its "Who's Who in South Dakota Hamdom" from England. Net activities for January: 160-net, 30 sessions, 838 QNI, traffic 98; C.W.-Net, 13 sessions, 113 QNI, traffic, 50; 75-Net, 30 sessions, 1010 QNI, traffic 113; NJQ-Net, 24 sessions, 628 QNI, traffic not reported. DES is back on the air with a Ranger after many years absence. UVL has a new daughter — his first "harmonic." North Hills hams have formed a new club, with AEN, pres.; Merle Reese, vice-pres.; DVB, secy.; and Arne Sjomeling, treas. Traffic: WØSMV 59, MPQ 42, BLZ 41, SCT 41, PHR 11, OOZ 7, BQS 6, DVB 6, RSP 6, RRN 4.

MINNESOTA — SCM, Charles M. Bove, WØMXC — KJZ now has worked all states on 80-meter c.w. TMZ's wife is now WNØZQR. YNY is located in Dawson and is on 75 meters. Albert Lea reports 4 new hams, WNØZBY, ZBL, ZJC, and ZLR. VEZ, at Murdock, bought JDO's old transmitter and JDO bought LVG's rig. The MJN Junior Slow-Speed Net on 3690 kc. changed time to 1700 CST. While we are mentioning nets, you can check into the MSN C.W. Net on 3595, MJN on 3690 kc. at 1800 and the MSN 'Phone Nets on 3820 kc. at 1205 and 1800 CST. The Mesabi Net meets on 1895 kc. at 1900 on Mon. and Fri. EQS is going into the Navy. TYV and OJP have dropped the "N" from their calls. PBL is sporting a new Gonset 500-watt final on his 10-A s.s.b. rig. Your SEC, GTX, now has 417 AREC members signed up. Out of this group there are 140 mobiles. George is to be commended for the fine job he has done as Emergency Coördinator. The St. Cloud Mike and Key Club has been reactivated and meets the 3rd Mon. of each month at 7 P.M. For meeting place call RVO, Phone 2986, and ask for Bob. HPS and his XYL, PYC, are moving to

(*Continued on page 86*)

THE HQ-140-X . . .

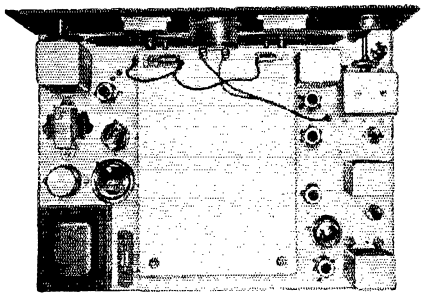


HAS "MORE THAN MEETS THE EYE"!

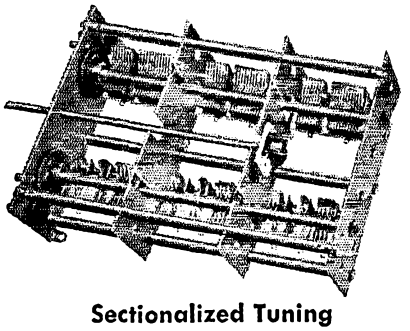
Just looking at the outside of an HQ-140-X communications receiver isn't enough, when you're in the market for a new rig. Sure, it's in an attractive case that's built for rugged service; and the controls are comfortably placed for lengthy DX operations. But, it's what's inside the cabinet that's important.

For example, the HQ-140-X offers a professional-type tube lineup. The use of a separate mixer (6BE6) and oscillator (6C4) contribute to the high degree of oscillator stability. Modern 6BA6's are used for the RF amplifier and for all three stages of IF amplication for maximum efficiency.

The nine individual sections of the band-spread capacitor, and the six sections that make up the main tuning capacitor, at all times maintain the proper L/C ratio regardless of what part of the receiver's range (540 Kc to 31 Mc) you use. Plates are heavy brass, soldered to their shafts, built into a large sturdy frame for rugged use.



HQ-140-X
Top View



Sectionalized Tuning
Capacitor Assembly

Features like those described above rate high with 'hams' the world over. For detailed information on the HQ-140-X, write to The Hammarlund Manufacturing Co., Inc., 460 West 34th Street, New York 1, New York. Ask for Bulletin R4.

HAMMARLUND
SINCE 1910

Mahtomedi. The 1954 Ten Thousand Lakes QSO Party was a success. Twenty-three certificates have been issued. The three highest scoring stations in Minnesota were HAH, KJZ, and LUX. Rondolfo Montero, who attended school in Minnesota and is a good friend of LUX, returned to his home at Vigan-Ilocos Sur in the Philippine Islands. Rodolfo has a burning desire to be a ham. To help him out LUX gave him a Heathkit receiver and Gonset code oscillator with key and also sent about $130 in assorted gear. Traffic: WØKLG 221, KFN 106, QBW 105, HIN 104, WMA 96, QNY 85, DQL 78, HUX 57, RVO 57, IRJ 54, GTX 41, TQQ 32, UCV 32, RQJ 26, TKX 25, TUS 23, QDP 22, EHO 20, LST 20, BZG 19, GGQ 19, MXC 16, ABA 11, BUO 11, CID 9, KNR 9, NTV 9, ALW 8, HMV 8, LUX 8, QGD 8, ZTB 7, OPA 6, VOA 6, FIT 5, WAA 1.

DELTA DIVISION

ARKANSAS — SCM, Owen G. Mahaffey, W5FMF — SXM reports he has his Extra Class license. Congratulations, Grover. MSH is RM and is trying hard to get the c.w. net going. New appointments: LUX, MRD, and DRW as ECs; MSH and LUX as ORSs; BAB as OBS. TNM, EVB, and BAB paid us a visit. We're always glad to see you. WN5FRG is a new ham in Clarksdale. LUX has a new modulation transformer and will be on with a new 'phone rig soon. LRE writes that he is in charge of telephone service in Frankfurt, Germany. CAF says he is recuperating from both an illness and a fire and will be back on the net soon. Traffic: W5MSH 555, FMF 25, PX 6, LUX 1, SXM 1.

LOUISIANA — SCM, Thomas J. Morgavi, W5FMO — The Single Sidebanders Dinner staged at a famous New Orleans restaurant was a huge success. Among those attending were HHT, TDY, IMT, IMU, ABS, VEU, UKQ, ZSP, ZNI, DLA, LFF, and SUM. LFF and SUM visited your SCM the morning after their whirlwind tour of the French Quarter. WQP is a proud pappy, a girl. She modulates his Viking better than Jerry. NDV meets with NTS, RN5, CAN, CFN, and TXN to continue as high scorer for Louisiana. DGB has been down with the flu but is up and around again. GXO was in the hospital for an operation but is on the road to recovery. FMO lost part of his 20-meter beam during a recent windstorm. He is building a new secondary standard consisting of a 100-kc. unit in a double oven and multivibrators for 100, 10, 1 and .1 kc. KHX is plagued with r.f. in the wrong places. SPZ made a tape recording of the last CD Test which was played back at a recent meeting of the Greater New Orleans ARC. It brought out to a lot of us our mistakes on net procedure along with some good points. An emergency net is being formed in New Orleans. Meeting time is 9:00 A.M. Sun. on 3825 kc. All AREC members are requested to report in at that time. Address queries in reference to this net to UQK or FMO. Four station activities report cards were received this month and that accounts for the lack of out-of-New Orleans news. Please send in your reports so that they are received not later than the 4th of the month. Traffic: W5NDV 92, EA 27, VIC 18, FMO 10.

TENNESSEE — SCM, Harry C. Simpson, W4SCF — SEC: RRV. PAM: PFP. RM: WQW. Congratulations to IIB on making DXCC with a maximum of 150 watts. WQW and PFP request more net attendance, although John still is enthused over the *fifty* stations who checked into the 'phone net one recent Sun. morning. CXY is doing a grand job as NCS of the new Novice Net which meets Mon., Wed., and Fri. at 1900 EST on 3737 kc. All Tennessee Novices are invited to participate. WQT has a new Slicer, and reports five new Novices in the Clarksville Area. OEZ reports on the Davidson County 2-meter Net, which now has 23 members in the Nashville Area. FUY has a new sixteen-element beam. The usual fine bulletin was received from the Upper Cumberland Net. PVD's DX score now is 113/90. UWA has a new VFO. VJ, IV, and UWA are new ORSs. Orchids to BER, PVD, ZJY, UWA, and the Cookeville Club for their fine publicity in newspapers concerning their emergency activities. TYU sent nice clippings and pictures with stories on Knoxville-Knox County activities, and a fine feature on the wonderful services TZD has performed for service personnel. FCD Regional Head YB, along with YEL and SCF, spoke to a full house at the Memphis Club. VKE, now at Northwestern, writes that he looks forward to QSOs over the school station, 9GBX. New Nashville Club officers are WHM, pres.; PRY, vice-pres.; and APH, secy.-treas. RRV reports more links in the 6-meter state chain, with APJ at Crossville and BXP at Harriman. Traffic: (Jan.) W4PL 743, OGG 334, TYU 248, ZJY222, PFP 129, PVD 110, TZD 80, IIB 78, PQP 73, WQW 66, SCF 59, HIH 57, UWA 54, RRV 44, VJ 41, BQG 40, CXY 34, IV 34, YMB 34, BMI 20, OEZ 16, UVS 14, APD 13, BBD 11, BAQ 10, PAH 8, RHK 8, FLW 6, UOA 5, DCH 4, ZZ 3, GFV 2, HSX 2, HUT 2, UDI 2, NPS 1. (Dec.) W4ODR 110, UVS 26, WQT 21.

GREAT LAKES DIVISION

KENTUCKY — SCM, Robert E. Fields, W4SBI — ZLK reports that he burned out his low-pass filter. YOK worked W6s HP and ELS on 80 meters. JCN is getting

(*Continued on page 88*)

New Heathkit VFO KIT

MODEL VF-1

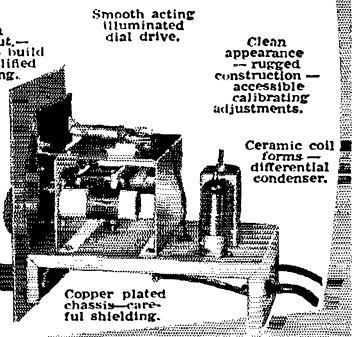
$19.50

Ship. Wt. 7 lbs.

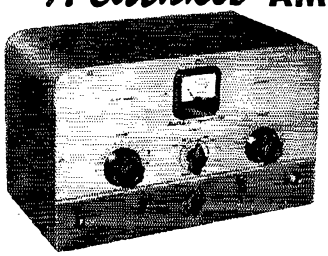
- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard ½" crystal holder. Construction is simple and wiring is easy.



Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

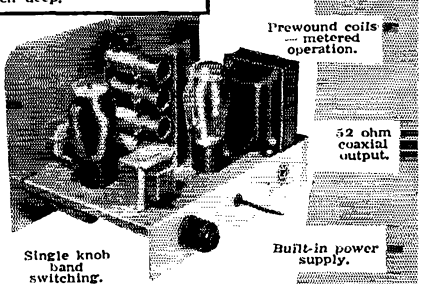
$29.50

Ship. Wt. 16 lbs.

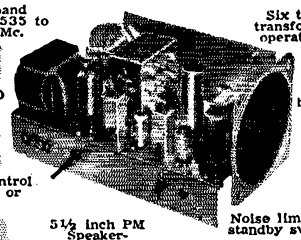
SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 .....Oscillator-multiplier.
6L6 .....Amplifier-doubler
5U4G ..... Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.

Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporating many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

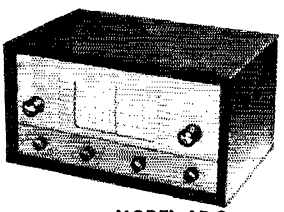


Heathkit COMMUNICATIONS RECEIVER KIT



SPECIFICATIONS:

Range.....535 Kc to 35 Mc
12BE6 .....Mixer-oscillator
12BA6 .....I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ....B. F. O. oscillator
12A6.....Beam power output
5Y3GT.....Rectifier
105-125 volts A. C. 50-60 cycles, 45 watts.



MODEL AR-2

$25.50

Ship. Wt. 12 lbs.

A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

CABINET:

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

HEATH COMPANY
BENTON HARBOR 9, MICHIGAN

ready to go to 160 meters for a KYN Net that is being organized. K4FBW reports that it was a very poor traffic month with very little moving on any of the nets, both amateurs and MARS. NIZ and NGN report that on the night of Jan. 31st ten mobiles from Owensboro, Ky., and vicinity were dispatched by an amateur station set up at the March of Dimes Headquarters to pick up donations from those missed by the Mother's March. Newspaper and radio publicity, including a live rebroadcast of the hams in action, promoted good will for amateur radio. Forty-eight dispatches were made to the cars and nine messages sent from a second fixed station set up in the county headquarters to main headquarters. This provided a fast reporting system for county donation totals. Operation was on 29.6 Mc. Incidentally, the mobiles picked up more than $100.00. CDA, Section Emergency Coördinator, urgently requests reports from ECs on the number of Emergency Corps members. Traffic: K4WBG 876, W4ZLK 106, K4FBW 60, W4HSI 51, CDA 41, RPF 34, NIZ 32, SBI 32, VBA 30, JCN 15, OGP 14, YOK 4.

MICHIGAN — SCM, Fabian T. McAllister, W8HKT — Asst. SCMs: Joe Beljan, 8SCW; Bob Cooper, 8AQA. SEC: GJH. New appointment: PHA as ORS. Newly-elected officers of the Grand Rapids Club are OCK, pres.; OPZ, vice-pres.; QOJ, secy.; CKK, treas.; TIJ and CPV, directors. Since this is the end of the road for me as SCM I want to thank the entire membership for splendid coöperation during my term of office. Special thanks go to those appointees who have helped to keep the organization functioning; the Assistant SCMs, the EC organization, the Route Managers and net control stations, and to all those whose attendance on the nets has been an inspiration to me. Your work has been deeply appreciated, and I hope you will continue to give the same support to the new SCM that you have given me. You have made an excellent choice in RAE as SCM. Tom is one of the old-timers of radio, and you will meet him on both 'phone and c.w. Again, many thanks; and I'll be seeing you. Traffic: (Jan.) W8NUL 215, ILP 116, ZLK 110, RTN 91, SCW 84, DAP 68, SJF 65, SWG 58, JKX 56, QIX 55, WVL 49, FX 44, IUJ 42, WXO 30, DSE 26, HKT 23, NTC 21, FSZ 18, NOH 17, HSG 12, AQA 10, OQH 8, PHM 8, INF 5, YDR 5, AUD 3, EGI 3, MEX 3, BRV 2. (Dec.) W8SCW 67, IUJ 44, TQP 13.

OHIO — SCM, John E. Siringer, W8AJW — Asst. SCMs: J. C. Erickson, 8DAE; W. B. Davis, 8JNF; and E. F. Bonnet, 8OVG. SEC: UPB. RMs: DAE and FYO. PAMs: EQN and HUX. New appointments include DVL as ORS, HHF as EC, and HOH as OES. We regret to report the deaths of ROX and WYE, both well known in the Cleveland Area. DSX, 8RN Manager, reports that LHV and MQQ have been issued net certificates. Please note the announcement of the Ohio QSO Party. It is hoped that 1955 will produce more entries than the two previous years when 1953 netted 17 and 1954 showed 27. WE's XYL has worked 46 states. WN8UPH has worked 19 states in three weeks of operation. ZLP became the father of twins on Jan. 5th. NGW, QSL Manager, reports that approximately 500 W8s have cards on file but no envelopes. The Cleveland Northeast gang has gotten a Viking Ranger for the clubroom. A new organization, the Nameless Wonders, meets the first Fri. of each month at the Euclid YMCA on Babbit Road. AQ has installed a ground plane for 10 and 15 meters. PS reports that he is helping Novices TTQ, TTX, and UCP to get on the air. DAE, BN Manager, is holding special net sessions on Sat. and Sun. at 11:00 A.M. The Fulton County Amateur Radio Club has been organized with SXU, pres.; ZHQ, vice-pres.; VAQ, act. mgr.; and UPR, secy.-treas. Recently licensed Novices in the club are UAG, UAC, TTV, and VFO. GDQ has worked all states on 160-meter 'phone. FJP built an electronic keyer. GCP's favorite bird brought him his second son on Jan. 11th. BSRA (Akron) officers for 1955 are VQI, pres.; BFH, vice-pres.; CMC, secy.; and KCK, treas. Steubenville became the second city in Ohio to have its RACES plan approved. ERR is Radio Officer, ZRI is alternate, and DNQ is assistant. On Jan. 2nd the Travelers Motorcycle Club of Toledo held its annual "Snow Run" with 16 stations participating. VQP was declared the winner in Toledo's hidden transmitter hunt of Jan. 23rd. The Hocking Valley Radio Club recently was organized with CRS, pres.; LQH, vice-pres.; and EEQ, treas. New officers of the Lake Geauga Radio Club are OXS, pres.; TPM, vice-pres.; WN8RCE, secy.-treas.; and OMZ, act. mgr. The club station, RWF, is being rebuilt and will have 75-, 10-, and 6-meter rigs. *Dayton RF Carrier* devotes much space to the coming Hamvention of Apr. 2nd. Other Dayton news: NFA made WAS on 40-meter c.w. FFM has moved to a new QTH, PLV had a QSO which lasted over an hour on 40-meter 'phone although running but four watts. RHG has a new 75A-3, FPZ is doing an excellent job in his training of c.d. operators and 7IIP has been transferred to Dayton. OVARA's *Ether Waves* shows that 13 members are over the 100 mark in countries worked with JIN, at 247, leading the pack. Springfield's Q-5 reports that JRG was the club winner in the SS Contest, with HBJ and RWZ taking second and third, respectively. The FHARA News Bulletin states that DMU is staying in Topeka, Kans.; DCE has finally gotten on mobile; and the Covered Dish Supper of January was a yelping success. The Toledo *Shack Gossip* informs us that OFG is going to town with a 6-watt rig; the WITs have a spanking new harmonic; new Novices are UPH, UPL, ULX, and TTH; YGR is building a new home; UEL has been transferred to California; and QCT has dropped the "N." The Columbus *Carascope* mentions that MRC is building a 20-meter Quad; OMY is going great guns on 15 meters; NPF is doing better than 30 w.p.m. on the mill; and LVF has returned from his tour of duty. Northeastern Ohio's *Ham Flashes* relates that BRG is now on 40-meter 'phone; SXG has a new Ranger; JIF is temporarily QRT while rebuilding; JWC has returned to the air; NUW has been released from the Navy; and the RACES plan for the Youngstown Area has been approved. Traffic: (Jan.) W8FYO 401, UPB 268, DAE 181, REL 171, ARO 105, AMH 84, MQQ 82, IFX 65, ILC 61, KDY 31, AJW 25, LZE 24, AL 23, EQN 20, LMB 19, HPP 15, QIE 12, VTF 12, AJH 11, TLW 10, RN 9, ET 8, GZ 8, LER 8, WE 7, HFE 6, OQP 6, RO 6, DL 4, GCP 4, HUX 4, NQQ 4, TJD 4, WJB 4, DMD 3, GDQ 3, BUM 2, LZR 2, WYL 2. (Dec.) W8REL 372, DQG 164, ZAU 80, DL 8, PBX 7, AQ 4.

THIRD ANNUAL OHIO INTRASTATE QSO PARTY APRIL 16-17

The Ohio Council of Amateur Radio Clubs will sponsor a QSO party, open to all Ohio amateurs, which will be held April 16-17, 1955, from 6:00 P.M. EST Saturday until 6:00 P.M. EST Sunday. All Ohio amateurs are urged to participate in this affair and to submit their logs to the contest manager.

Any and all amateur bands and any mode of emission may be used. There will be no power restrictions. Scoring: multiply the number of Ohio stations worked by the number of Ohio counties contacted. Each station may be worked but once regardless of band or mode of emission used. Logs should include call signs of stations worked, time, date, signal reports sent and received and the county in which the station is located. Operation near the following frequencies is recommended: 3550, 3740, 3860, 7100, and 7250. On the other bands, take your pick. The call "CQ Ohio" should be used on both 'phone and c.w. At least five appropriate certificates will be awarded to the highest scoring stations. Certificates will also be awarded to the Novices, the number of certificates being contingent upon the degree of activity.

All contest logs must be postmarked no later than May 1st, 1955, and should be sent to the contest manager, Hamlin King, W8EQN, 353 So. Arlington Ave., Springfield, Ohio.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W2ILI — SEC:RTE. RM: TYC. PAMs: GDD and IJG. The SARA, one of our oldest clubs, celebrates its 25th anniversary. Its record of achievements has been outstanding and lists many "firsts" in the field of amateur radio. As an example, the first microwave communication on 2300 Mc. was established by RMA and RYT in the year 1945. During the same year, UKL and RDL set the DX record of 800 feet on 21,000 Mc. The newly-elected officers are YIV, pres.; ZBY, vice-pres.; GRI, secy.; K2HON, treas. The Club directors, NZE, UKL, K2AXY, and K2CKS, promise an outstanding program for the coming year. To all concerned, our hearty congratulations. LXP, past-president of AARA, was honored by the U. S. Air Force with a trip to Thule AFB in Greenland for distinguished service. Through a 'phone patch, Garry has permitted the boys of this isolated area to talk with their folks back home. To thank him, the trip was arranged by the Pentagon. Congrats, Garry, for a job well done. **NOTICE:** The MHT Net meets every Sat. at 1300 on 3716 kc. This will correct the error in our February report. The HHRL is sending a copy of its excellent bulletin to each club in Westchester in an effort to create closer relationship and interclub visitation. We hope for the speedy recovery of K2CA and K2AVY. New on 144 Mc. are K2EOQ and KN2GZM. K2KJV has a new model 12 Printer. The HHRL authority on RTTY is AWQ. K2AWH lost one of his new homes plus a 5-kw. generator earmarked for the HHRL Field Day activity. The recent banquet held by the RVWARS was well attended and the FB talk given by Vern Chambers, of ARRL, was enjoyed by all. Traffic: (Jan.) K2BJS 512, W2CFU 30, K2HVN 19, W2ANB 14, K2EHI 12, W2APH 4. (Dec.) K2BSD 313, BJS 147, BE 76. (Nov.) K2BJS 187.

NEW YORK CITY AND LONG ISLAND — SCM, Carleton L. Coleman, W2YBT — Asst. SCM: Harry J. Dannals, 2TUK. SEC: ZAI, PAM: JZX. RMs: VNJ and LPJ. ZAI reports AREC membership has increased in

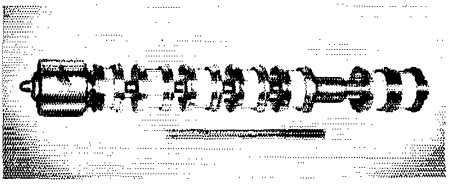
(*Continued on page 90*)

What's New with the Electron?

Latest power tube developments displayed by Eimac at annual I.R.E. show

New and improved klystron, ceramic and negative grid tubes highlighted the Eimac display at the annual Institute of Radio Engineers show and convention in New York City, March 21-24.

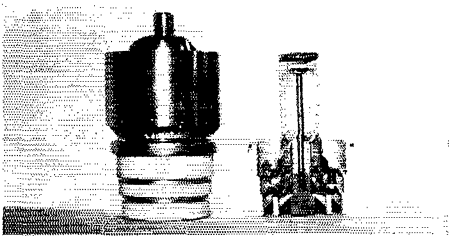
High power Eimac amplifier klystrons range in frequency from 225-3000mc and 5500-7500mc and vary in CW power output from 50 watts to 50kw. Application-proved Eimac amplifier klystrons such as type 3K50,000L,



High power Eimac amplifier klystron

delivering 10kw/CW power output at 400-1050mc, make possible high power previously limited to VHF and lower frequencies. These amplifier klystrons are of ceramic and copper construction and, although larger than negative grid tubes, are easily the lightest and least complicated of any klystrons intended for similar service. Small, rugged Eimac reflex klystrons are designed for local oscillator use as high as 9600mc in airborne environments.

Sharing the spotlight with klystrons were the latest in Eimac ceramic tube developments. Ceramic replaces glass in these tubes, giving a greater immunity to thermal and physical shock, plus allowing revolutionary construction techniques. In production, the ceramic and electrode parts are placed one on top of the other, similar to stacking



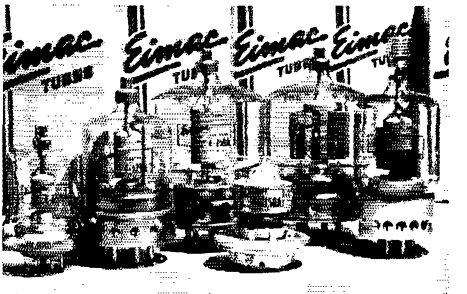
Ceramic tetrode and cross-section

poker chips. The copper metallized seals are the electrode terminals.

Eimac also announced improvements in popular commercial and military tube types such as the 3X2500A3 and 3X3000F1 power triodes, as well as new high vacuum rectifiers and water- and air-cooled tetrodes.

Along with the new, Eimac featured products that have been performance proved through years of operation in all types of commercial and military service. These tubes, of course, included the Big Six of Amateur Radio operation, the 4-65A, 4-125A, 4-250A, 4-400A and 4X150A radial-beam power tetrodes and 4E27A radial-beam power pentode.

New developments and standard line tubes shown at the I.R.E. show represent the leadership and reliability that have made Eimac the world's largest manufacturer of transmitting tubes.



The Big Six of Amateur Radio: 4-65A, 4-125A, 4-250A, 4-400A, 4X150A, 4E27A

"What's New with the Electron," a brochure distributed at the I.R.E. show discussing Eimac tube developments of the past year is available upon request. Write our Amateurs' Service Bureau for your free copy.

Eimac

EITEL-McCULLOUGH, INC. SAN BRUNO, CALIFORNIA

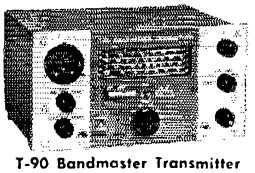
Brooklyn, Nassau, and Queens. VNJ is planning to reactivate the Section Training Net (NLT, 3710 kc.). All KNs and slow-speed General Class licensees interested in this traffic net are urged to contact Vic. LPJ continues to collect BPL cards and the XYL/OM combination of KEB/KFV continues to break section traffic records. JOA received EAN Net certificate. MUM made DXCC. K2ABW added a new antenna to his 813. K2HID won a Viking Adventurer kit at the Fordham RC. OKU is going RTTY. K2ECN is completing a 300-watter. K2IYK dropped the "N." LGK uses a Williamson amplifier for a modulator. The Tu-Boro Club already is planning its Field Day in W3-Land. JGV is going mobile. OBU keeps his old rig going while hoping for a modern transmitter. EC and GP are kept busy with business, which explains their low traffic scores. KN2KMD is a new Novice at HJ. K2DVT expects to invade 2 meters. K2AED is converting a 522. ENW and K2ESZ completed 813 rigs per Jan. '54 *QST*. ENW also has 10-meter mobile ready for spring mobiling. K2CMV built GDO and audio oscillator for test gear. JCA is rebuilding 813s and expects to move out on the Island in May. DSC is the proud possessor of a WAC certificate. KFV has completed Viking mobile and VFO. DLO has finished 220-Mc. transmitter and crystal-controlled converter for the same band. 5ZRA, GG's son and TUK's brother, is off to North Africa with the Air Force. RB has a new SX-88. CXI became the proud father of a baby boy. The Nassau 10-meter AREC Net had a successful hidden transmitter hunt with 12 mobiles and 4 fixed stations locating GPQ/KCW. K2HYK received 20-w.p.m. CP certificate. AEV visited ZS6-Land and EL2X. Ray is adding a 75A-3 to his shack. The Levittown RC started '55 with 20 new members and a brand-new 2.5-kw. generator. The VHF SS saw many new stations active. K2ED returns to the air with a Viking II and an HRO-50T. K2AMP is working on a new VFO. K2DDU now is a MARS member. UXY is returning to 144 Mc. 1RTV/2 has modified the HT-6 on 75 meters. The Columbia U. station, AEE, is heard regularly in contests. CLG has a new Gonset 20-meter beam. TUK is completing the Signal Slicer for s.s.b. reception. FI reports that RACES activity in Nassau County is increasing. RDK has moved to W8-Land. K2DND, ex-8MUP, and 5MLR, now are heard on 144 Mc. GG has added crystal converter for 2 meters. Please continue mailing reports to TUK to avoid re-mailing by YBT. The percentage of reports for the last quarter of 1954 shows that many stations do not report as regularly as they might. Keep the reports coming! Traffic: (Jan.) W2KEB 1016, KFV 720, LPJ 584, VNJ 344, JOA 290, MUM 162, BO 129, AEE 125, K2ABW 69, W2JZX 67, K2HID 64, CRH 41, AMP 27, W2LGK 22, K2HYK 18, W2IN 16, JGV 14, GP 13, OBU 10, EC 5, IAG 5, TUK 3, K2AED 2, W2HJ 2. (Dec.) K2GXL 10, DDU 2.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — Asst. SCM: Charles Teeters, K2DHE. SEC: IIN. PAM: CCS. RMs: EAS, CGG, and NKD. A new club, The Raritan Bay Radio Amateurs, has been organized in the Raritan Bay Area. Officers are TTM, pres.; K2DDM, vice-pres.; K2BEV, secy.; SUT, treas.; and K2EQD, act. mgr. K2CHI has a new Viking II. K2AFQ is having receiver trouble. YVQ has a ground-plane antenna on 20 meters. EAS reports the Jersey Net is alternating NCS each night of the week. NIY has worked more than 1000 different Novice stations. EWZ now has 30 watts on 3.5 Mc. The Windblowers VHF Society is making plans for a visit to 1HDQ's shack and ARRL Headquarters. Many of the members expect to be on 420 Mc. and higher very shortly. JCO is QRL with school work. K2GAS is a new ORS. Dick ran up a fine score in the CD Party a few days after receiving his ORS certificate. The Ocean County Amateur Radio Assn., AFU, elected the following officers at a dinner meeting: Arthur C. Wilkes, pres.; Joseph Solante, secy.; and William Thorne, treas. After the election two films sponsored by Hallicrafters were presented on the screen, "Adventure in Africa" and "The SCR-299B." At a later meeting K2AT demonstrated (at his home at Princeton Junction) microwave transmissions, transistors, transmission of modulated light waves, and a solar battery in action. K2BAY has finished the new VFO and is back on the air only to find he has TVI. K2DSW needs four more states for his WAS on 40 meters. HXP is lending a hand with the RACES program in his home QTH. CVW was active in the CD Party. KN2HXP sends in his first report and says he has the Novice 807 rig as described in the *Handbook* all fired up on 40 meters and is having wonderful luck with it. Herm rolled up 1292 points in the Novice Roundup. You need not be an ARRL member to report your activities. We are pleased to hear from anyone. Anyone knowing the QTH of KN2JLQ, please pass it to the SCM. I am holding a KN6 QSL card for him. JKH is off the air until the new home is completed. KXD has a new addition to his family, a little boy. ZPD is doing a fine job with RACES in the Bloomfield Area. His monthly news letter, *The Signal*, distributed to all members of the Bloomfield Civil Defense and RACES members, is a very excellent way of keeping up interest in this activity. LQP reports Bergenfield well organized in the RACES program. The Irvington Radio Amateur Club held its annual banquet Feb. 21st at Townley's Restaurant in Union. N. J. K2ICE and asst. operator

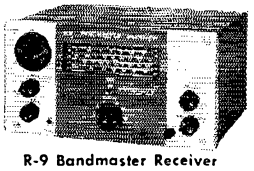
(*Continued on page 92*)

System Engineering

IN *Harvey*-WELLS EQUIPMENT

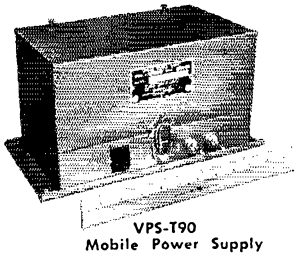


T-90 Bandmaster Transmitter

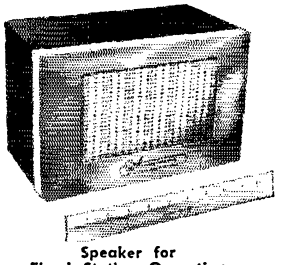


R-9 Bandmaster Receiver

APS-90 Power Supply
(115 V, A.C.)



VPS-T90
Mobile Power Supply



Speaker for
Fixed Station Operation

Speaker for
Mobile Operation

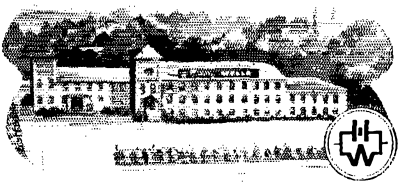
Here at Harvey-Wells, we make communications systems for military and commercial applications, and we believe that Hams too, want their stations complete in every respect. That's the basic thinking behind this new equipment we are introducing. The tremendous success of our TBS-50 Bandmaster has been due in part to the fact that it can be put on the air quickly and efficiently because it is a complete "package" with no additional equipment necessary.

Our new T-90 Bandmaster Transmitter is also a complete "package". It can be on the air five minutes after you bring it home if you so desire. Just plug in the power supply and connect the antenna. Our new R-9 Bandmaster Receiver, in its matching case, becomes an integral part by simply connecting the antenna to the T-90.

For fixed station operation, we offer the APS-90 A.C. Power Supply in a cabinet to match. (Just connect to 115V A.C., plug the output cable in the rear of the T-90 and you are ready to go.) The R-9 Bandmaster Receiver has a built-in A.C. supply. For mobile operation we have two vibrator power supplies, the VPS-T90 for the transmitter, and the VPS-R9 for the receiver. Both are convertible for 6 or 12 V operation.

Speakers for either fixed or mobile operation are matched electrically and physically to the R-9 Bandmaster Receiver to complete the system. This new Bandmaster Series is a complete *system*, engineered for fixed, mobile or portable operation — a system which has beauty as well as efficiency. It's well worth waiting for.

P.S. We are still making the world-famous TBS-50 too!



Harvey-WELLS ELECTRONICS, INC., SOUTHBRIDGE, MASS.

Annie are off to Florida for a holiday. Lou has the Communicator with him so no doubt will talk his way to Florida and back. A big sale is in progress at the shack of K2DHE. LIR is going strong on s.s.b. His influence on HJL might produce another sideband station in the Belmar Area. SWL Tony Sexton has purchased a new National receiver and a Viking II transmitter. NIE has a new 75A-3 receiver. Traffic: W2CQB 194, EAS 111, K2GAS 97, W2FPM 24, K2DSW 21, GFX 14, GER 13, W2CVW 12, CJX 4, NIY 3, K2CHI 2, BAY 1.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — This is my biggest month for reports since I've been SCM. Twenty-two reported. BDR and SCA are running neck and neck with PZO and CZ on the way up in traffic. HWY, PAN, and PKT are new members of TLCN. KVJ is a new ORS. TLCN worked NWX/M/3 while he was driving downtown in Philadelphia. UBY dropped the "N" and is working all bands. FKA and his XYL vacationed in Florida. QQA built up a Globe Scout. QJF has a Viking II. QWN has a Globe Scout on order. NGS has a new 32V-3. WNØZAQ and WNØZAN are new Novices in Des Moines. MKT reports excellent results with his Viking Ranger. SFK is busy with a new power supply for his 813. PAN is all set for traffic. MG was reëlected president of the Waterloo Club. TQI is about ready to drop the "N" from his call. New officers of the Ft. Dodge Club are JOL, pres.; QVZ, vice-pres., and treas.; NGS, secy.; NCV, YUA, and LAR, directors. JAD and KVJ sent along nice letters with their reports. Thanks a lot, fellows. Please get your appointments in for renewal, fellows. These will be the last I will be privileged to endorse. Traffic: WØBDR 2140, SCA 1703, PZO 532, CZ 181, LJW 76, QVA 52, NGS 46, EHH 32, LFZ 28, MKT 24, BLH 22, RMG 20, LGG 19, KVJ 17, SFK 14, HWU 11, SWD 8, PAN 2, NYX 1.

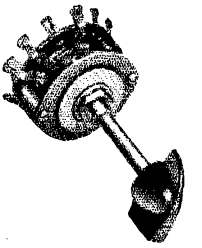
KANSAS — SCM, Earl N. Johnston, WØICV — SEC: PAH. PAM: FNS. RM: NIY. The Kansas 75-Meter 'Phone Net came to action from 2 P.M. to 10 P.M. Feb. 4th because of heavy snow and icing conditions in the State. ONF, TNA, and WXT acted as net controls. Those known to have participated were BLI, BYV, ECD, ERA, EBB, EBL, FHU, FHT, HF, IWS, IYF, ITF, KXB, KAJ, LIX, OZK, PBU, QMU, RLZ, MI, MXJ, IFR, LOW, YOS, DSY, SKW, UPB, VSC, NAS/M, NFS, TDW, OMM, OPQ, ONC, TYR, VRZ, EUZ, RC, REP, SQX, DSY, and UTL. The Kaw Valley Radio Club of Topeka participated in the Cerebral Palsy Telethon which was telecast over WIBW-TV for 18 hours. Using CET, with WGM's equipment as base station on the stage and eight mobiles, several thousand pick-ups of contributions were made. Those participating were UPU, KSY, IMH, EUU, AFN, BD, JLY, KKF, QJC, AGC, OZF, W5MFC/Ø, and ICV. 3ISH/Ø and YUH are new 2-meter stations in KC. A new c.d. net is operating in KC on 145.5 Mc. MOX has completed the 125-watt rig for 6 and 2 meters and is starting on a 220-Mc. rig. A new club is being organized in Manhattan, according to NFX. LBJ needs only New Hampshire to complete WAS on 160 meters. UGA is at Camp Carson, Colo. PHV is a new active station in Perry. REP is a new OPS. We regret to report FYG, of KCK, as a Silent Key. He was killed in a holdup of the YMCA where he worked. KVRC of Topeka is sending code practice on 1815 kc. Mon.-Fri. 1930 to 2030. Traffic: WØBLI 455, OHJ 231, NIY 195, UAT 131, FSE 116, EOT 61, TOL 55, FEO 49, ABJ 44, KSY 36, NFX 34, VBQ 30, TNA 27, FNS 24, REP 24, LBJ 23, FDJ 16, YJU 15, FVD 14, IFR 14, RBO 14, YFE 14, RBO 13, ICV 12, ECD 11, SAF 8, BET 4, DEL 4, KFS 4, QMU 4, LIX 1.

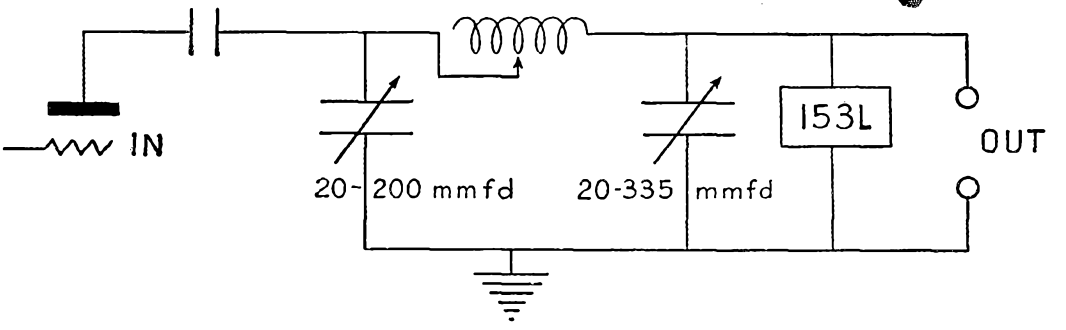
MISSOURI — SCM, Clarence L. Arundale, WØGBJ — SEC: VRF. PAM: BVL. RMs: OUD and QXO. The Suburban Radio Club, Inc. elected BTC, pres.; ZIO, vice-pres.; AKS, secy.; and PMU, treas. The St. Louis U. Radio Club elected ETW, pres.; TCF, vice-pres.; WKI, secy.; WKG, treas. The Club has purchased an HRO-50 for its station. NGX, of Lebanon, was killed in a recent tragic highway accident. The EXFs are vacationing in KH6-Land. OMM received her RCC and WAS certificates and is going all-band mobile with a new Gonset. DFK has worked 7 states with 15 watts on 2 meters. GCL has the 813 rig rebuilt and on the air. RCV is teaching code to prospective Novices. VFP has a new Heathkit VFO. CFL received his 2500 Traffikers Club certificate and GAR his 10,000 certificate. EBE received an A-1 certificate. SUV has a new 40-meter antenna. SAK's 12-year-old brother now is WNØZOI. RTO burned out his modulation transformer. QBX has a new Viking VFO. New certificates have been issued to CFL, ECE, GAR, MFB, OIV, OMM, RTO, RTW, SUV, TSZ, TWL, VFP, VPQ, and WAP. MON is operating a 7:00 A.M. schedule on 3580 kc. MEN moved its schedule up to 6:00 P.M. on 3900 kc. because of skip conditions. Appointments: DFK and NRX as ECs, SUV as OBS, ECE and SAK as ORSs. The Show-Me Net has moved from 40 meters to 3580 kc. because of skip conditions, and meets at 4:00 P.M. Sun. 3MQA, chief operator at KØFBO, is the proud father of an 8-lb. daughter. Traffic: (Jan.) WØCPI 970, GAR 770, KØFBO 385, WØBVL 300, GBJ 280, OMM 100, RTO 92, SAK 74, CKQ 65, WAP 62, VPQ 61, OUD

(Continued on page 94)

MALLORY HAM BULLETIN

Pi Coupling Networks are easy to make with Mallory 153L Decade Switch





Whenever an amateur designer tackles the job of putting together a "Pi" antenna coupling network, he runs into the problem of getting a wide capacitance tuning range on the antenna side of the circuit.

The usual method of assembling a decade group of 10 mica fixed capacitors and a selector switch is not nearly as simple as it sounds. First, it requires 10 capacitors . . . which take a lot of space. And second, getting these units arranged into a compact, short-lead pattern is far from easy.

Here is what radio experimenters at Mallory did to lick the problem. Instead of 10-unit decades, they built a capacitor decade with only four capacitors . . . by using a Mallory Type 153L Switch. Type MC 500 volt mica capacitors, with values of 100, 200, 300 and 400 mmfd. are connected to the switch in the recommended manner. As the switch is rotated, the capacitors are automatically connected in single and parallel arrangements to provide ten steps of 100 mmfd. each, plus an "off" position. If you're not familiar with the 153L Switch, you can find a description in any late Mallory Distributor Catalog.

Placing a variable capacitor, with a range of about 20 to 235 mmfd. in parallel with the decade switch provides an output circuit with a smoothly adjustable range from 20 to 1335 mmfd. This circuit, as set up by Mallory amateurs, gives good matching from most low power final amplifier stages into a wide range of antenna feeds. It will be smoothest when working from plate impedances of the order of 3000 to 5000 ohms into a 50 ohm co-ax fed antenna system. As drawn here, the circuit will work well on all bands from 3.5 through 28 megacycles.

The inductor L_1 must be made adjustable over a range from 20 to 2 or 3 microhenries, depending on the frequency band and on the particular plate and antenna impedances. Representative values will be found in the Radio Amateur's Handbook and in magazine articles on "Pi" network operation.

Your Mallory distributor will be glad to show you one of these versatile Capacitor Decade Switches, as well as the many other Mallory electronic components that you can rely upon to keep your rig in top-notch operation. Stop in and see him soon, and put this idea to work for yourself, too!

P. R. MALLORY & CO. Inc.
P. O. Box 1558
INDIANAPOLIS 6 INDIANA

P.R.MALLORY & CO. Inc.
MALLORY

60, HUI 45, IJS 36, EBE 32, TSZ 27, SUV 24, KA 22, QXO 21, RTW 18, QBX 11, W9LHB/Ø 10, WØKIK 10, TCF 8, TGG 6, DFK 5, BUL 4, MFB 4, QMF 4, OIV 2, TWL 2, ECE 1. (Dec.) WØOMP 203, QBX 10.

NEBRASKA — SCM, Floyd B. Campbell, WØCBH — Asst. SCM: Tom Boydston, ØVYX. SEC: JDJ. PAM: EUT. RMs: HTA and RDN. RHL has p.p. 4-250A homebrewed rig. BZS has a new YL around the shack. ERM has PR 807-VFO with 813 in the building stage. RDN contacted 56 sections, 326 QSOs for 90,000 points in the CD Party. WNØWLO worked 44 sections, 135 contacts, 37 states for 6600 points and earned his 15-w.p.m. certificate in the Novice Contest. The Wheat Belt Radio Club is in operation with territory in Northwest Kansas and Southwest Nebraska. FVD is secretary. New officers of the North Platte Amateur Radio Club are QGV, pres; VFX, vice-pres.; ERM, secy.-treas. KXD (mobile), LRK, (mobile), and CBH (operating fixed control station) recently aided the marchers in securing dimes. RNH has 46 states and rang up 60,000 points in the SS Contest. RNH is a member of the Nebr. C.W. Net, Nebr. 'Phone Net, TEN, and United Trunk Lines Daily. AIN is using cubical quad. PHW received the grand prize awarded by the Ak-Sar-Ben Club for his outstanding contribution to amateur radio. IOS got his final QSL for WAS on 20 meters. IJK has a new YL around the shack. ATU is using 250THs s.s.b. FQB received a BPL medallion. UOW retired the 348 for a better receiver. Traffic: KØAIR 1874, WØZJF 130, RNH 107, FQB 82, AEM 53, HTA 48, FXH 45, FTQ 43, MAO 32, VYX 26, OFL 22, PDJ 21, ERM 18, EGQ 17, DQN 15, BEA 12, QHG 12, KØFBD 10, WØORW 10, UJH 10, CBH 9, GVA 9, PUT 9, OOX 7, PZH 7, NHS 5, PPT 5, QOU 5, WNØVZI 5, WØBOQ 4, EFV 4, THX 4, UJI 4, VKY 4, KØWBF 4, WØAGP 3, CIH 3, DDP 3, OXA 3, IAY 2, KLB 2, LXF 2, POL 2, IRW 1, NIK 1.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Milton E. Chaffee, W1EFW — SEC: LKF. PAM: LWW. RM: KYQ. MCN and CN 3640, CPN 3880, CTN 3640 Sun., CEN 29,580 kc. Although all nets show a dip in traffic totals, CN passed 177 for 6.8 average per session. KYQ, RGB, and LV rated QNI honors again. CTN, meeting at 9 A.M. Sun., rates a look by all who are interested in trying their hand at slow-speed traffic and it's good for 'phone men who want to bone up, too! MCN averaged 5 messages per session clearing 127 for the month. IBE, YYM, and RGB scored high in QNI. ORS renewals went to KYQ and TD; EC renewals to TCW, HDQ, and OAX; YU renewed OBS and OPS; URC and HDQ renewed OES. GVJ is a new OPS from Massachusetts and WKW is a new OES. CPN proves traffic moves on 3880 kc. by reporting 97 cleared with QNI honors to DAV, LWW, KGT, and VWL. WNH is struggling with 5 watts to a "rinky-dink" antenna but still snared KV4AA on 80 meters. AOS reports on his troubles with his private power plant. WHL says he is having fun running a flea power 'phone on 75 meters. New officers of the SARC are URC, pres.; Rovak, vice-pres.; Hopkins, secy.; BGP, secy.; TCW, comm. officer, with ZTY and Novice BHZ as stewards. BRM plans an active part in AREC at Hartford. A nice monthly bulletin from MRA is published by WRO. BVB and GIX furnished OO reports. RWD is active in RACES Area 2. HYF is now a handy man so is less active on the air. EJH, new Bridgeport EC, reports a new club, BARES, for AREC work, with IM, EJH, EOD, DJL, NKR, NQY, JVQ, RLD, SXR, YPV, and WZV starting off. BDI is overhauling 144-Mc. gear. CHX reports a new Novice in West Hartford is WN1DKK, the father of ZCR. CUH has a new 200-watt rig with 813 final. HDQ reports c.d. is all set at Canton. UJG reports new Hamden ARA officers are DDP, pres.; WIS, vice-pres.; QXT, secy.; FKQ, treas.; and AYC, act. mgr. RAN has donned a uniform by now. URC has all home-made 144-Mc. gear. BGP says many in his area were active in the V.H.F. SS. BSE now has General Class ticket and upped power to 180 watts. JTD has the new 375-watt rig ready to go. EFW visited the HCARA Feb. 3rd. DTX is a new call in Meriden. Traffic: (Jan.) W1YBH 199, AW 120, NJM 103, YYM 86, CUH 85, LV 77, EFW 75, LIG 66, KYQ 65, HUM 51, RGB 49, RRE 47, RFJ 37, QJM 30, BDI 26, HYF 26, ZDX 19, EDA 18, EJH 15, UED 15, KV 14, WHL 14, WNH 13, YU 13, EOB 10, GIX 8, NEK 8, BVB 4. (Dec.) WINJM 75, FTM 15, WFM 15. (Nov.) W1FTM 13. (Oct.) W1YNC 2.

MAINE — SCM, Bernard Seamon, W1AFT — The Pine Tree Net meets Mon., Wed., and Fri. on 3596 kc. at 7 P.M. the Barnyard Net Mon. through Sat. on 3960 kc. at 8 A.M. the Sea Gull Net Mon. through Fri. on 3940 kc. at 5 P.M. The Maine C.D. Drill is held each Sun. on 3993 kc. at 11 A.M. The Bangor Radio Club put its mobiles to work under the direction of QJA during the Mother's March On Polio and gave a big boost to the "March of Dimes." There is a new OM in Dixfield and his call is YVN. The Maine gang has had considerable success in contacting LHA on his cruise through the Southern Waters aboard the Maine Maritime Training Vessel. ZFH is being congratulated on the arrival of a new harmonic, a YYL. TBZ reports that his jr. operator, Roger, who is attending

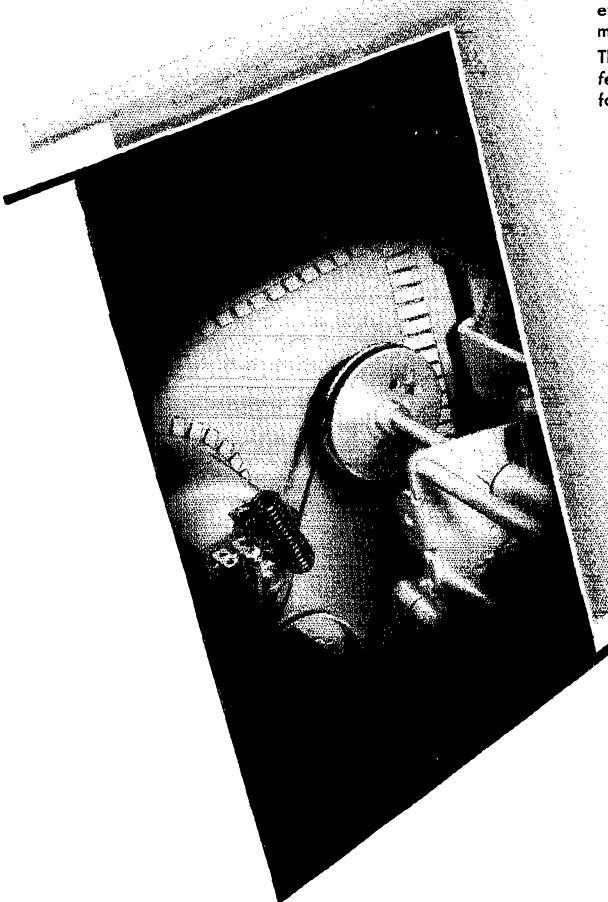
(Continued on page 96)

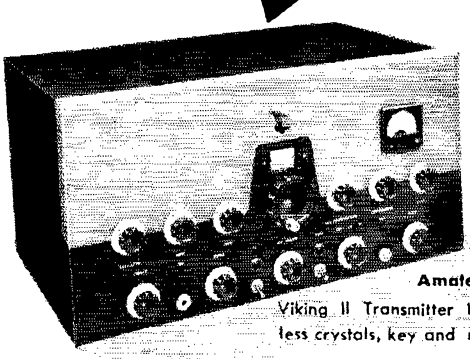
before you buy...

Check for TVI!

It's not always easy to spot points of superiority among competing products, but after careful comparison one out of every four active radio amateurs has chosen the world famous Viking II transmitter.

That's why we say, "Before you buy . . . check for TVI!" *Effectively* TVI suppressed, the Viking II leads the field in performance, signal quality, and dependability.





Before you buy your amateur transmitter, make sure:

✓ **Cabinet shielding is complete,** metal to metal bonded every inch of the way. Experience has proven that even the smallest aperture may allow TVI harmonics.

✓ **Control shafts are bonded to the panel** — otherwise they act as small antennas for harmonics.

✓ **Meter is thoroughly shielded and leads filtered**—a dangerous area for harmonic radiation if not protected.

✓ **All external leads are carefully filtered** —The AC line, key leads, control leads, power leads for other equipment—all can radiate harmonics unless they're filtered before they emerge.

✓ **Dial apertures are shielded** — Every opening is a potential source of TVI.

All amateur bands from 10 to 160 meters, 135 watts AM phone input, 180 watts CW. All stages metered—instant bandswitching—wide-range pi-output *tuning. Available from your* distributor either in kit form or completely wired and tested.

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Southern Tech, in Atlanta, Ga., has a brand-new ticket with the call CIS. That makes Frosty's family 100 per cent ham as his XYL is UQT. Greetings to a new operator in Augusta, ZAK, Cony High School, of Augusta, has organized a radio club. Our own WTG is the "Veep." Incidentally, Charlie suggests that the Maine gang sponsor a Maine QSO Party and also a WAM certificate. For the third time the amateurs of Maine are asking the Maine Legislature to issue distinctive license plates to them in recognition of their service to the citizens of the Pine Tree State. Traffic: W1WTG 97, UDD 42, LKP 37, LYR 35, YYW 20, ZBN 12, TWR 11, BX 10, EFR 9, AFT 8, BTY 8, FD 8, YTE 8, ZME 6, BZF 3, WRZ 1.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New appointments: NCO Acton, QKY Canton, ZYX chairman of the Area 1 Radio Comm., as ECs; ABJ as OPS; EPE as RM for 20-160-meter c.w. band and PAM for 160-meter 'phone. Appointments endorsed: ORA Wakefield, KTG Cambridge, MRQ Groveland, TRC Maynard, as ECs; LMU, QHC, and TNK as OBSs; LMU and AOG as OESs; UIR, AVY, and WSN as OOs; MRQ, AQE, AOG, and TY as ORSs; TNK and MRQ as OPSs; AQE as RM for 40-meter c.w. BJN is moving to Schenectady. LZW is on 40-meter 'phone. UIR is mobile. Heard on 2 meters: ODQ, DLY, DPN, RMF, NVB, ABJ, CHN, DQF, WEW, DRP, AAI, DCJ, AQR, and K2CBD. New Novices are DQF, BB's XYL, and DRP, UOC's XYL. WN1DOM is Sonny Hayes in Quincy. KL7PDG, ex-1PDG, now is living in No. Reading. ALP had a meeting at OLP's for the new towns in Area 1 Sector B with NFQ and CLF. A 2-meter frequency of 147.3 Mc. has been assigned. The IPN has moved to 3970 kc. WSN has 500 watts on 20 meters. Sorry to have to report the death of KCJ. WHC has gear for 1215 and 432 Mc. AJZ has a 32V-2. VTX has a new 10-meter converter. YPT and YXJ are coming back to Cape Cod. BCN is on 3615-3912 kc. MFI is conducting a radio and code class in Hyannis. TJW has a rotating 75-meter dipole antenna. CLF is active on 15 meters. HIL built side-band slicer for HRO-60. The Cape Cod and Island Net has formed an organization which meets Mon. through Sat. from 0745 to 0915 on 3912 kc. It was started by SGL. AQE worked HKØAI on 40 meters. CTW is active on 15-meter c.w. The T-9 Radio Club met at HMC's and has perfected a Black box antenna 6x6x3! CAM is in EMN. DOF participated in the January CD 'Phone Party on 75 meters. The Arlington Radio Club elected KNW, pres.; WYC, vice-pres.; THO, secy-treas. Radio Amateur Open House has changed its meeting night to Wed. at Cambridge YMCA, reports TON. KJO gave the Club a talk on Transistors. BSY gave a talk at the Wellesley ARS on Antennas. The South Shore Club had a talk by SX on S.S.B. and OOP spoke on VFOs. The Braintree Radio Club had TQQ demonstrate a Gonset Communicator on 2 meters and Mr. Lucas, wire inspector, gave a talk. DDH, a new ham in Reading, has TBS50-D, VFO NC-125 receiver. ABJ is on 4 bands. CLF has an SCR BC-211 frequency meter. KEK, Lynnfield EC, says they have the call DKH. ISU, Holbrook EC, has FED and JXM helping him. YYL is handling public relations for the Seacoast Ham Club. The annual meeting was held at RZZ's. Officers are WCI, pres.; AFE, secy.; YYB, treas. ALP attended a meeting of the Norfolk County Radio Assn. at NOV's. NCO, Acton EC, has TRD, YPW, MFY, BPA, and QEY signed up in the AREC. DVS, Falmouth ARA secretary, writes that the Club took part in the ARRL DX Contest. TJW, our EC, has made QLT and DVS his assistants. QLT will be Mobile Marine on the *Albatross*, mainly on 21 Mc. SUE and KCL are Mobile Marine on the *R.V.Bear* in the Caribbean. DJK has high power on 2 meters. The Wellesley Club held an auction with PTY, ZZO, and GGM. AZY and SSS have new HQ-140X receivers. WN1s DIR and DIY are on 80-meter c.w. UIE is 100 per cent s.s.b. UID repairs meters. QJR is on 20-meter c.w. ZPE has a new speech clipper for the Viking II. AVY has an Eldico automatic keyer with monitor. The Braintree Radio Club has received the call DUO for its station in the library, with TYN at the police station. OMU is putting up a long wire. LMU is rebuilding for 2 meters. QKA will be on 2 meters. UH has a new 20-meter beam. Newton has some new Motorola FM 2-meter rigs. EK is going to crystal converter for 2 meters. LVN is making trips to VP9-Land. On the last Winthrop C.D. drill HFJ, DEL, BDU, CMW, DJ, OIR, MQB, NMX, BOX, DQF, DPN, DLY, DGY, DRP, TTH, and BB were on. 4STM is at Fort Devens and has a Viking Ranger transmitter on the air. Sorry have to report the death of Helen Wright, 1UPZ. Traffic: (Jan.) W1EMG 393, UKO 238, EPE 99, WSN 95, IBE 40, LM 22, NUP 19, TY 17, AVY 16, MKW 14, CLF 12, AOG 10, BY 8, HIL 7, WU 6, IA 5, CTR 4, TYN 4. (Dec.) W1NUP 19.

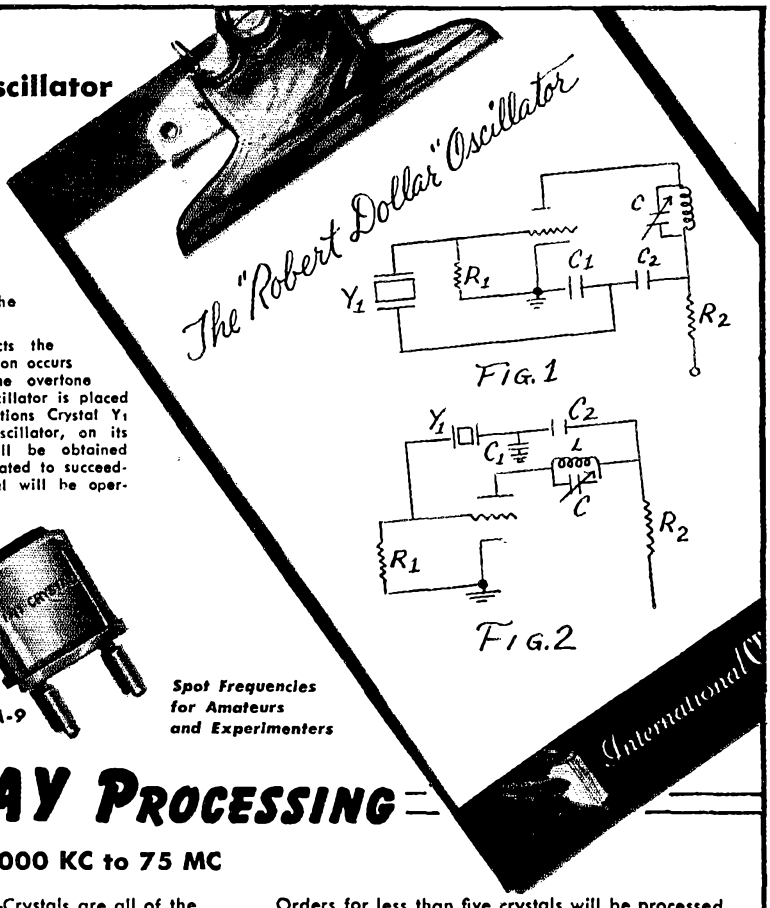
WESTERN MASSACHUSETTS — *NOTICE TO WESTERN MASSACHUSETTS ARRL MEMBERS: In view of finding that a technical lapse in his FCC license status had inadvertently occurred (confusion with June '53 date of* Extra Class *endorsement on name) Art Zavarella, W1MNG, asked Hq. to find his SCM nomination invalid. This left Mr. Osborne R. McKeraghan, W1HRV, in the running as the only eligible nominee and he has therefore been certified as SCM for the current term.* SCM, Osborne R. McKeraghan,

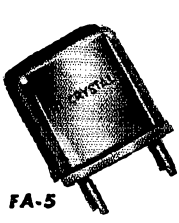
(Continued on page 98)

Notes on the "Robert Dollar" Oscillator

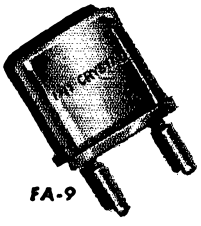
Considerable use is being made of the circuit shown in figure 1 for overtone use. Redrawn as in figure 2 this circuit appears as a basic Pierce Oscillator where R_2 is plate load. Capacitor C_2 may be considered a blocking capacitor, while C_1 is the plate capacitor providing capacitive reactance as required in the Pierce Oscillator.

This, for the moment, neglects the tuned circuit L-C. Such a situation occurs when L-C is detuned from the overtone crystal frequency. When the oscillator is placed in operation under these conditions Crystal Y_1 oscillates, as in any Pierce Oscillator, on its fundamental mode. Output will be obtained from the circuit and drive indicated to succeeding stages. However, the crystal will be operating on its fundamental.





FA-5



FA-9

Spot Frequencies for Amateurs and Experimenters

ONE-DAY PROCESSING

Spot Frequencies 2000 KC to 75 MC

.01% TOLERANCE—Crystals are all of the plated, hermetically sealed type and calibrated to .01% or better of the specified frequency. See specifications below:

For close tolerance and commercial applications use the F-6 series crystal. Write for full information).

SPECIFICATIONS

Holders: *Metal, hermetically sealed, available in* .093 dia. pins (FA-9) or .050 dia. pins (FA-5).

Calibration Tolerance: ±.01% of nominal at 30° C.

Temperature Range: −40° C to +70° C.

Tolerance over temperature range from frequency at 30° C ±.01%.

Circuit: Designed to operate into a load capacitance of 32 mmf on the fundamental between 2000 KC and 15 MC. Designed to operate at anti-resonance on overtone modes into a grid circuit without additional capacitance load. Write for recommended circuits).

Orders for less than five crystals will be processed and shipped in **one working day.**

HOW TO ORDER—*In order to give the fastest possible services, crystals are sold direct.* However, crystals are also available by special order through your local jobber. Where cash accompanies the order, International will prepay the Airmail postage; otherwise shipment will be made C.O.D.

PRICES

FA-9* (Pin Diameter .093)*
FA-5 (Pin Diameter .050)

Pin Spacing .486 *(*FA-9 fits same socket as FT-243)*

RANGE	TOLERANCE	PRICE	
Fundamental Crystals		**FA-9**	**FA-5**
2000-9999 KC	.01%	$2.80	$2.70
10000-15000 KC	.01%	$3.90	$3.80
Overtone Crystals			
(for 3rd overtone operation)			
15 MC—29.99 MC	.01%	$2.80	$2.70
30 MC—54 MC	.01%	$3.90	$3.80
(for 5th overtone operation)			
55 MC—75 MC	.01%	$4.50	$4.40

International CRYSTAL Mfg. Co., Inc. 18 N. Lee Phone FO 5-1165 OKLAHOMA CITY, OKLA.

W1HRV. Send station and club news to 22 Mutter St., Easthampton, Mass., please. In building up our section organization and activities we ask your coöperation and reports, please, right after the first of each month. MNG summarizes all our January activities and announcements; this will be our task next time. The WM c.w. Net meets on 3560 kc. Mon. through Sat. at 1900 EST. WM 'Phone Net will require overhaul for survival. SSBand activity in No. Adams has engaged MKD, MJD, and ZEO, who ran 10 milliwatts peak on 75 meters at 8 P.M. QWJ has been logging QSOs with F7, ON, HB9, and Gs on 3810 kc. in early-evening using mechanical filter in home-brewed rig and Q-Multiplier in the receiver. EC endorsees: LLN, HRV, SPF, RLV, COI. ORS: HRV, LLN, UVI. TVJ's absence from the traffic column is caused by heavy school skeds and diligent OObserving: 21 notices to stations mostly outside of WM. ULE and ULF have changed their QTH to Connecticut. An active YL is YCU, Judy of SatEvPost fame, who now makes her traffic debut as manager of the College Net. Along with top traffic honors, UKR has taken on the job of national radio chairman for the Powder Puff Derby terminating at Barnes Field, Westfield, July 2nd through 7th. Eunice is lining up help for this event which should give WM amateurs a firecracker field day on 75, 20, and 2 meters. The Hampden County Club is in the act. LJQ, TAY, and ex-QFB are instructing code for Northampton c.d. EVZ is communications officer for the newly-established C.D. Area 4, all of WM except Worcester County (Area 3). COI is itching to fire up his rhombics. Active in the January CD Party were ABC, AMI, BKG, JYH, MNG, MVF, and WEF. BVR has a new Viking II and improved signal. VSR was heard on 75 meters. FKN checks into VNH — managed the 2-meter Connecticut Valley Roundup (145.3 Mc. at 2000 EST, Thurs.). Some 40 WM stations took part in the January V.H.F. SS. Included were 31 Hampden County stations which rolled up almost 20,000 points. Traffic: W1UKR 254, MNG 74, BVR 68, SRM 62, HRV 53, K1WAV 48, W1AMI 26, TAY 25, WEF 24, DVW 13, YCU 13, ABD 9, HRC 8, HNE 6, JYH 4, BH 3, UVI 3. NY 2, AVK 1, LLN 1, MJD 1, YCG 1.

NEW HAMPSHIRE — SCM, Harold J. Preble, W1HS — SEC: BXU. RM: CRW. PAM: AXL. AIJ has taken over NCS for the Merrimack County Emergency Net and is using a new Viking II complete with Matchbox, VFO, and SX-99. This net meets Tue. at 1830 on 28.6 Mc. IP has been appointed ORS and is getting a kick out of handling traffic again. YHI has a new jr. operator named Garry, born Jan. 2, 1955. YFZ has enlisted in the Air Force. TWP has completed his kw. and is doing an FB job with it. CNR, a new addition to Portsmouth RC, has been appointed Asst. Radio Officer for Portsmouth C.D. YMJ is busy building lobster traps. JWJ, YFZ's dad, still is doing a terrific job of teaching code classes. The Portsmouth C.D. Net meets on 29.560 Mc. Thurs. at 1900. ARR has a new electronic key. SSK is busy at present with hi fi. Rockingham County EN, 'phone section, meets Sun. at 1230 on 3850 kc. Rockingham County stations, please call in. WBM recently took a trip to New Jersey and reports lots of activity on 2 meters in New York City and New Jersey, using his Gonset Communicator II. Welcome to the following Novices: CRC, CSE, CSW, CUE, CUI, CUL, CWN, and DCB. Traffic: W1COC 51, IP 43, ARR 40, HS 34, CCE 30, POK 9, WBM 9, CDX 6, FZ 5, VZS 2, YHI 2.

RHODE ISLAND — SCM, Walter B. Hanson, jr., W1KKR — SEC: TQW. RM: BTV. PAM: VXC. The NCRC installed the following new officers and celebrated at Stone Bridge Inn: ODZ, pres.; TXF, vice-pres.; AJR, treas.; ZUL, rec. secy.; YAO, corr. secy. JFF and TRX report the Newport County Emergency Net now is on 29,530 kc. 4CVO/1 appeared on the Honor Roll of frequency measuring stations for 1954, and is grinding crystals for Novices on 40 meters. KCS notes ever-increasing section activity in V.H.F. Contests and aurora openings for these who are patient. CDV has left for Navy duty from March to November. A new club has been formed in Woonsocket with the call DDD. The Blackstone Valley Amateur Radio Club has started with a bang and has its state charter. The Club has a summer club house plus winter quarters at Stone House Club and was given a two-page spread in the local Sunday paper. The officers are IHW, pres.; ZEZ, vice-pres.; DPA, secy.; DQR, corr. secy.; DQR, treas.; AUT, act. mgr. The BVARC meets every Fri. at 8:00 P.M. Your SCM happily reports a new high in station activity reports this month. Keep them coming. Traffic: W1CDV 114, UTA 60, YKQ 32, BTV 31, ZXA 17, BXN 16, W4CVO/1 13, W1VXC 8.

(*Continued on page 100*)

FOURTH VERMONT QSO PARTY

The Tri-County Amateur Radio Club of Brattleboro, Vermont, announces the 4th Vermont QSO Party and invites all radio amateurs to participate. Vermonters are urged to work as many out-of-state stations as possible, so that interested amateurs can earn credit toward WAS, WANE and W-VT awards. Here are the details:

(1) Time: 24-hour week-end period from 6 P.M. EST Saturday, April 9, to 6 P.M. Sunday, April 10, 1955.

(2) No time limit and no power restrictions.

(3) Scoring: *Vermont stations:* 1 point per contact and multiply total by the number of states, U. S. Possessions, Canadian provinces and foreign countries worked during the contest period. *Outside stations:* 5 points for each Vermont station worked and multiply total by the number of counties in Vermont worked during the contest period.

(4) Credit for contacts with the same station on another band will be given this year, in order to promote more activity on the higher bands.

(5) A certificate will be awarded to the highest-scoring station in each state, U. S. Possession, Canadian province and foreign country, and to the highest-scoring station in each Vermont county. In addition, a W-VT certificate will be sent to any station working 13 of Vermont's 14 counties, provided the station has not previously been issued this award. Party logs showing required data will be accepted in lieu of QSLs.

(6) Watch 3520, 3740, 3860, 7050, 7250, 14,100, 14,250, 21,000, 28,100 and 28,800 kc. for contest stations. Stations are urged to spread out to keep QRM down and to allow our low-powered stations to be heard.

(7) General Call: "CQ VT." Vermont c.w. stations should identify themselves by signing *de VT (call) K.* 'Phones say, "Vermont calling."

(8) Contact information required: Vermont stations send number of QSO, RST or RS and county. All others send number of QSO, RST or RS report, and state, possession, province or country.

(9) Logs and scores must be postmarked not later than May 10, 1955, and should be sent to Tri-County Amateur Radio Club, c/o Ray N. Flood, W1FPS, 2 Marlboro Ave., Brattleboro, Vt.

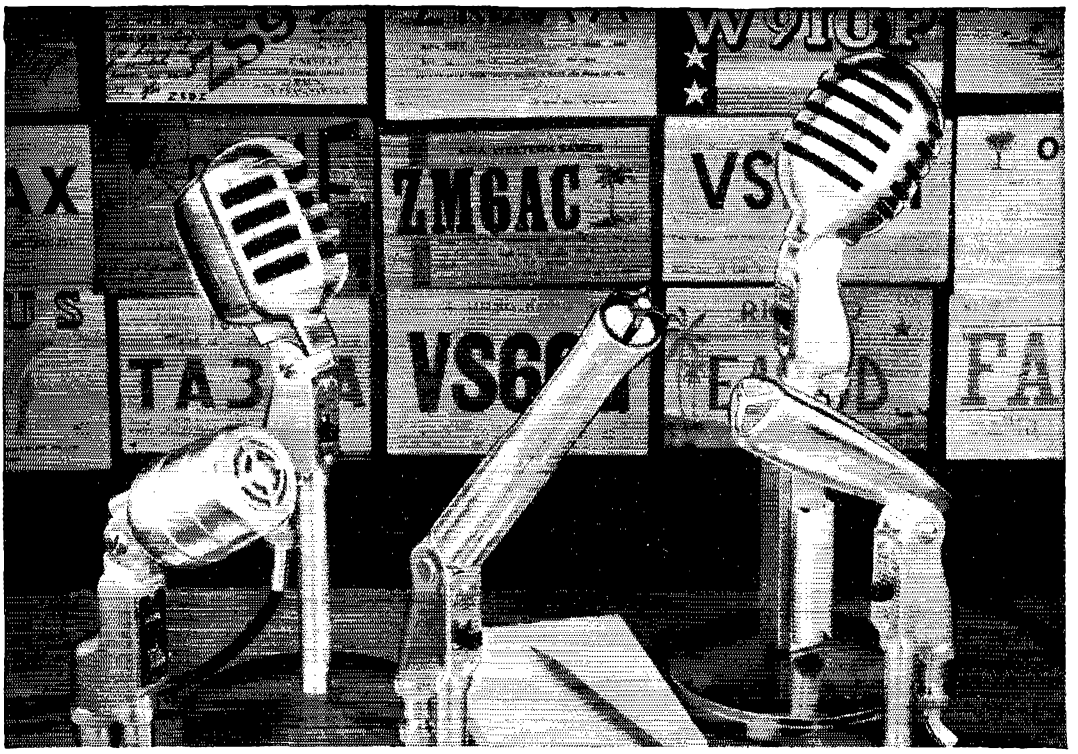
VERMONT — SCM, Robert L. Scott, W1RNA — SEC: SIO. PAM: RPR. RM: OAK. The Brattleboro TCARC announces a Vt. QSO Party to be held Apr. 9th and 10th. Rules, etc., follow this report. The Burlington ARC states it will operate KOO/1 c.w. and 'phone in Grand Isle County during the QSO. The BARC voted to co-sponser with the Montreal ARC the 4th Annual International FD at Bayside (near Burlington) June 12th and also is working on the idea of combining the Vermont Hamfest with the FD. GAE is building a kw. rig, RPR a kw. final, and GAZ a kw. final. SEL is wintering in Florida and AXN is in Texas. BARC's new officers are VEB, pres.; WPK, vice-pres.; VSA, treas.; and NLO, secy. We understand QQN has an antenna for 75 meters now! FPS *still* is using a flit gun. WPY, VSA, VEB, and TBG are working 220 and 420 Mc. Traffic: W1RNA 140, OAK 78, AVP 60, IT 46, QEW 38, BJP 30, BNV 28.

NORTHWESTERN DIVISION

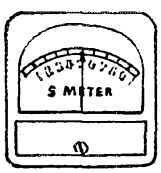
ALASKA — SCM, Dave A. Fulton, KL7AGU — It appears that it soon will be hamfest time again and the date for the Alaska Amateur Radio Convention has been set for July 22, 23, and 24. It will be somewhere in the Anchorage Area and just as soon as we get the details will pass them on. AWB reports several good openings on 21-Mc. c.w. to the East Coast, also AWB reports lack of W interest in working KL7s in the CD Contests. Ws and VEs just don't seem interested, or is it the weak signal? We would like to know the answer to that one ourselves, Joe. It might be why more KL7s aren't on. DG is holding radio classes in Kodiak and there should be some newcomers soon from that island city. AGU finally has the mobile installed in the new vehicle and should be heard more often on 75-meter mobile. It should be about time to get the mobile tuned up. How about it, fellow?

IDAHO — SCM, Alan K. Ross, W7IWU — Ririe: LQU reports WNs WEX, WEY, and WEZ, at Menan, are now Conditional Class. Pocatello: QIS writes from Treasure Island that he is returning to his home in Pocatello. He spent most of his Navy enlistment in KH6-Land. Lewiston: IDZ reports a pot-luck dinner was held by the club. UJA won a receiver kit and OOW a multimeter. RGZ is building a crystal converter for 75 meters. Kellogg: RQG is trying

(*Continued on page 102*)



A good microphone can improve your results as much as a high gain antenna



Ever notice that two signals of the same "S meter" intensity sound differently? One is muddy, dull, a little hard to read—the sibilant letters like S and F almost alike. The other signal is sharp, clean and readable even in QRM and QRN—because there's usable intelligence. No mistake about the call or comments.

The greatest variation is in the microphone. A sharp peak adds no intelligibility but limits the modulation to that value. A peak of, say 6 db, which is usual in many ordinary microphones, will reduce voice power by HALF. Don't be fooled by a microphone that sounds "louder"—loudness by itself is not a criterion of performance; quite the contrary since it may indicate undesirable peaks.

An E-V microphone with smooth, peak-free response, replacing an inferior instrument, often will do more for a phone signal than a new antenna or increased power. As a further *plus*, of course, you get well-known E-V durability, style and performance. An E-V microphone, to raise stations, to carry through a QSO, is your best station investment.

Shown above are a few of the E-V microphones designed for effective communications. Amateur discount applies.

(upper left) **Model 611** high output dynamic and **Model 911** crystal. On-Off switch. **List from $25.50 to $37.50**

(upper right) **Model 950** Cardax high-level crystal cardioid, with dual frequency response. On-Off switch. **List, $42.50**

(lower left) **Model 630** wide range, high output dynamic, with exclusive Acoustalloy diaphragm. On-Off switch. **List, $47.00**

(center) **Model 636** "Slimair" wide range dynamic. Pop-proof head. Acoustalloy diaphragm. On-Off switch optional. **List, $70.00**

(lower right) **Model 623** slim-type high output dynamic, with E-V Acoustalloy diaphragm. On-Off switch. **List, $49.50. Also Model 926** crystal, less switch and connector. **List, $24.50**

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for 2-meter activity with himself and HXN already on. Emmett: TYG reports on the newly-formed Emmett Valley Radio club. Boise. Officers of the Gem State Amateur Radio Club are GHT, pres.; PKA, vice-pres.; and IWU, secy.-treas. JMH is back with us but still is using ØRSG/7. ALY also is back with us from a spell at San Francisco. OZJ moved to Caldwell. MKS reports Idaho RACES is awaiting approval. Traffic: W7RSP 52, NVO 4.

OREGON — SCM, John M. Carroll, W7BUS — HUI has resigned as net director for the Cascade Net and is being transferred to a post in the Army in the Far East. QWE and QJC turned in a perfect score for check-ins on the Cascade Net. The Cascade Net picked up contributions called in to KOIN on a March of Dimes program. A transmitter was set up in the studio on 29.3 Mc. and contacted the mobiles from there. HAZ is new president of the Powder River Camera Club. UAR and UAV are at EOSC at La-Grande. OWI is new president of the Baker Amateur Radio Club. QEI is active in MARS. AHP resigned as EC for Grants Pass and NFZ was nominated as his replacement. SBT is active on 2 meters. WKA is working for his Conditional Class ticket. Skip conditions have made attendance in OSN difficult. The OARS has almost finished building the club house. VZD has a new QTH in Oklahoma. VBK is new president of the Southern Oregon Radio Club. VBH is new president of the PARC. SZS is becoming active on MARS. AEF has a new business QTH in Portland. This month marks the end of my two-year term and it has been a pleasure to be SCM for Oregon. ESJ will take over from here and please give him the fine coöperation I have received. Traffic: (Jan.) W7APF 957, QKU 222, VIL 111, TBT 49, AJN 32, BLN 32, WAT 30, QEI 28, ESJ 19, HDN 19, PRA 6. (Dec.) W7WAT 518.

WASHINGTON — SCM, Victor S. Gish, W7FIX — Your new Section Emergency Coördinator is RCM, of Vancouver, Wash. The North Seattle Amateur Radio Club elected JPH, pres.; WAM, vice-pres.; WAO, secy.; UZK, sgt. at arms, QHI and FIX, trustees. Other trustees are CO, OEX, LWB, and PGY. VAZ is on 3970 kc. at 0700 PST Tue. through Sat. for traffic. KUS is QRL trying to get the Fort Lewis station on the air. OE is traveling with new Adventurer for portable. AIB is playing around with the page 24 Feb. *QST* antenna-coupling systems. EHH is on ALN, FARM, WARTS, and Montana 'Phone Nets. K6-BDF/7 is having antenna trouble — the guy next door dropped a tree across it! The Skagit Emergency Net meets on 50 Mc. 8 to 10 A.M. Sat. GAT says "Condx!!!" TGO is working 80-meter DX between studies. LVB has no regular skeds but takes traffic for anywhere. ZU still is keeping the Sun. 20-meter sked with PRZ at Cornell U. HDT hopes to get back on WARTS soon and reports UJA is on with a new 180-watt 4E27 rig. YPD, ex-6PZG, is building a new 813 final. CZY has little time for anything but MARS nets. JEY reports the MTN C.W. Net closed down because of conditions. Richland News from UQY: YFO is on 40 meters with 813 and ground-plane antenna; GWD, NLI, and UQY tested out equipment for the DX Contest; UBJ was heard chasing 40-meter DX with 150 watts and a new Vibroplex; PKP and VXE are on both c.w. and 'phone and PKP also is mobile. BA reports that he will be in KH6-Land for a month; JNC is on with a vertical — working against the fence; PGY has his RTTY copying; CBE RTTY copies and sends; TMO is working KH6 with a Ranger; WAM made Gen. Cl.; PHO still is working on the cool, cool kw; OZG has a kw. on the air with a vertical. HMQ reports from Puyallup that EHJ is on 75 meters; GJU has a new QTH in Olympia; HMQ is on 2 meters; LEC sends code lessons on 10 meters; MCU now is RTTY; MTX is buying mobile gear; OEB checks into all the nets he can find; VLC is NCS of the Novice Net; WHV made 173 contacts in 41 sections in the Novice Roundup; SWA and his XYL, WMX, are sharing a Globe Scout. The Radio Club of Tacoma elected RXS, pres.; RGD, vice-pres.; UYL, secy.; UIN, treas.; RGD, pub. (also Tacoma EC). The Apple City Radio Club is building a communications van for c.d. work. PVF is looking for a 6-ft. relay rack — he checked in on the WSN 1988 Net the next day after inquiry about nets. Traffic: (Jan.) W7BA 1740, PGY 1085, VAZ 658, FRU 570, KUS 90, APS 38, UYL 33, EHH 30, USO 29, WEV 27, UZB 23, FIX 20, K6BDF/7 14, W7OE 14, AIB 13, FWD 11, KT 10, PQT 10, RXH 9, GAT 6, TGO 6, LVB 5, ZU 5, AMC 4, YPD 4, EYF 2. (Dec.) W7FRU 1522, KT 94.

PACIFIC DIVISION

HAWAII — SCM, Samuel H. Lewbel, KH6AED — Many thanks to the gang for the honor of election as your SCM. The varied services "of, by, and for" ARRL members and amateurs are to be built up through appointment. There is a need for OOs, OBSs, the formation of an AREC, and traffic and net activity reports. In *reporting* use P. O. Box 3564, Honolulu. I expect to visit our neighbor Islands shortly, when possible on club meeting nights. Civil defense net activity is to be reported. Send all news *prior to the seventh of each month*. V.h.f. activity in Hilo and Honolulu has raised interest in this field. The gang is preparing for long-haul tests between Oahu and Hawaii. Attend all club meetings possible. Monthly reports are welcome! Traffic:

(*Continued on page 104*)

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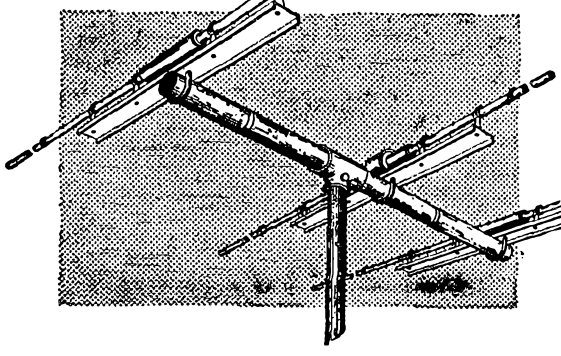

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20 Meter, 2 Element Shortbeam

6 ft. boom. Forward gain 4.4 db over full size reference dipole. Front to back ratio 15 db. Tuned 14,250 Kc. Approximate weight 15 lbs. Longest element 16 feet.

MODEL R.S. 2-20 AMATEUR NET **$49.95**

20 Meter, 3 Element Shortbeam

16 ft. boom. Forward gain 4.8 db over full size reference dipole. Front to back ratio 20 db. Tuned 14,250 Kc. Approximate weight 20 lbs. Longest element 16 feet.

MODEL R.S. 3-20 AMATEUR NET **$59.95**

15 Meter, 2 Element Shortbeam

6 ft. boom. Forward gain 4.4 db over full size reference dipole. Front to back ratio 15 db. Tuned 21,350 Kc. Approximate wt. 15 lbs. Longest element 13 feet.

MODEL R.S. 2-15 AMATEUR NET **$44.95**

15 Meter, 3 Element Shortbeam

12 ft. boom. Forward gain 4.8 db over full size reference dipole. Front to back ratio 20 db. Tuned 21,350 Kc. Weight approximately 20 lbs. Longest element 13 feet.

MODEL R.S. 3-15 AMATEUR NET **$54.95**

40 Meter, 2 Element Shortbeam

12 ft. boom. Forward gain 4.4 db over full size reference dipole. Front to back ratio 15 db. Tuned 7250 Kc. Weight approximately 30 lbs. Longest element 33 feet.

MODEL R.S. 2-40 AMATEUR NET **$74.95**

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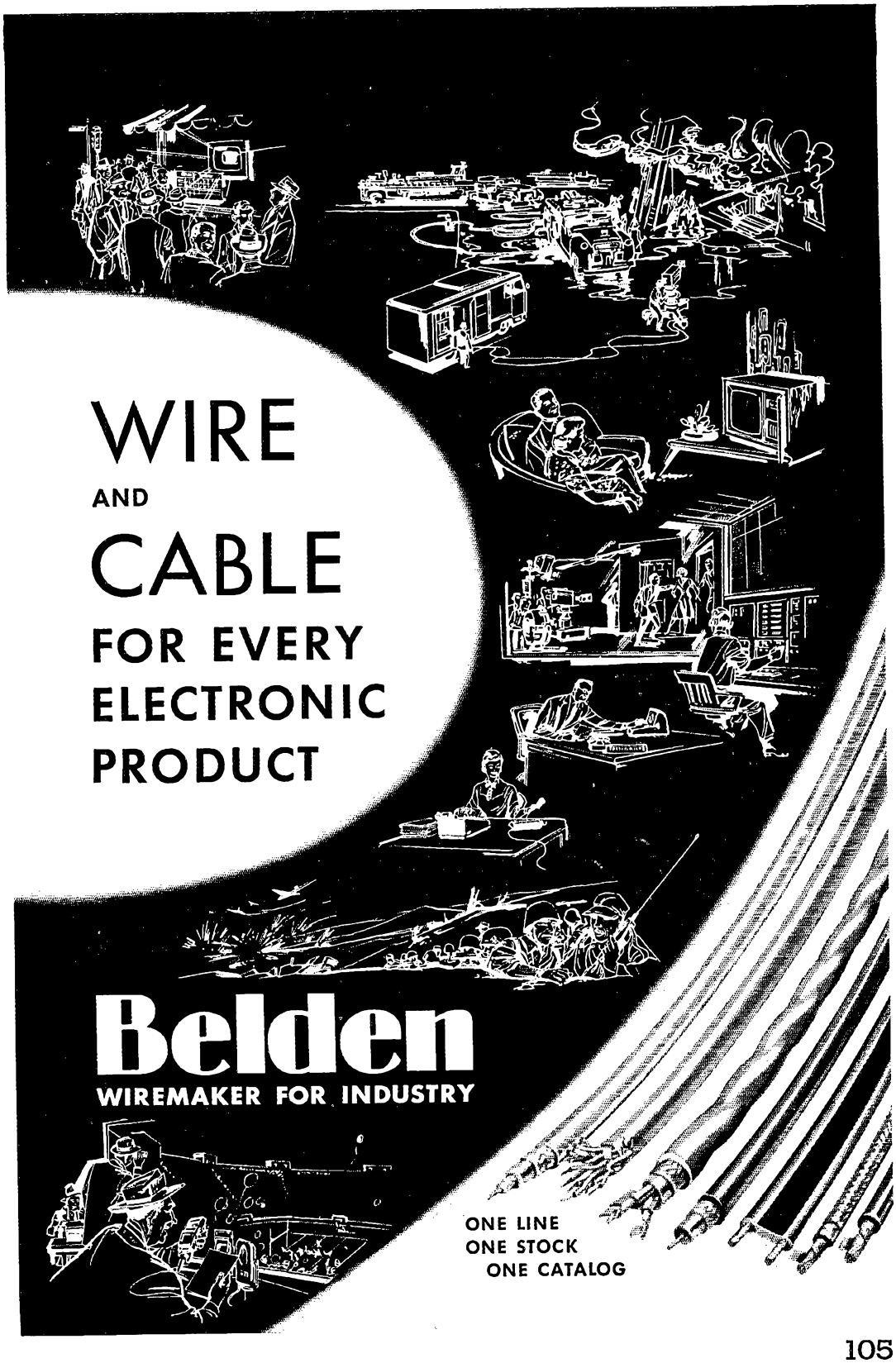
NEVADA — SCM, Ray T. Warner, W7JU — ECs: PEW, PRM, TVF, TJY, and ZT. OPSs: JUO and UPS. ORSs: MVP, PEW, and VIU. OBS: BVZ. Nevada State frequencies: 'Phone — 3880 and 7268 kc. C.w. — 3660 and 7110. WVQ recently was elected prexy of the Southern Nevada Amateur Radio Club. RKE left Boulder City for the Dakotas. WTR heads the TVI Committee in Las Vegas. WN7YNO is the son of VIU in Elko. VIU worked Japan on 80-meter c.w. WN7YNF is an XYL in Henderson. YJB is active in Henderson. WN7YEX is active in Winnemucca. SKU has returned to Nevada and is now on 40-meter c.w. from Sparks. Welcome back, Neil. QGE, of Sparks, is on with a Viking Ranger and SX-71 showing interest in MARS activities. PEW, Elko EC, expects to show an increase in daytime activities now that he is on a graveyard shift.

SANTA CLARA VALLEY — SCM, R. Paul Tibbs, W6WGO — EXX is QRL installing mobile in his new car and is rebuilding gear for low frequency. AIT is reporting in on NCN and RN6 for traffic. K6BBD is sporting a new Viking Ranger and reports that Santa Clara High School has organized a radio club. YHM says the new HQ-140X sure brings in the signals. Don is looking for an insulator to take the base of the new vertical antenna. K6BBF has a new Gonset 144-Mc. rig using it to work fixed and mobile. K6BAM has been heard on s.s.b. of late with an FB signal. 4YIP/6, at Moffett Field, is a good outlet for overseas traffic. MMG reports officers of the North Peninsula Electronics Club are MMG, pres.; K6EMN, vice-pres.; LPS, secy.-treas.; QIE, act. mgr.; and NVD, QIE, and MMG, CCRC representatives. The Club meets the 3rd Fri. of each month. DPE is on the air with a new 803 final. WLI worked in the last CD Contest. FON reports in with traffic. KN6-EMO was active in the Novice Roundup and says that it was a thrill to work his first DX, JA1AEA. FTI is back on the air after a long period of inactivity, working on 14 Mc. mostly. CFK is coming back on the air with s.s.b. using Central Electronics exciter 20-A. HC still is looking for you who are interested in traffic to check into NCN on 3635 kc. at 2015 nightly. There is need for New Mexico and Arizona stations to report into RN6 to handle traffic for those states. Let's fill these spots and plug up the holes in the coverage of these nets. Traffic: W4YIP/6 502, W6YHM 351, HC 95, K6BBD 71, W6FON 60, UTV 48, AIT 11, K6BAM 11, BBF 10, W6MMG 10, EXX 6.

EAST BAY — SCM, Guy Black, W6RLB — Asst. SCMs: Oliver A. Nelson, jr., 6MIXQ, for v.h.f.; and Harry T. Cameron, 6RVC, for TVI. RMs: IPW and JOH. PAM: LL. ECs: CAN, CX, FLT, QDE, TCU, ZZF, and K6ERR. New officers of the Richmond Radio Club are K6BYD, pres.; ACM, vice-pres.; IRJ, secy.; K6AYM, treas.; WXB, sgt. at arms; TWI, EFD, PAV, and EJA, board of directors; and K6CUH, TWI, ACM, and EJA, delegates to the CCRC meetings. In addition, TWI and EFD are on the TVI committee. PAV is the publicity chairman and K6DMI is program committee chairman. It's really swell of IJR to send in a complete rundown on the Club, and I wish other club secretaries would do as well. IRJ and FZC have been checking into the Central California Civil Defense Net (CCDN) Mon. at 7:30 P.M. 3501 kc. VPC reports for the Southern California RTY Society that the following have just received Model 26 machines: KHW, FZC, CBF, RLB, NCQ, JNY, FSL, NEQ, MCU, and K6DCA. A recent visitor to the Bay Area was GM6LS. NBS is building a new mobile rig. OHQ and WGM are new East Bay Radio Club delegates to CCRC. The EBRC heard a fine talk on travelling wave tubes by EXX and CQG. KHW and LBJ are now part of the Club's TVI committee, with ØHTG as chairman. K6ERR has a net for the Berkeley-Albany-El Cerrito AREC at 7:30 P.M. Thurs., 145.69 Mc. The SARO 144.27-Mc. Net is very active. The Oakland Radio Club has a fine project — an oldtime radio shack as a museum piece, to be located in the Oakland Red Cross building. Donations of old-time equipment are being solicited. GMB is building a new VFO. KN6GOY is building a 15-meter rig. K6IGN, at Richmond Union High School, is shared by ten operators. PAV has a 44-ft. vertical. KFU is a new assistant communications chief for civil defense in Richmond. K6DMI is taking care of mobile activities for civil defense. EJA is publishing a club paper for the Richmond Club, *The QRMer*. ITH is spending a lot of time around Waikiki. K6CCQ is interested in 420 Mc. BXE is putting out Official Bulletins at 7 A.M. Mon., Wed., and Fri. for the early birds. Listen at 3870 kc. also at 7 P.M. on Mon., Wed., and Sat., same frequency. TI reports 175 foreign contacts and 36 countries with his new 7-Mc. ground plane in just three weeks. TMX expects to be active on Guam with a peanut power rig and HRO. Traffic: (Jan.) K6WAY 558, FDG 511, GK 146, W6IPW 115, EJA 13, YDI 3, HBF 1. (Dec.) K6WAY 353, W6ITH 17, K6CCQ 12.

SAN FRANCISCO — SCM, Walter A. Buckley, W6GGC — SEC: NL. The S.F. Radio Club enjoyed the movie "The Atom Goes to Sea" and also, through the courtesy of ELW, the slides "50 Years of Amateur Radio" by Bruce Kelley, 2ICE. Approximately 200 members attended the January Special. The 29ers transmitter hunt for the month

(*Continued on page 106*)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was put on by SY and BIP. The HAMS once again has changed its meeting night; starting in February the Club meets the 3rd Fri. night of each month. HAMS (local Red Cross group) participated in the local disaster drill. Oakland supposedly was hit by a strong earthquake and all local branches of the Red Cross came to her aid. With Admiral Cooke in charge all the bay area cities attended a meeting at the local Jewish Community Center in San Francisco and gave a report on activity. The amateur group of Red Cross Communications put on a demonstration of how they worked in time of disaster. Five mobiles checked in with net control at center, stated what equipment they were using and their location. NL acted as outside net control and BYS acted in charge at the Community Center. Evidently the demonstration made quite an impression on the group. The point was brought up that amateurs could contact other amateurs in disaster places and obtain all the information needed before the Red Cross Survey Department could even reach the stricken city. The HAMS use the 2-meter band for c.d.-Red Cross work and the Club was congratulated on how well organized it is. YLRCSF, the ladies' radio group of San Francisco, celebrated its first birthday by holding a dinner for members and their families. CEE, Vada Letcher, president of the National Ladies' Radio Clubs, came up from Santa Monica to join in the celebration. The Mobileers had 14 members take a trip to Yosemite Valley. They had such a good time they decided to make Yosemite Motorcade a yearly affair hereafter. Three San Francisco amateurs died within a short time of each other, PA, YZI, and ILS. Condolences to their families. KN6HIW has a new Harvey Wells transmitter. KN6JDK built a transmitter and now is ready to go on the air. KN6IKQ is the proud owner of a Viking II. PCN is busy trying to get news for the San Francisco Club paper. Congratulations to SWP and GQY on January BPL totals. QMO reports that she is active on c.w. YC is active on 40- and 80-meter c.w. CBE was busy preparing the rig for the DX Contest. ACN reports that approximately 2000 more ham plates have been issued since the 6040 list came out in June. License plate bills, Senate Bill No. 222 and Assembly Bill No. 593, already have been introduced at the current legislature session. Local amateurs are looking forward to the ARRL Pacific Division Convention coming up May 21–22 at Fresno. Many plan to attend. JZ, Pacific Division Director, fell and broke a couple of ribs. We wish Ray a speedy recovery. Congratulations to three new Novices, KN6JMM, KN6JMN, and KN6JKA. Traffic: (Jan.) W6SWP 663, GQY 533, QMO 203, YC 12, GGC 10, PHT 5. (Dec.) W6GQY 390.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — The Golden Empire Amateur Radio Club is moving to the Engineering Bldg., Chico State College. The Shasta County Amateur Radio Club elected new officers Feb. 7th. The c.d. radio officers for Carmichael Calif..TYC, KKI, IQF, and UM are really doing a fine job. Congratulations. Our RM has resigned. Who will fill Harvey's shoes? Any takers? Harvey, I want to thank you for your aid during your stay as RM in the section. I only hope that you will return and give us further aid and I want you to know that your work was really appreciated by the entire section. Luck to you in your undertakings and 73 from us all. The Sacramento Council of Amateur Radio Clubs will make three awards: (1) For the year's Outstanding Amateur. (2) A merit award. (3) Certificate of Achievement. CIS reports he is QRL work but he makes c.d. drills. KN6JIG is new in Chico. PYE and SIA are still arguing over who has the best beam. FXO is playing with s.s.b. OEY, president of the Tehama County Amateur Radio Club, is expected on soon. LSB keeps a weekly sked with K6GVB, 100 miles on 144 Mc. with a 2500-ft. mountain between. New amateurs on the engineering staff of KBET-TV are QAQ, CVV, LEY; QEU is chief engineer. K6ER reported QRM from an Armed Forces station on 14,090 kc. K6ASX, in the northern part of the section, has ORS, OPS, EC, and OBS appointments. Jon's a junior in high school and skipped the Junior Prom to be in the DX Contest. The Dunsmuir Club is coming into its own and hopes to have a hamfest this summer. Well, fellows, in starting a new two-year term I hope with your coöperation it will be as pleasant as in the past. Traffic: W6MWR 20, CIS 8.

SAN JOAQUIN VALLEY — SCM, Edward L. Bewley, W6GIW — SEC: EBL. RM: K6BGM. PAMs: ZRJ and WJF. The Sonora Club is getting started and already has a 250-watt Kaar transmitter at the Office of Civil Defense. PCB is secretary and the Club is building seven portable rigs for 2 and 10 meters, designed by CQI. EBL is kept busy every Sun. morning as NCS on the Central Valley Round Table at 1100 on 3900 kc. We have word that ZRJ and K6BGM moved to San Jose Mar. 1st. Doc and Ann have boosted lots of club and traffic activity in the section and we will miss them. K6EVM will replace Ann as RM. WPV is getting on s.s.b. soon and is giving 2 meters a workout. NTV anticipates about 500 watts on 2 meters with a pair of 4-125As. He already has the final. Sandy is proud of his new SX-96 receiver. The Stockton Club presented a television program on KTVU, demonstrating amateur radio. It was a wonderful job of public relations and thanks go to ZNL, QUE, and KN6HWT. EXH sends code nightly on 144.8 Mc. at 1830, 5 to 13 w.p.m. IAZ has bought a home at

(*Continued on page 108*)

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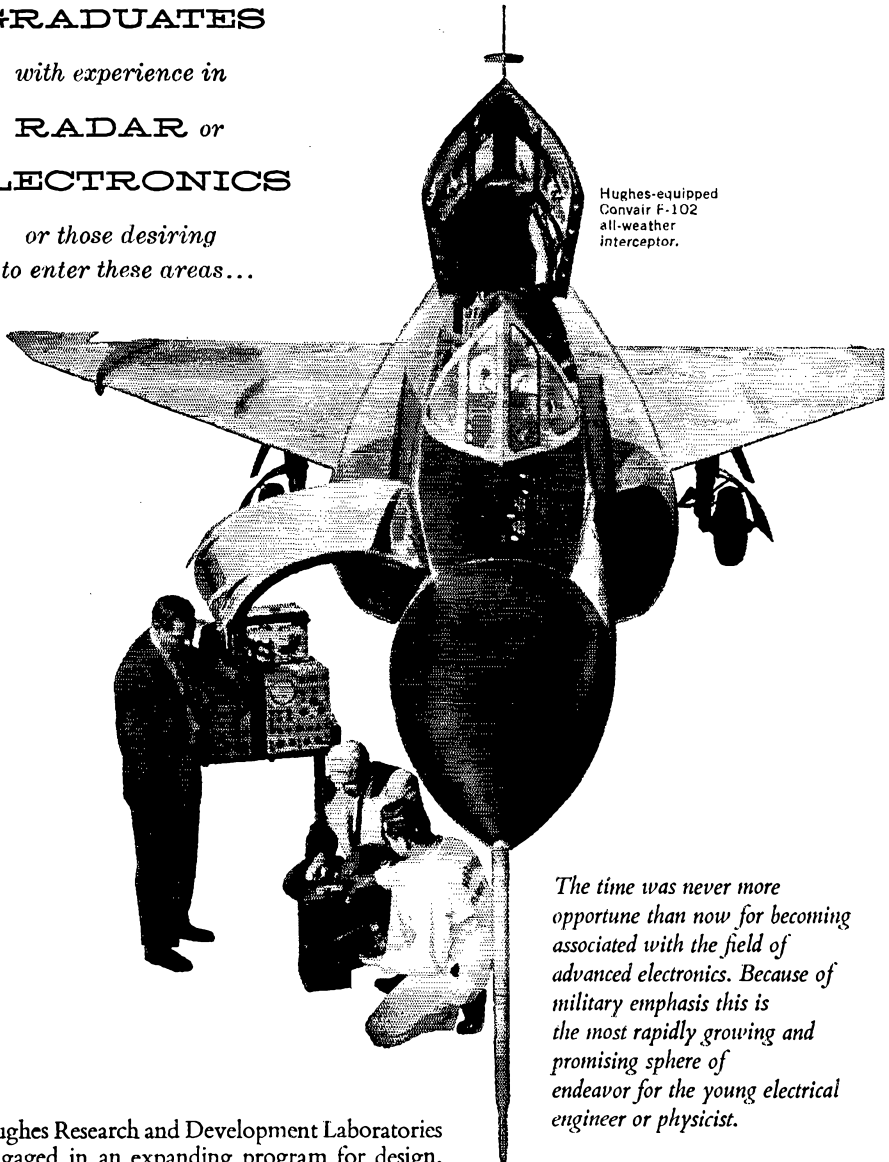

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Seacliff. JDC and LMA are active from their new QTH in Oakdale. VKR is working in Hawthorne. SJJ is building a 500-watt final. SNF is getting started in c.w. traffic with 60 watts to an 807. K6EVM is building a VFO for 40 meters. GRO is kept busy as prexy of the Am. Legion Net. JJE is putting out an FB signal from Lemoore on 2 meters. LOS moved from Stockton to Bakersfield. HXJ and KN6EEV moved to Stockton from San Francisco. Traffic: W6ZRJ 459, FEA 171, ADB 119, GRO 116, K6BGM 55, EVM 28, W6SJJ 25, EBL 9, SNF 6.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Charles H. Brydges, W4WXZ — SEC: ZG. PAM: ONM. RM: VHH. PIC, in Greensboro, is a new ORS. CBP is working on a new pair of 812s and will be on soon. YPY has been doing fine business with his 813s but has a little TV trouble. TLA and WXZ were in the 'phone section of the CD Party and BDU and VHH were in the c.w. section. MDA worked 24 stations in the V.H.F. Contest on 2 meters and made a real fine score, high score in the State. REW got his 37th state toward mobile WAS by working 1BCR in Rhode Island. Bill still needs Delaware before working on the western states. The Charlotte C.D. Net sounds very good on Sunday afternoons. There are about 35 stations on roll with about 20 checking in every week. DBQ is moving to Florida. AJW is expanding to 20 and 40 meters. During January CVX worked 18 new countries on 20 meters. His DX total now is 44 — not bad for just getting on the band. There are several new stations on 2 meters in the Charlotte Area. VHH got Moresville with his 15 watts. DLX also is on 2 meters and TYR is building up stuff to get on. WXZ received WAS and will be on with p.p. 813s soon. Not as many monthly reports were received as per usual this month. Let's have those reports next month and fill our column. Traffic: W4WXZ 244, BUA 2, CVX 2, EJP 2.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — BAN has moved to a new QTH and needs only Nevada for WAS. Congratulations to HDR on making BPL on 'phone. According to SCM records he is the first to have this honor in South Carolina. RPV reports a club is being organized in the Sumter/Shaw Area. LXX now is ORS and made a score of 95 in the CD Contest, saying that his antenna would not bring in the signals and he hopes to do better next time. FGX is making alterations in his rig and soon will be back on the air. ZRH was on 3700 kc. for 16 hours and 15 minutes during January sending Official Bulletins and code practice nightly at 7 P.M. The Charleston Club, HHO, has ordered a complete Viking emergency station with receiver and emergency power supplies. AUL reports that with the advent of TSU on mobile he has 5 mobiles on 75 meters in his EC net with two more prospects. The South Carolina C.W. Net, under RM AKC, meets nightly Mon. through Fri. on 3525 kc. at 7 P.M. The South Carolina 'Phone Net, under PAM FFH, meets at 7:30 P.M. Mon. through Fri. and at 0830 and 1530 Sun. The president of each South Carolina club is being appointed Asst. SCM to form a group to act on joint matters. The SCM should be contacted for this appointment. Traffic: W4HDR 378, AKC 213, FFH 108, ZIZ 108, RPV 26, ANK 23, YNR 3.

VIRGINIA — SCM, John Carl Morgan, W4KX — Hughes Motley, RTV, the new SEC, will be looking for volunteers for EC appointments in many areas. If you're interested, drop him a card. UBC succeeds sea-duty-bound LW as publisher of the *Virginia Bulletin*. LW, in Europe in January, sent a card from Germany. New arrivals include YL K4BUN, ex-KL7AZJ. Departures are LPP, now in Texas; BMX, gone to KP4-Land; and 3WDP, of K4MC, headed overseas. KFC reports visitors included ØNWX, ex-NNN, KVM/VO6, and FO8AJ. Vic worked YV and ZL on 160 meters. The Central Valley ARC is conducting classes for some 25 prospective hams in the Staunton-Waynesboro Area. NRO reports the W.&M. ARC is in the doldrums. NQV won the senior championship in the international model plane meet in Miami in January. IF and YVG are bemoaning skip snafuing VN and VFN, but IF reports DXers QNIing VN included ex-VNer 6CIW/KP4. Reported on s.s.b. in Virginia: FJ, IMP, IYC, JLV, JUR, MK, KMU, SPE, and VWS. JIII says since he and JFV are the only v.h.f.ers in the Roanoke Area, it's a lesson in patience waiting for "openings." CGE finally got an antenna that gets him beyond Norfolk City limits. Who says power is mandatory on 160 meters? BYZ got an OO QSL from Massachusetts as the result of VFO leak-through on 160 while he was on 80 meters. Pappy and jr., YE/YZC got a new 183D to go with the new all-band half-bucketful. EBH has ordered a new V-37 all-band vertical. KAO is back in business with a new Ranger. UBC's XYL is beavering away for her ticket. Thirteen-year-old EZB passed the General Class exam. PXA is VN Net manager. All appointees are requested to note appointment expiration dates and send certificates to the SCM for endorsement during the month previous to the expiration date. RJW was silenced during the transfer of his hard-working mobile gear to a new chariot. Traffic: W4PFC 1241, K4MC 136, W4TFZ 122, BLR 45, KFC 44, CFV 37, YKB 36, YZC 34, KX 28, IF 26, YVG 25, TYC

(*Continued on page 110*)

13, JAU 12, CGE 11, WYC 9, AVO 8, IA 8, OWV 8, YE 7, BYZ 4, WBC 4.

WEST VIRGINIA — SCM, Albert H. Hix, W8PQQ — SEC: YPR. RMs: GBF, HZA, DFC, and JWX. PAMs: FGL and GCZ. Congratulations to NCS on being awarded the special citation by General Electric in its Edison Radio Amateur Award program for his work during the Richwood Flood. HZA has officially accepted the position of acting as net manager for the c.w. net. KCN has a new Viking Ranger. EMG has the mobile rig working very well now. RRD has a new Viking II and new antenna. GCZ is a new PAM. SHG is well on the way toward completing WAS on 40 meters. IEQ is NCS of the 50-Me. Emergency Net in Hungington. Active members of the net are I.SJ, FUM, GQJ, EZR, HRU, AHF, LBN, and club station KEF. The frequencies are 50.72 and 50.8 Mc. IYG has his kw. rig working very well. FUM is QRL getting things set up for its AREC-RACES Net. The hobby show in Morgantown provided lots of traffic for the nets. FMU has a pair of 813s about ready to go. BKI is plugging away at his 144-Mc. schedules very successfully and is building a converter for that band. MBA is very QRL school. The MARA continues to be a very active club. RKV is the new president of the Tri-City Club. Thanks for the excellent coöperation this month in submitting activities information. Traffic: W8JWX 232, GEP 118, HZA 99, IXG 81, ETF 29, FUM 16, NYH 14, IYG 10, FMU 9, MBA 8, KDQ 7, PQQ 6, QWU 3, RRD 3.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Karl Brueggeman, WØCDX — SEC: MMT. RMs: KQD and KHQ. PAM: IUF, KØWBB, W6PKL/Ø, WØCYT, EKQ, BEN, KHQ, and KQD now hold TCC appointments. Our Colorado Slow Speed Net is going real well, with an average session attendance of about 6. TVI won the fur-lined soup dish for a perfect attendance record. Remember, the Net meets Mon., Wed., and Fri. on 3570 kc. at 1715 MST. KQD received her BPL medallion. It is the only one in Colorado so far. We all want to give IC and BWJ a vote of thanks for the work they have done on the license plate legislation. They have been most active and have represented our group at the Statehouse. It also is most gratifying the way everybody has coöperated and worked to get our bill through the legislature. WVZ was working in Alamosa and Monte Vista during January. OYS heard ZL1BY on 160 meters but could not make him answer. The Hi-Noon Net handled 219 messages in 22 sessions. Some of the appointments in the section are due to expire so I would appreciate it if all of you would check your appointment and if it has expired or is about to do so, send in your certificates for renewal. Traffic: KØWBB 889, WØKQD 248, LN11 27, PGN 18, SWK 17, IA 11.

UTAH — SCM, Floyd L. Hinshaw, W7UTM — NVY is the sparkplug for the new cal' letter license plate bill which has been introduced in Utah Legislature. SAZ advises the Ogden Annual Club Dinner was a big success with about 60 in attendance. Director ØIC came over from Denver and renewed acquaintances. Officials of Salt Lake City and Salt Lake County are holding conferences to determine the feasibility of consolidating c.d. activities. JVA has a new 2-meter transmitter at 90 watts. SP is occupied with a complete rebuilding program of his h.f. gear and is only on the air on 2 meters and DCS frequencies. NOE has transferred to Hollywood and has been assigned his old call, 6LXI. Congratulations to WRV on receipt of his General Class license. NVY is using a model 26 printer on 40-80-meter RTTY and has results from NY to KH6-Land. Art also has 700 watts on 2 meters. Winners in the SLC Club membership drive were JVA and BRV. LKM is offering free instruction to prospective hams who wish to learn the fundamentals of radio. Those interested call Salt Lake City AM 6-2897. Traffic: W7PIM 78, UTM 3, QWH 2.

WYOMING — SCM, Wallace J. Ritter, W7PKX — The Wyoming Pony Express gang is working hard on the license plate bill. The outlook at present is very doubtful because of opposition in the House after a vote of twenty for and seven against in the Senate. The Sheridan Radio Club now has a Radio Officer appointed. C.d. officials have appointed a Communications Officer. We expect the RACES authorizations to start in the near future. TZK, at Aladin, is a welcome newcomer to the 75-meter groups and to the Pony Express Net. The Casper Radio club house is nearing completion and sounds very nice. UZP is back from the hospital and recovering rapidly. LLP is back mobile on 75 meters with a Commander. PAV, the SEC, is getting the ECs lined up after some delay because of illness. Nominations for SCM are now being solicited for the coming term. We are looking for volunteers for OO and ORS appointments. Traffic: W7PKX 188, PAV 23, LLP 18, PMA 14, PAW 8.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Joe A. Shannon, W4MI — SEC: TKL. RM: KIX. PAMs: RNX and EBD. New appointments: NLB and PAC as ECs. Activity is picking up in Jasper. CIU reports the following active stations: CIU, BWG, DDH, WN4s HPE, BAE, and KN4s BBM, BFF,

(*Continued on page 118*)

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Bob Henry, WØARA Butler, Mo.

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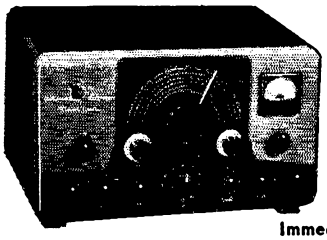

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Collins 75A3	530.00	B & W 51SB	279.50	Hallicrafters SX99	149.95
Collins 32V3	775.00	Central 10B	129.50	Hallicrafters SX96	249.95
HQ140X	264.50	Central 20A	199.50	Hallicrafters SX88	675.00
Pro-310	495.00	Elmac PMR 6 or 12	134.50	National NC88	119.95
Ranger Kit	179.50	Elmac AF-67	177.00	National NC98	149.95
Ranger wired	258.00	Morrow 5BR-1	73.45	National NC125	199.95
Viking II kit	279.50	Morrow 5BRF	66.59	National NC183D	399.50
Viking II wired	337.00	Morrow FTR	125.83	National HRO60	533.50
KW amplifier	1595.00	Gonset Super 6	52.50	RME DB23	49.50
Adventurer	54.95	Gonset Commander	124.50	RME MC53	66.60
Matchbox	49.85	Communicator II	229.50	Babcock MT5B	119.50

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and BEX. KN4s BOJ and BOX are new in Anniston. Three clubs have new officers: Anniston — BCU, pres.; SCM, vice-pres.; OAO, secy.-treas. Montgomery — HKK, pres.; IVC, vice-pres.; and FMW, secy.-treas. Tuscaloosa — HCV, pres.; HFK, vice-pres.; and MI, secy.-treas. K4FDY has RTTY working fine and racks up high traffic totals. UHA was designated MARS "Station of the Month" for December for "exceptional participation." COU has new SA with clipper and now is working on s.s.b. exciter. ZSQ took a delayed vacation, hamming on the way. He put in some time coaching KN4s AOZ and APF (OM, XYL) for General Class. YRO reports the following new officers of the Muscle Shoals Club: ZSH, pres.; VRC, vice-pres.; CMK, secy.-treas.; MEM, trustee. OAO is instructor in the Anniston Club sponsored code class. Traffic: (Jan.) K4FDY 1332, W4UHA 513, COU 287, ZSQ 186, WOG 88, KIX 77, YRO 66, PWS 46, AAN 38, TKL 38, HKK 28, ZSH 27, K4ACO 26, W4OAO 23, TXO 14, CAH 9, EJZ 8, USM 2, VIY 2. (Dec.) W4ZSP 110, WHW 19.

EASTERN FLORIDA — SCM, John W. Hollister, jr., W4FWZ — RACES as of Jan. 31st: Approved are Leon, Volusia, Pinellas, Lake, and Hillsboro. Planning are Sarasota, Manatee, Broward, Orange, and Brevard. NHN Bulletin #3: Try 3660 kc. for the NHN generals at 2230 nightly for round tables. Traffic total was 41. SDR is an ANCS. The "N" was dropped by FXP, FJE, and EHW. BKC is secretary of the Orlando Club. Use the NHN for traffic on 3725 kc. Sun. at 0800. *Bird Sparks:* UWP is using a Globe Scout 55; AZO has a code class going on the air; SRZ is s.s.b., as is PQ; IL is using 32V-3; ZPO uses a mini beam on 20 meters; NJM needs a cat. AREC: IM reports 479 members now. IYT, Dade EC, has 149 with 40 mobiles; FIQ, of Cocoa, and YNM, of Lake City, showed big gains in January. Ft. Lauderdale: Fixed and mobile stations worked again this year with the Mothers March of Dimes. Gainesville: New club officers are TJU, WEM, TKE, K4AQR, and WN4AZB. Jacksonville: NavAir Club (W4NEK) officers are TVN, WSK, NFC, and CNC. The main activity is skeds with KG4, KZ5, VO2, KP4, VP9, CN8, ZB1, and KH6 and equipment is 75A-2A, HQ-129, NC-173, Globe King, T350-XM. PMZ and PNA are back in Jacksonville. Key West: ELS says the club at NAS is K4NCN. DRT says the emergency net is on 29,080 kc. each Wed. at 1930. Lake City: The "N" was dropped by CYG, EGS, and EGY. New Novices: KN4BKZ, KN4BNO, and KN4BOS. K4BLL is serious about 220 Mc. Miami: PBS says the DEN planning committee is IYT, VYU, VZC, PBS, YCL, IQF, ZPO, and UIW. PBS uses a 'scope for modulation checks. EHW works 3 c.w. section net for operating experience. DNU uses a Viking Ad to drive 400-watt 813 final and LVV's HRO on 20/40-Mc. c.w. He and FGO and WN4HUP are working on Novice Net plans for 40/80 Mc. DNU is in charge of Marine Reserve station (BC-610 and BC-348R). Using Telrex mini beams are KMV and PBS. The DEN member certificate was designed by YCL. Ocala: DVR uses radiomarine rig from MARS. St. Augustine: FJE uses a Globe Scout with Heathkit VFO. Traffic: (Jan.) W4PJU 536, DVR 150, IYT 136, HCQ 116, WS 109, LAP 89, WEO 75, ELS 52, K4ANJ 49, W4RWM 49, TJU 46, LMT 42, DSC 19, FSS 18, DES 11, FWZ 11, WHK 10, DNU 9, FJE 9, PBS 8, HFR 6, EHW 2, WEM 2, IM 1. (Dec.) W4DNU 8.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PLE. ECs: MFY and HIZ. AXP has joined RACES. PLE is working hard to stimulate interest in emergency units. HJA is going in for hi-fi. BGG meets the Gulf Coast Hurricane Net. GMS is building a 15-meter beam. QK has 813s perking FB on 75 meters. CCY is going real high power for DX. JPD works them hand over fist with the B&W 5100. BG0 is working s.s.b. over Quincy way. RMO keeps the Fish Net perking. UYS and UUF keep a close watch on 144 Mc. KN4AGM is studying for Technician Class exam. PAA has a 32V-3 perking on 15 meters. MUX is heard on 20-meter 'phone. TTM/PTK have a new porthole radio. BFD is interested in ham-TV. AIA is a nightowl with a B&W 5100. MS is enjoying s.s.b. on 20 meters. ZFL is getting out FB with a vertical. 1ASY/4 is heard in the Pensy Area. EAR is having modulator trouble. ECT says FJR is becoming interested again. NOX/NYZ keep the rig perking out Bohemia Way. HQG gets out FB with low power. CDE is heard on 75 meters in the wee sma' hours. NN is out of the hospital and getting on FB. QU meets USNR Net drills. Traffic: K4AKP 111.

GEORGIA — SCM, George W. Parker, W4NS — SEC: OPE. PAMs: ACH and LXE. RMs: MTS and OCG. Nets: Georgia Cracker Emergency Net meets on 3995 kc. Sun. at 0830, Tues. and Thurs. at 1830 EST; Georgia State Net (GSN) 3590 kc. Mon., Wed., and Fri. at 1900 EST. YTO is new NCS for the Atlanta 40-Meter Net and the new frequency is 7040 kc. 5RDP/4 has been transferred from Warner Robins, and ZLS is taking over as EC for Houston County. Norm has done a fine job organizing the AREC in his community and we wish him well in his duties. YRX is going great guns with a converted ARC-5 on 75-meter mobile. 6OIF/4 has a new Viking Ranger on the air and working fine. ERA is working 75 meters and MARS with ¾ (Yep, three-quarters) watts input. CFJ, ZD, NS, and others have a 420-Mc. Net set up in Atlanta, using converted surplus rigs. A 160 "Flea Power" Net now is going at Camp

(*Continued on page 114*)

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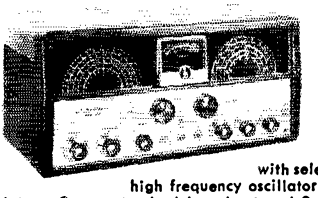

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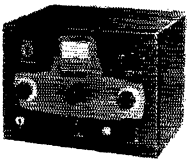
Complete with tubes (less speaker)

Model R-46A speaker for above in cabinet to match 19.95

Johnson VIKING 'ADVENTURER' Transmitter



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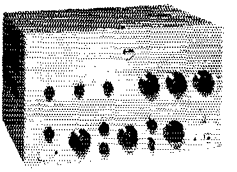
Detailed step-by-step instructions are included for wiring, no drilling or punching is necessary, and all necessary parts and hardware are furnished.

Complete with tubes, less crystals and key **$54.95**



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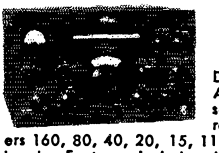

Designed for AM, CW and selectable SSB reception. Covers 160, 80, 40, 20, 15, 11 and 10-meter bands. Features include: double conversion . . . permeability tuned, hermetically sealed VFO . . . mechanical filter in IF strip . . . separate detectors for SSB and AM . . . band-pass tuning . . . new noise limiter . . . bridged-T rejection notch filter . . . built-in crystal calibrator . . . provision for 3 Collins plug-in mechanical filters.

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Model 312A-1 control/speaker for above in matching cabinet 37.50

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116U, 7.5 amps, panel mtg.	18.00
1126, 15 amps	50.00
1156, 45 amps	118.00

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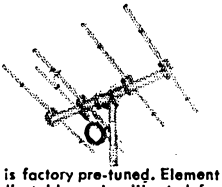
HY-LITE SKY-CASTER Antennas



Structural strength and high efficiency are the outstanding features of these antennas. Have 3" diameter aluminum alloy booms. Elements are made of 1½- and 1⅜-inch aluminum tubing and are mounted to the boom with special cast aluminum clamps. Two feet of 2⅜" pipe are furnished threaded to fit flange or mast.

Each antenna is factory pre-tuned. Element lengths are adjustable and calibrated for center of bands. Supplied with T-match fed from a Balun made of RG8/U cable and fitted with coax connectors.

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Gordon. DNT has left Cedartown. ZDP is back on the air with an 813. FZO has a new three-element beam for 15 meters. MA has been off the air lately because of illness. Seventeen prospective hams reported for the code and theory classes sponsored by the Atlanta Radio Club. ZD and MTS are the professors. The Charles E. Newton, jr., Radio Club held its first meeting in Griffin and elected AFG, pres.; CZS, vice-pres.; HAO, secy.-treas.; OQT, act. mgr. The club is named for the late Charles E. Newton, jr., W4TNT. Traffic: K4WAR 1302, W4OCG 97, PIM 94, IMQ 92, CFJ 89, ZDP 67, MTS 40, NS 38, ZD 20, BWD 16, ZWT 7, FZO 4.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: HZ. For the DX Contest DV had a kw. on 80, 40, and 20 meters; 200 watts on 160 meters; and 60 watts on 15 and 10 meters. ZW handles traffic on TXN at 2100 AST on 7160 kc. KD and CC are concentrating on 3.5-Mc. DX while the season lasts. KD worked ZC4JA and LZ1KDP on 3.5 Mc. WP4AAA has new vertical phenomenal on 3.7 and 7 Mc. WP4ZC is now KP4. WP4ZT has a new Viking II. WP4ABA worked DL3TB on 3740 kc. WP4s planning a net on 3740 kc., contact WP4ABA for details. US replaced cathode modulation with Class B plate modulation. MO is operator at MARS KP4USA. HZ and CX are checking 144 Mc. from Monte del Estado near Mayaguez. ZN took down the 80-meter antenna and put up a 40-meter folded dipole and 20-meter Telrex beam. WT's receiving antenna is 60 feet of wire zigzagged in the room. MV and RK built Telrex-type beams. WL again is on 3925 kc. YI writes he now is WICHC. IY moved to Seattle. DM is moving to Miami. WN, our 3925-kc. OBS, soon will have a 500-watt Globe King. W6CIW/KP4 is commander and industrial relations manager at Naval Air station and will be on with a 32V-3 and 75A-3. AZ and GX are building s.s.b. transmitters. KV4AA has a new Globe King. WAC, at N.G. headquarters, and other KP4s throughout the Island participated in maneuvers handling military traffic on 3885 kc. so well that amateur radio has been incorporated into N.G.'s Emergency Plan. Traffic: KP4ZW 28, DV 4.

CANAL ZONE — SCM, Roger M. Howe, KZ5RM — QA is the new EC for the Atlantic Side, UD having resigned. DG had a visit from Smoky, W6UXX/MM, while the tuna clipper *Sea Prince* was in port for a Panama bait-fishing license. Also W6QDD, of Malibu, Calif., dropped in on DG. WA has installed a new cubical quad for 10 meters. In August 1954 the *SS Matarca* had a run-in with the bank of the "Big Ditch" and was dock-bound for several days for repairs. On board was Tom, ZL3JX, who had a very nice collection of color slides of the Coronation and other interesting scenes in England. Tom was entertained by the KZ5 gang during his enforced sojourn here and as a token of his gratitude he sent us about 70 pounds of fresh-killed New Zealand pig. Recently the gang got together at the home of FL and enjoyed an excellent barbecue with the New Zealand pig playing the lead role. Traffic: KZ5WA 114, DG 95, KA 45.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Howard C. Bellman, W6YVJ — Asst. SCMs: William G. Coe, 6KWQ; and Henry G. Garman, 6BHG. SEC: QJW. PAM: PIB. We are sporting a newly-endorsed RM, GJP. We have 8 Asst. SECs, who also act as part of the 34 ECs in the section. Six amateurs are OBS, 5 are OES, 5 are OPS, and we have 12 ORS. The latest total of OOs is 12. The appointees included above rightly deserve their certificates; there is no "dead wood" listed. ORS who failed to report twice in 1954 without good reason have been cancelled. JJU is sporting new QSL cards sent from General Electric for his 1952 Edison Radio Amateur Award. K6DGW wants someone to start a KN6 QSL Bureau. K6AUZ has just moved in from the Santa Barbara section. On Jan. 30th we had a get-together at the Morris Cafe in Alhambra for the quarterly Traffic Breakfast, with W6ORS as chairman. Representatives of SCN, MTN, ALN, UTL, RN6, and MCAN-4 attended. Also attending was QR from Hemet. The next Breakfast will be run by USY. The 28th was made nicer by the free dinner at the Biltmore Hotel by the house of Weatherford, who handle radio parts and who serve the valley. When 'City at Night" visited the Beverly Hills YMCA, they televised all aspects of the "Y" including an amateur radio station with NJU at the mike. Gary reports a new 15-meter beam at his place. EBK is running 300 watts A.M. and 700 s.s.b. to a 304TL final. MLZ is our new ORS. Ray has just passed around copies of the Coöperative Interference Committee Directory, listing 120 members in the 11th Radio District who have indicated their desire to assist the FCC and other agencies in the "reduction, or suppression, of interference in the community or area we serve." LVQ reports that YUY is the new president of the Whittier Radio 50 Club. K6COP has added a crystal calibrator and a Heathkit grid-dip meter to his station. "Some old boy," according to K6BEQ, is bootlegging his call on 40 and 75 meters. LXI has been reissued to its original owner, George R. Cannon, who is a TV engineer for NBC in Hollywood. He recently was on the air from the KSL transmitter at Saltair, Utah, under the call of 7NOE but is now living in Pasadena. CK was on emergency power 3 hours in January,

(*Continued on page 116*)

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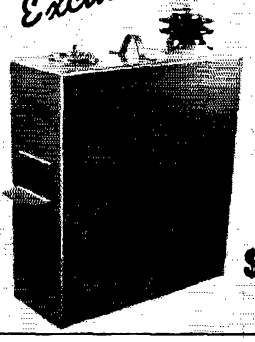

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isolated part of the time with 3-foot-deep snow up in the mountains. BGH and NNE have formed a corporation to build mobile gear, etc. BGH is the designer of the KP-81 and PR series of receivers. New president of the Rio Hondo Radio Club is UKC, who also is editor of the *Listening Post*, the club paper. Traffic: (Jan.) K6FCY 368, W6CMN 255, CAK 227, GYH 212, USY 172, MBW 150, GJP 120, YAS 118, BHG 82, K6DQA 64, W6MLZ 54, CK 34, FMG 34, K6BSD 32, COP 29, W6ORS 27, NIE 24, K6EIV 7, W6AM 4, K6BEQ 3, W6BQC 3, CBO 2. (Dec.) W6TRF 40, K6DGW 26, W6NTN 1.

ARIZONA — SCM, Albert H. Steinbrecher, W7LVR — Asst. SCMs: Kenneth P. Cole, 7QZH; Dr. John A. Stewart, 7SX. SEC: VRB. PAM: KOY. Arizona 'Phone Net: Tue. and Thurs., 7 P.M., 3865 kc. Arizona C.W. Net: Tue. and Thurs., 8 P.M., 3690 kc. The outstanding activity of January was the participation of Phoenix amateurs in maintaining communications for the March of Dimes Campaign, sponsored by the Phoenix Junior Chamber of Commerce. Radio station KONI was on the air for 24 hours soliciting funds. As pledges were telephoned in to that station, UNL, working as an F/P with NYN, VKO, and RBA as fixed field stations, relayed the information to mobiles, who in turn sent out members of the Phoenix Hot Rod Club to pick up the donations. Besides the above, the following participated as mobiles: KOY, MOF, OIF, OQF, OSM, PMQ, SUL, UCA, UDI, and WTZ, aided by CJ, GUJ, IRX, KWB, LXX, MAE, NEL, QUE, PUP, QZH, QZX, RIJ, SUI, XP, SYV, UXZ, UYA, VMO, VMP, VMQ, YFG, and ØOVI. We welcome 9CZR and 5PHQ to Arizona. QFQ has a new home-built 60-watt mobile. *Remember:* The Montezuma Well Hamfest will be held May 21 and 22. Contact GYK or OAS for tickets and information. Have you made application for your Arizona call letter license plates? Traffic: W7UNL 392, RBA 96, VKO 92, KOY 38, SUL 32, QFQ 30, LQB 24, LVR 17.

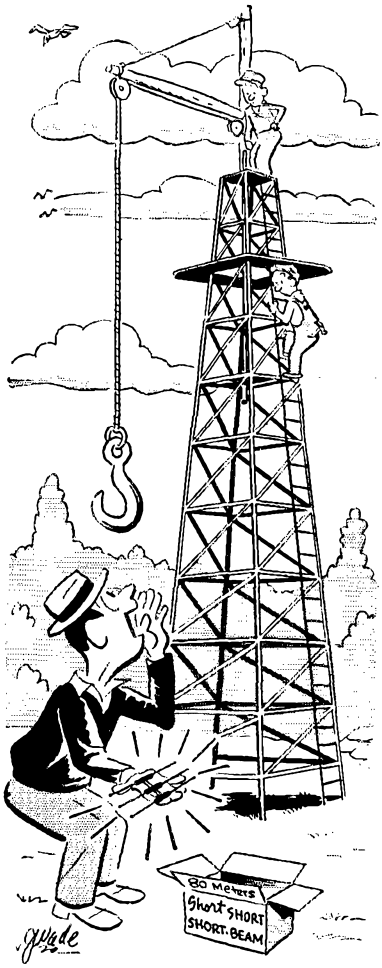
SAN DIEGO — SCM, Don Stansifer, W6LRU — Asst. SCMs: Tom Wells, 6EWU; Shelley Trotter, 6BAM; Dick Huddleston, 6DLN. SEC: VFT. ECs: BAO, BZC, DLN, HFQ, HIL, HRI, IBS, KSI, KUU, and WYA. RM: ELQ. The big news is that Ben Hamilton, VFT, SEC for the San Diego section, won the G.E. Edison Radio Amateur Award for 1954. New TVI chairman is K6AEI, new secretary is K6AWF. Ex-K6DY now is W4EF in Florida and is looking for San Diego contacts. 3MSK/6 will be active in the area for six months. 4KRR was a visitor at the DX meeting in January. K6ILO, ex-KP4IV, 2ZAN, and 3ZAN, now is ORS in La Mesa. K2HMT now lives in Solana Beach and plans early 2-meter activity. K6ADA, vice-pres. of the Teen-age Drag Net, now is a member of the Naval Reserve. IAB and YDK attended the Southern California Traffickers breakfast. K6BTO has been reappointed OES in the South Bay Area. Ex-4VZH now is K6JOF in Del Mar. KN6JGI is a new licensee in Vista. Ex-K6BIG now is W8TKA. USZ is mobile on 21 Mc. CAE has converted his two-element 40-meter beam into a four-element 20 for the DX contest. CHV and CRT battled it out for section honors in the recent CD Party. KN6ITB was elected president of the Dana Jr. High student body, and promptly passed his Technician Class test. LRU is a new member of the Helix Club. All clubs are showing much activity preparing for Field Day. KL7AUV was a recent visitor. The Helix Club presented VFT with a large piece of luggage prior to his trip East to receive the Edison award. The following were active in the DX Contest on c.w.: K6EC, DGB, W6BZE, CAE, CHV, CRT, FFD, GBG, KSN, LRU, MGT, and W3MSK/6. BZE attended the DX meeting in Fresno. Traffic: W6IAB 3163, BSD 770, YDK 698, IZG 171, KVB 11, K6HZO 6, W6CRT 4.

SANTA BARBARA — SCM, Vincent J. Haggerty, W6IOX — NKT, in the San Luis Obispo Area, is quite active in his capacity as Official Observer. ZND is reportedly working on a new shack. FNP recently visited the radio club at Paso Robles. K6NBI and FYW were the only traffic reporters for the month. PP delivered K6NBI's traffic report to the SCM. Traffic: K6NBI 128, W6FYW 5.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, T. Bruce Craig, W5JQD — SEC: RRM: PAMs: PAK and IWQ. RMs: PCN and QHI. WN5FBY reports working c.w. from his car. The *Dallas 10 Meter Net Bulletin* of Feb. 5th gives information on civil defense drills and meetings, also a Chili Supper at the home of UHV. The Dallas Amateur Radio Club began code classes in November and on Jan. 7th graduated 26 out of the 143 who started. The Sweetwater Amateur Radio Club put on a demonstration of amateur radio for the Lions Club. DTA/5 needs only Delaware and Wyoming for WAS on 75 meters. UUR is looking for conversion data on R-28/ARC-5, and T-23X/ARC-5. YPI still is rebuilding his big rig, but is working all over the country on 5 watts. SFA has a new baby girl. DNY is rebuilding his 813 rig for built-in VFO. HKF has had his ticket two months and has worked 29 states with 20 confirmed with 50 watts on 75 meters. AFY, AFW, DRV, AFR, and OFV have new Viking Ranger rigs. 9PIM/5 of Perrin Field, Sherman, has a new son. PWS has a 20-meter Cubical Quad. GFN lost her brother during Christmas. BDB is back in Dallas. RHP monitors the 3960-kc. Traffic Net regularly, with little

(*Continued on page 118*)



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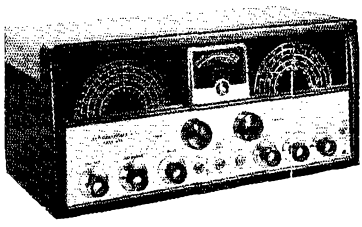

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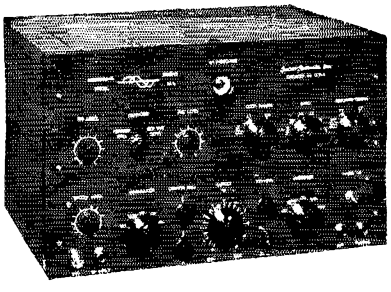

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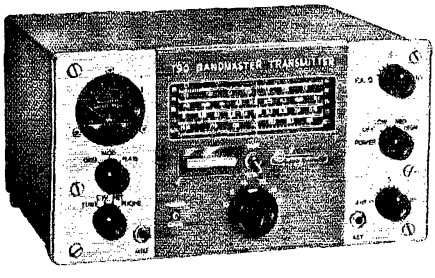

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traffic for Tyler. The Panhandle Amateur Radio Club held its Christmas party at the home of CKB in Amarillo. Reports have been received of amateurs assisting in the March of Dimes Drives in Longview, Amarillo, and Abilene. Traffic: W5IGU 1717, KPB 615, BKH 556, CF 141, UBW 128, PAK 121, K5FFB 119, W5AHC 63, BAT 54, ACK 32, DTA/5 29, YKE 21, OCV 19, ASA 18, WNK 14, UUR 13, NFO 12.

OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GIQ. SEC: KY. RM: GVS. PAMs: PML, SVR, and ROZ. OLZ, the Oklahoma c.w. traffic net (3682.5 kc.) is taking a new lease on life, with GVS as RM and with the help of JXM at Oklahoma University on TC, and is putting out a regular bulletin of interest to net members and others. The Aeronautical Center ARC has 100 per cent ARRL membership. Only one Novice reported this month, WN5JUR, Lamont. The others are getting their General Class licenses like ERV, IPQ, HPW, and EJU. The ACARC, Oklahoma City, had a barbecue dinner for members and an open house afterwards with good attendance. Director CF, SCM RST, and SEC KY were there and some short informative talks and vis-a-vis ragchews resulted. The Shawnee Radio Club's new officers are NMN, coördinator, GNQ, asst. coördinator, WSM, secy.-treas. The Club meets on 3825 to 3840 kc. the 2nd and 4th Wed. at 2000 hours. Honorary membership certificates in the Shawnee Radio Indian Tribe are available to any amateur contacting five members of the Club. There is a new radio club in Grant County named Tom Cat Alley. The Club consists of BCI, CYQ, WN5FWP, WN5JUR, WN5CYZ, W5QT, and other Grant County prospective amateurs. Traffic: (Jan.) W5GVS 146, MRK 102, QAC 71, ZKK 60, SVR 59, RST 41, TKI 33, MGK 27, PML 26, FEC 17, PNG 17, WSM 16, CBY 15, VBD 15, LDM 13, TC 13, ADC 12, GXH 12, ITF 10, GIQ 9. WTC 8, SWJ 7, UTC 5, EHC 4, REC 3, CYQ 2, LWG 2.

SOUTHERN TEXAS — SCM, Dr. Charles Fermaglich, W5FJF — WN5JVD is working on a new de luxe rig with a pair of 6146s to be used at school in W7-Land. The problem is that 110 volts d.c. is all that is available. LSE is talking about s.s.b. and a.m. He is building kw. rigs for both. What I can't understand is that he is a c.w. man. ABQ, while recuperating from a severe heart attack, operated a 75-watt bedside rig on 20, 40, and 80 meters and enjoyed meeting old friends and handling some traffic to pass the time. This is the second year he has been confined to a bedside rig. Jerry says it renews his old feeling toward ham radio. CE is building an 813 rig so small it will go in a hat — a 10-gallon hat, that is. FDZ, ADZ, URU, and FJF were overheard talking about the Sheriff's posse. DUG, NCS for CERN, is going strong on 420 Mc. FND is giving programs on "car-emitted speech." KQG, NCS for SARC Emergency Net, wants more activity on the Net, which meets at 6 P.M. every Thurs. QCH is hiding transmitters again. Bill Case, Paul Tarrodaychick, Bro. Bill Hamm, Andy Crockett, Derwin King, and Willard Carmack recently attended the IRE Convention. SDA has a new ham shack. Traffic: W5MN 504, ABQ 29.

NEW MEXICO — SCM, G. Merton Sayre, W5ZU — SEC: KCW. PAM: BIW. V.H.F. PAM: FPB. RM: JZT. The NMEPN meets on 3838 kc. Tue. and Thurs. at 1700, Sun. at 0730; NM Breakfast Club every morning except Sun. at 0700-0900 on 3838 kc.; NM C.W. Net daily on 3633 kc. at 1900. Because of long skip and QRM, the Tue. and Thurs. net has moved up to 1700. The Amateur Radio Caravan Club of New Mexico is sponsoring the New Mexico State Ham Picnic at Albuquerque June 4-5, with the Albuquerque Chapter in charge. In order to secure the choice of Ruidoso in 1956 for the West Gulf Division, New Mexico amateurs should plan on a large and vociferous delegation to the West Gulf Division Convention at Fort Worth June 10-12. CIN reports a new c.d. director has been named for San Juan County. QR and CEE are checking into PAN. AK, ARD, AWR, CAZ, EAP, GYN, PGJ, SUF, and SZM recently received Section Net certificates. FAG, FPB, WIY, CGE, ECS, DFJ, YXM, DED, UEO, HAG, DNK, FJE, WBA, EEM, FMM, CFJ, OIA, IUE, and NSJ ranked in that order in the January V.H.F. Sweepstakes, with HGV, BXS, PQA, WNL, EDK, HLE, and 3KNW/5 also active. ØAZE/5 is a recent addition on 144 Mc. Traffic: W5QR 75, AQQ 32, HJF 22, ZU 21, CEE 18, JZT 14, SZM 12, BAG 7, BZA 7, ARD 5, BZB 4, GEM 4, WBC 4, BXP 2.

CANADIAN DIVISION

MARITIME — SCM, Douglas C. Johnson, VE1OM — Asst. SCM: Fritz A. Webb, 1DB. SEC: RR. RMs: VE1HJ and VO6X. PAMs: VE1OC, VO2AW, and VO6N. ECs: VE1AAY, VE1DQ, VO2G, and VO6U. A new appointee is DW, EC for Yarmouth. Bouquets to the NBARA for a successful VE1 Contest on Jan 29th and 30th. The Dartmouth ARC is conducting code and theory instruction for newcomers. RN, XK, and UM are sporting new Viking Rangers. A visitor to Halifax was VE2LI (ex-G5LI). AAY, Fredericton EC, reports 7 Full and 2 Supporting Members of ARE . HJ and OM are QRL week nights with traffic on TRN. TA is building s.s.s.c. exciter. WL worked four new countries in the BERU Contest. BN is all set, having completed an all-band exciter and raised 3 antennas. PX and

(*Continued on page 120*)

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FQ have been assisting DW as NCS on the Maritime 'Phone Net. VN has been working out on 160-meter 'phone. W4KVM is back in Virginia after a sojourn in VO6-Land. SEC RR would like to see an Emergency Coördinator appointed and an Amateur Radio Emergency Corps formed in the following centers: Truro, Liverpool, New Glasgow, Middleton, Amherst, Sydney, Moncton, Saint John, Chatham, and Charlottetown. Any volunteers? VO6N, Goose Bay ARC secretary, announces the annual Club QSO Party to be held from 0001Z Apr. 8th to 2400Z Apr. 11th. 20 hours operating permitted, contact total times provinces, states, and countries total for score. Log RST, date, time, and location. No interclub or net contacts count but multipliers of 2 for up-to-50 watts and 1½ for 50-100 watts input apply. Traffic: (Jan.) VO6AH 207, VE1FQ 148, W4WOU/VO1 132, VO6N 132, VO6B 79, VE1DW 67, VE1AV 58, VE1QC 45, VO1T 42, VO6AF 42, VO6S 41, VE1HJ 25, VE1ME 24, VE1OM 19, VO1AO 6, VO1B 6, K6EJI/VO2 5, VE1DB 2. (Dec.) VE1HJ 19.

ONTARIO — SCM, G. Eric Farquhar, VE3IA — Congratulations to Arnold Duke, popular secy. of the Quinte Club, on joining the ranks of married folks. Welcome to the Gateway Club of North Bay, now an ARRL affiliated club. 1955 executives are DMI, pres.; TX, vice-pres.; EAW, secy.-treas. and editor. AZV demonstrated thyratron timing equipment at the West Side Club of Toronto. DXCC members are HB with 126 countries and AHV with 106. HB also has W.A.A. certificate with confirmations of 45 out of 57 countries. The v.h.f. contingent held an enjoyable affair at Oakville on the week end following the Sweepstakes. DMQ is on the air again. Highlight of the Ottawa Club meeting was an interesting talk and the showing of pictures by BBW, recently returned from Korea. Occupying new shacks are AAS and BCV. BSQ is making continued improvement after hospitalization. ATR, AJR, and DWG, on the Restricted Speed Net, 3645 kc. Sun. at 1330, solicit your participation. Originated to assist newcomers, this net deserves your support, which will determine its continuation. AVS, in Kapuskasing, reports the shack was rather cool Jan. 29th — just 42 below! AHL and BIW complete 10-meter walkie-talkies. BIW is EC for Windsor. To get away from QRM, AOE packed the radio gear into the car and drove out to the country to enjoy a couple of hours operation in the recent CD Party. The London Amateur Radio Club, AJQ, pres.; meets the 2nd Thurs. of each month. Code classes are very popular. Bulletin editor TO welcomes the exchange of club bulletins. Congratulations to AD on the arrival of a jr. operator. NG, pres. of the Nortown Club, Toronto, has the distinction of being first to win the coveted ARRL BPL Medallion in this section. IL, communications officer for civil defense, was instrumental in the Nortown Club getting first-class quarters for meetings and operating facilities. Traffic: (Jan.) VE3BUR 182, AJR 132, GI 132, NG 102 TM 83, VZ 66, NO 42, CP 29, AUU 28, DQX 28, BJV 19, AVS 18, AOE 17, KM 13, IA 11, PH 8, DPV 5. (Dec.) VE3DPV 3.

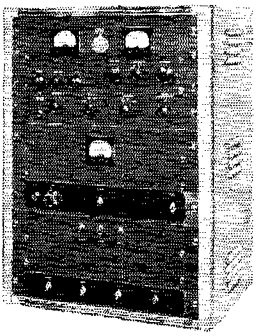
QUEBEC — SCM, Gordon A. Lynn, VE2GL — The MARC elected TA, pres.; HY, 1st vice-pres. and treas.; CH, 2nd vice-pres.; and Hal Moray, secy.; with HI, AKT, AMA, and KS on the board. UM has returned from VO6-Land and is active on 20 meters again. OO, formerly AM and before that RI, has a Viking II with VFO on 20, 40, and 80 meters. APA, ALR, ANB, JA, and TI are heard consistently on 75-meter 'phone as representing the Trois Rivieres gang. ANK has 400 watts on c.w. from the same place. ADX, station of the South Shore Amateur Club, has an 814 transmitter with CR100 receiver and reports into the Ontario C.D. Net, also the local c.d. roll call each Sun. KG is rebuilding with an 833A in the final rig all shielded against TVI. II is active from Sherbrooke on the Green Mountain Net on 3860 kc. at noon. SS is experimenting on 10-meter 'phone for EC purposes and also reports into PQN. AKO, in Sherbrooke, is badly hit by TVI and gets only an odd QSO. DJ is new in Thetford Mines. AIE is reported knocking off some good DX on 160 meters. ANR is on 75-meter 'phone regularly from Bury. FL arranged a special AREC exercise on Jan. 23rd, with planning by AFQ and AEV, in which ABS, AFH, AJQ, OB, HL, AHU, AFQ, AEV, FL, ZB, AMY, VE3BJE, and VE3BZM took part. WW finally worked Asia on 80 meters for EAC on that band. CA reports increased traffic with the north country and makes BPL with originations plus deliveries. LO has converted the 1154 transmitter. Traffic: VE2CA 152, DR 143, II 106, BB 69, ATQ 16, LM 14, CP 12, EC 11, GL 11, FL 9, ADX 7.

ALBERTA — SCM, Sydney T. Jones, VE6MJ — PAM: OD. RM: XG. AL is building a frequency meter and is acting net control on PLN during the absence of XG, who is rebuilding his rig to clear TVI. Alberta has lost one of its oldest and best-known amateurs, Jessop Nott, VE6JJ, passed away on Jan. 28th. He will be sadly missed by all who knew him. YE still is working on that new high-powered rig. HM reports his new vest-pocket beam is working out well. WC reports better operating conditions in the south but claims traffic is slow. The Lethbridge gang has decided to stage the 1955 Alberta Hamfest. Let's not only support them by attending, but please let them know what you would like in the way of activities during the hamfest week end. Remember, it's your hamfest. NX has his new rig on

(Continued on page 122)

Everybody's Talking About Our GLOBE KING!

A Globe King transmitter was used in the Amateur Radio Booth at the recent State Fair of Texas. How did it operate? Here's what Mr. Edward F. Aymond, Jr. Amateur Day Committee Chairman, has to say:



THE 500 WATT Completely Bandswitching GLOBE KING

Here's an advanced design, high power transmitter of 500 watts input on both CW and fone 100% modulated. Is completely bandswitching 10 thru 160M. bands. Consists of FR, Speech Modulator and Dual Power Supply Sections. Entire unit is specially screened for TVI. Pi Network output matches any antenna from 52-600 ohms. Has provisions for VFO and Single Sideband input. Forced air-cooled 4-250 tube, push-to-talk, special aluminum mesh screening of RF Section — just a few of the many fine features. Enclosed in grey hammertone cabinet, 31" x 21¾" x 15".

ONLY $36.78 per mo.

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W5UHV

". . . was operated on 14.228 mc for 16 days continuous from 10:00 a.m. till 10:00 p.m. Some 200 different amateurs used this transmitter and not once . . . did we have any trouble whatsoever.

". . . no interference either on the video or the sound as a result of the Globe King being operated in this close proximity (3 feet) to (two) television sets. During the operation at the Fair, 41 states were contacted, 5 of the Canadian Districts, Alaska, Hawaiian Islands, Canal Zone, Cuba, Nicaraqua, Honduras, Peru, and Columbia. All operation was via phone.

". . . we were more than pleased with this operation and wish this transmitter had belonged to one of us personally"

and . . .

Dan Hoover (W9VEY) of Hillsboro, Illinois says, "It sure is a wonderful rig. QRM just melts and backs off to either side."

In the words of George H. Cooke (W2LOP) of 25 Cottler Ave., Springfield, N. J.: ". . . there is absolutely no intereference on our own TV set . . . Needless to say I'm very well satisfied with my purchase."

And from Don Smith, La Junta, Colorado,: "I think you have topped the field . . . I congratulate World Radio Labs for really turning out a FB rig!!! . . . The modulation reports I get are 'The best sounding rig on the band OM what are you running?' "

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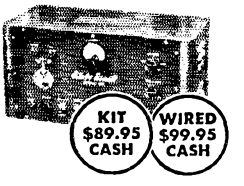
65 WATT GLOBE SCOUT

Completely Bandswitching

This excellent Xmttr. offers 65 watts input on CW, 50 watts on fone. Is completely bandswitching 10 thru 160M. Combination Pi Network antenna tuner. 100% modulation of Final. Housed in 8" x 16" x 8" grey cabinet.



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the air and is gunning for the elusive DX. MJ is working 21-Mc., 'phone with fair results. LW has acquired an AT-1 transmitter and has plans for some modifications. Traffic: VE6HM 130, OD 17, MJ 6, WC 6, AL 3.

BRITISH COLUMBIA — SCM, Peter McIntyre, VE7JT — You didn't see anything in your *QST* column for January since "you no write, me no type." The hams at Dawson Creek are in full swing with emergency work in conjunction with the c.d. and the RCMP and the fellows at Kelowna were there with mobile and emergency gear when a hunter was lost in the mountains. Welcome to two new ECs, ADV in District 6, and AHJ, of Terrace, in District 14. District 2 on Vancouver Island now boasts 8 mobiles, namely ALL, BF, US, GP, DH, AOG, ACC, and PN. ASR, as RN7 manager, reports little activity because of poor band conditions. Congrats to AAH and his XYL on the birth of a jr. operator. Congrats to AUF and AQW and QC, who have been carrying the load on the AREC Net during the poor band conditions. If any VE5s or VE6s read this section we would appreciate their coöperation on 3755 kc. at AREC Net time. We know the frequency is not exclusively ours but think of all the free channels open during our hour of net time. We respect their net frequency of 3765 kc. so give a listen, fellows, before you start testing and bellowing. I hear the BCERARC is cooking up some new secret weapons for Field Day, including a new call, so be prepared. Traffic: VE7QC 55, ASR 23, DH 19, ZV 2.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — ADVANCE NOTICE — The Saskatchewan Hamfest will be held at Saskatoon on July 1st week end. Plan now to attend. Get your gear in shape for the various events. Bring the family. More information will come. LJ and 6KZ/5 are active at Biggar. HJ is working in Edmonton for the winter. EO has a new NC-88 and is going to the U. S. A. for a new transmitter. YF is busy organizing hamfest details. WC visited the Saskatoon Club and attended its annual party. BD keeps 40-meter c.w. active during his spare time. MK is looking for Baker Lake contacts. FG has his 'scope working now and watches your signals. OB gets little time for ham radio: he is spending his spare time keeping CFQC-TV on the air. Reports have been very lean, fellows. Let's have some news so this column can be written. Officers of the Moose Jaw Club include AV, pres.; OM, vice-pres.; KG, treas.; and MG, secy. Traffic: (Jan.) VE5CW 39, MX 13, DS 7, HR 7, FG 6, CI 4, BF 2, GX 2. (Dec.) VE5CW 66.

Jest Test

Anyone can become a radio amateur provided he or she has a/an

1. High *Q* of 100 or better
2. Aunt Enna to finance the rig
3. Code in the head
4. Key to the exam answers

Which person would most likely short-circuit a final tank?

1. Millie Ampere
2. Mr. D.C. Watts
3. Ol' Man Mhos
4. Mr. Gilbert Maxwell

Which of the following would constitute an excellent spot for a DX man?

1. A magnetic domain
2. An old peoples' ohm
3. A bandspread in Texas
4. A bus bar

Why is the average ham always broke?

1. His current expenses are high
2. His earning potential is low
3. His sales resistance is poor
4. He spends money to save phase

Medical history was made when Dr. Ima Ham discovered the surest cure for DX-itis to be a

1. Series of shocks in a cornfield
2. Penny behind the fuse
3. Magnetostriction straitjackets
4. Bolt of lightning down an untuned line

What device will eliminate flies and mosquitoes in a hamshack?

1. A parasitic suppressor
2. A fly-back transformer
3. A screen dissipation network
4. A trigger circuit

— *Charles A. Wilson, W9SCD*

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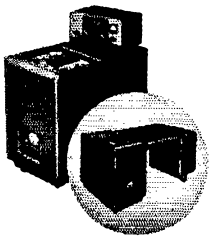
JOHNSON VIKING KW POWER AMPLIFIER



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SW54	$ 49.95
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HR060 complete	549.50
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Thordarson 100W. transmitter, (C.W.)	$ 75.00
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Eldico modulator for TR75	50.00
S40B, perfect condition	100.00
Gonset Super Six	45.00
Morrow 3BR1	50.00
S76 Hallicrafter, new condition	175.00
SX71 Hallicrafter	150.00
Meissner DeLuxe Signal Shifter	35.00
2 Web 10 meter transmitters ea.	25.00
National SW54	35.00
Gonset 3026 Communicator	175.00
Hallicrafter SX62, like new	295.00
Elmac AF67, like new	145.00
Eldico TR75TV	60.00
Eldico Modulator	60.00
Hallicrafter SX62, no speaker	200.00
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SRT120 Sonar (Wired)	168.72
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32V3 Collins (Transmitter)	697.50
AF67 ELMAC (Transmitter)	159.30
PMR6A ELMAC (Receiver)	121.05

Folded dipole amateur antennas 300 ohm (kilowatt cable) each cut to band length 75 ft. lead-in.

10 meter 28 mc, 20 ft.	$3.00
20 meter 14 mc, 36 ft.	4.50
40 meter 7 mc, 68 ft.	5.85
80 meter 3.5 mc, 134	8.45

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Again by popular demand
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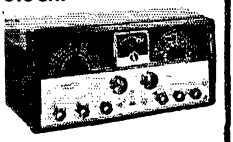
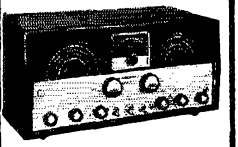


SX96 .....$249.50
Speaker..... 19.95



SX99 .....$149.50
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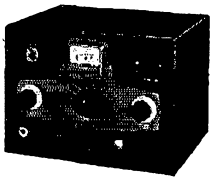

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Symbols

(*Continued from page 17*)

zigzag symbol for inductance so that it could be used for resistance and the communication workers gave up the parallel lines for capacitance so it could be retained as a contact symbol.

Obviously, the power engineers could not immediately use the zigzag symbol for resistance because it already meant an inductance to them; so the two existing symbols for resistance had to be retained.

The communication inductance symbol is complicated and therefore expensive to draw with a drafting guide, and the small loops tend to fill with ink when a diagram is reduced to small size. The simpler form that omits these loops was accepted as a more practical alternative symbol.

Both groups gave up their capacitance symbols because the communication version was too much like the power open contacts and the power symbol had the same drafting and reduction faults as the communication inductance. There was considerable unhappiness over the compromise symbol that uses one curved and one straight line but it was the best that was thought of at the time, or since then.

Agreement could not be reached on a single symbol for electric contacts because the power group must have a very clear distinction between open and closed contacts and the communication group must be able to show a large number of contacts in a single compact assembly as is often required in telephone work. Both existing symbols were therefore retained.

Acceptance of the idea that we are using symbols, rather than pictograms of actual pieces of equipment, means that there need be no top or bottom for a symbol as there might be for a picture. Thus, a ground symbol may point toward the top or side of the drawing and the same is true of an antenna symbol, which might point toward the bottom of the sheet.

Capacitance and Capacitors

If you have stumbled over "capacitance" because you are accustomed to "capacity," please note that the unfamiliar form was used with malice aforethought. This is one technical matter in which the amateur has not been showing the way to the professional.

There are three basic elements: resistance, inductance, and capacitance; and they are provided by resistors, inductors, and capacitors.

Strictly speaking, capacity is the ability of a device to do work, and we should speak of the capacity of a vacuum tube as being so many watts. Its interelectrode capacitance will, of course, be stated in micromicrofarads or picofarads, which are the same things.

A condenser, again strictly speaking, is a device used with steam engines to condense the exhaust steam into hot water that is pumped back into the boiler. This saves fuel in heating

(*Continued on page 126*)

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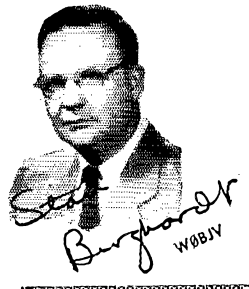
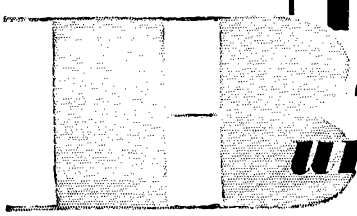
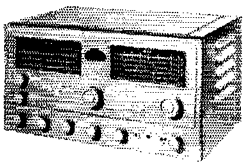


Satisfaction Guaranteed or your money refunded after 10 day trial.

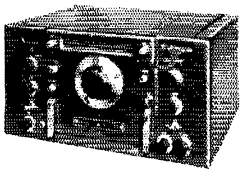




NATIONAL NC98—Complete with crystal filter and an S meter! Now you can take your choice of electrical band spread calibrated for either SWL or amateur bands. Edge-lighted dial scales—noise limiter and separate high frequency oscillator. Provision for narrow band adapter. Full 550 kc to 40 mc coverage. $8.12 per month for 18 months.

ONLY **$14.95** Down

Matching speaker **$11.00**



NATIONAL HRO-SIXTY—Dual conversion—plug-in coil units supplied—covers 1.7 to 30 mc; band spread on 80, 40, 20, 11–10 meters. Provides virtually image-free reception. Excellent selectivity; high sensitivity; top mechanical and electrical stability. Two RF stages; ANL with threshold control; S meter; provision for crystal calibrated and NBFM adapter. $29.15 per month for 18 months.

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HRO-60XCU-2 Crystal Calibrator **$27.50**

NFM 83-60 . . . . . **$26.75**

NATIONAL NC-183D—540 to 31 mc and 47 to 55 mc in 5 ranges. Dual conversion—a superb performer even under the most severe receiving conditions. Excellent selectivity, sensitivity, and stability. Calibrated electrical band spread for 80–75, 40, 20, 15, 11–10 and 6 meter amateur bands. Three IF stages; 16 tuned circuits—an outstanding receiver. $21.77 per month for 18 months.

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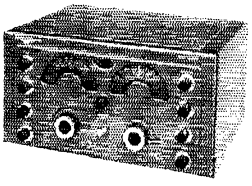

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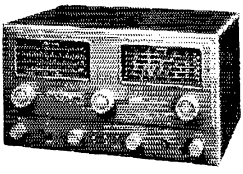
NATIONAL NARROW-BAND FM ADAPTER NFM 83-60 Plugs into socket provided **$26.75**



NATIONAL NC-88—Top NATIONAL performance in a moderate cost receiver. Smooth operating—perfect for novices, SWL's, or the experienced amateur. 540 kc to 40 mc in 4 ranges for reception of: amateur bands from 160 to 10 meters, standard broadcast, police, aircraft, maritime, and other services. Jack provided for crystal phono pick-up. $9.87 per month for 12 months.

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NATIONAL SW-54—A smart, xtra-compact communications receiver. Excellent for the short wave listener or beginning amateur. Top DX getter! Provides selective and sensitive reception equal to many higher priced units. Covers 540 kc to 30 mc for standard AM broadcasts, police, foreign and domestic short wave, maritime, aircraft, and amateur reception. $7.72 per month for 6 months.

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fresh water and reduces the amount of salt that gets into the boiler and causes corrosion. The electric device does not condense electricity but stores energy in the form of an electric field in a dielectric. Correspondingly, an inductor stores energy in a magnetic field.

Now, by drawing your attention to the page of preferred standard symbols that will hereafter be used in *QST*, this pedagogical character will gain that necessary interval of inattention in which he may silently close his typewriter and be gone.

6360 Dual Tetrode on 220 Mc.

(Continued from page 22)

form in the interest of simplicity. The actual connections for the power leads should be as shown in the main diagram, Fig. 1. The modulated plate voltage is brought in to Pin 6 on P_1. A screen-current meter, or a jumper, should be

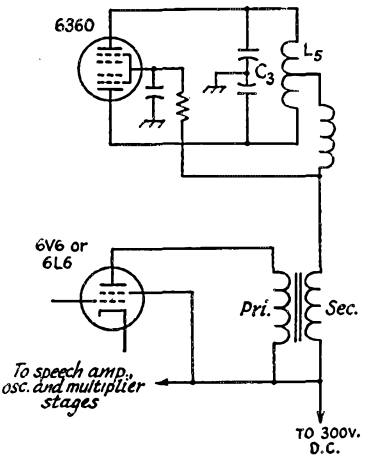

Fig. 3 — Simplified diagram showing how a modulator is connected to the final stage.

connected between Pins 6 and 7, and a plate meter or jumper between Pins 6 and 8.

A modulator of simple design that can be adapted readily to use with this transmitter was shown in *QST* for December, 1954, page 29. A 6L6 can be substituted for the 6V6GT shown in the original, if more audio power is required.

Power output at 300 volts is about 10 watts, which is enough to do interesting work on 220 Mc. if a good antenna system is used. Antenna ideas can be found in December, 1953, *QST*, or in any recent edition of either *The Radio Amateur's Handbook*, or the *ARRL Antenna Book*. The transmitter may also be used as a source of driving power for any of the larger dual tetrodes, such as the 6524, 6252, 5894 or 9903. The first two will take up to 50 watts input on 220 Mc., the latter two up to 100 watts or more.

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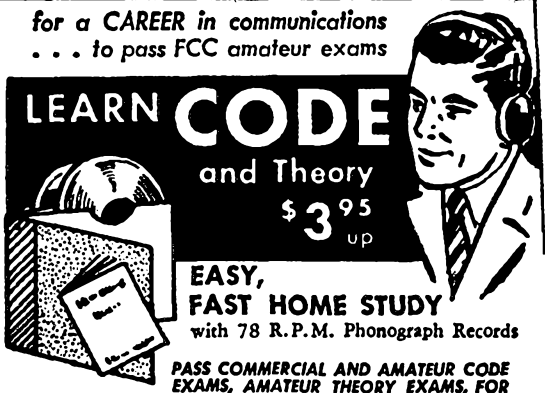

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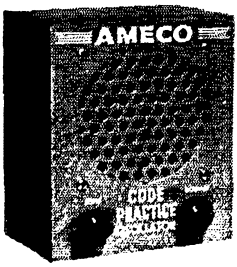

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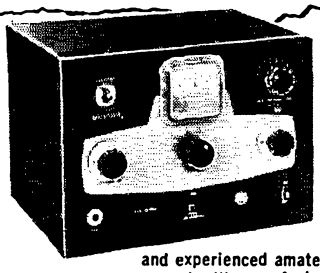

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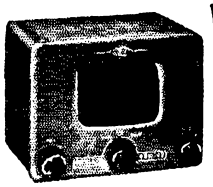

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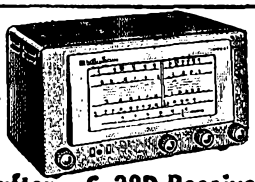

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Director Beams

(*Continued from page 24*)

center, and the position of the taps for the transmission line should be made carefully for minimum standing-wave ratio. Both adjustments can be carried out experimentally by means of a power-indicating standing-wave meter. A suitable balun is shown in Fig. 1.

One of the 12-element beams, Fig. 3, has No. 12 wire on 2-inch spreaders (for high power) for the phasing lines. Each line was made the same length, and tapped at the exact center, so that each pair of driven elements would be in phase. The whole system was then resonated with a single shorted stub approximately 40 inches long. The balun taps were about 5¼ inches up from the short in this case. The positions for the short and the taps were found by using a temporary stub about four feet long, sliding the shorting bar and the taps until maximum forward power and minimum reflected power were indicated on the s.w.r. meter.

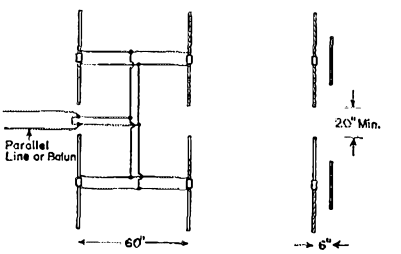

Fig. 3 — A 12-element array having a gain of 13 db. The entire system may be fed through a single tuning stub as shown.

A 6-element array for 222 Mc. has driven elements 20 inches long, with directors 25½ inches long of ¼-inch thin-walled brass tubing. End insulators of ¼-inch o.d. fiber bakelite mount in a 1⅛-inch square wooden boom 3½ feet long. The directors are 4 inches in front of the driven elements. The phasing line of TV ladder line is 40 inches, with a 26½-inch tuning stub at the center. When 300-ohm tubular-type line is employed it is tapped 2½ inches up from the short. Metal construction would have been satisfactory, but in view of the small size, wood was used.

The simple 6-element array of Fig. 2 offers good possibilities for portable operation. A gain of 10 db. or more over a car antenna of the same height (more if a few feet of mast is added) can mean a tremendous improvement on long-distance contacts. Either the 6- or the 12-element beam is light in weight and of low wind resistance and can be handled readily by one man. The horizontal directivity pattern is the same with both beams (when vertical polarization is used) but the gain of the 12-element array is increased by 3 db. because of the lowered vertical angle of radiation.

(*Continued on page 130*)

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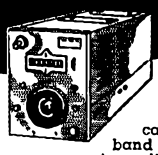
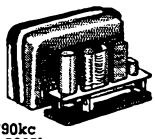
Page of Special Values



BC-746 Tuning Unit Close-out



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BC-459A. Same as above but brand new, orig. cartons.

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BC-457. Same as above but brand new, orig. cartons.

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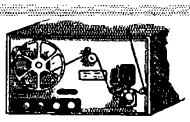

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"Tiny Tim"

(Continued from page 27)

be operated from a car using an 8-foot whip, properly loaded, worked against the car body as ground. I'm even thinking of trying it as aircraft mobile!

With this self-contained ham station you built yourself, you're ready for any emergency with a reliable, low-power c.w. station on 40 and 80 — and you can have plenty of fun with it from your home station, out in a boat, at the beach, climbing a mountain, or whatever.

I wish to acknowledge the helpful suggestions of the late Walter Bradley, W1FWH, of ARRL, and the assistance of my 11-year-old son, WN1BRS, in assembling the rig and manning the home station during tests.

I.F. Amplifier

(Continued from page 34)

The over-all bandwidth of the amplifier can be calculated from

$$\Delta f \cong k_c f_o \sqrt{2^{\frac{1}{n}} - 1}$$

where $m = \dfrac{\text{voltage at } \frac{\Delta f}{2} \text{ cycles off resonance}}{\text{voltage at resonance}}$,

n = number of identical stages.

For the bandwidth at 3 db. ($n = 3$),

$m = 0.707$,

$\Delta f = 112$ cycles.

The response curve of the complete amplifier is given in Fig. 6. The bandwidth is 220 cycles at 20 db. down and 1000 cycles at 100 db. down.

B.F.O.

In the unit constructed by the author, the b.f.o. inductor, L_7, has a Q of about 25. The coil

(Continued on page 132)

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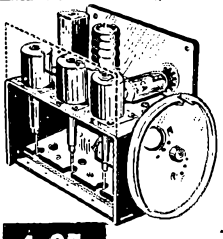

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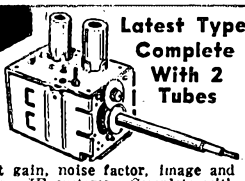

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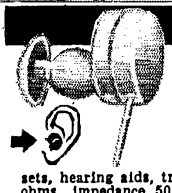

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was wound in the form of 3 pies on a 1-inch-diameter bakelite rod. Commercially-available chokes could be used and turns removed to give the right inductance value. For Qs much different than specified, some adjustment of the feed-back condensers C_2 and C_3 and the anode load resistance will be necessary. The oscillator was built in a 3 × 4 × 5-inch metal utility box with the tube mounted on one side. The cathode choke coil was pi-wound on a small form. This choke coil is, however, readily obtainable from commercial stock. The oscillator tunes from 20.4 to 23 kc. The low-frequency limit is set by the fixed bandset condenser.

Power Supply

Although an electronically-regulated power supply was used, it is not absolutely necessary. It does, however, provide a power source having a low output impedance at 20 kc., and thus lends to the over-all stability of the amplifier. The voltages are made available for use with external audio filters and clippers through an octal plug. It is convenient to be able to draw current from the power supply without upsetting the amplifier supply voltages.

5-Band Antenna Coupler

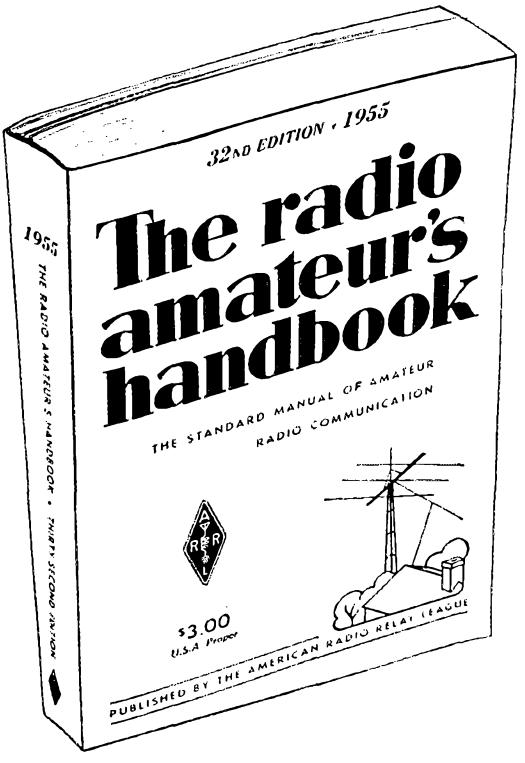
(Continued from page 40)

the feedline plus antenna, not feedline plus half the antenna.

In many instances it is more convenient to put up a Zepp antenna than a center-fed one. If, however, there is only room for a 66-foot antenna (half wavelength at 7 Mc.) and 80-meter operation is desired, the feeders can be tied together in the shack and connected to one of the antenna terminals of the coupler. If it will work with a parallel connection, fine; if it won't, a series connection can be tried, with the other antenna terminal of the coupler connected to ground. An antenna worked this way is a "random" length of wire, and consequently, the same tuning procedure applies to a piece of wire that is actually a random length and doesn't have any feedline. The trouble with antennas lacking a true feedline is that they are sometimes responsible for "r.f. around the shack," as evidenced by r.f. on microphones and cabinets.

Harmonics

One last bit of information worth passing along to the newcomer who may not know one of the values of using a coupler: As many amateurs have found to their sorrow, harmonics of their transmitted signal can get them into trouble with the FCC. The use of a link-coupled antenna coupler provides considerable attenuation of harmonics, usually enough to keep them from interfering with other services. And if one is experiencing TVI caused by harmonics, the coax link line between the transmitter and the coupler furnishes an ideal spot for the installation of a low-pass filter.



1955 EDITION

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Complete . . .

HIGHLIGHTS OF THE 1955 HANDBOOK:

The high-frequency chapter includes many new units incorporating such features as continuous (multiband) tuning units, pi-section tanks and clamp-tube protective circuits. V.h.f. material has been extensively changed to improve clarity and take advantage of techniques developed as a result of greater occupancy of this portion of the radio spectrum. The v.h.f. transmitter chapter includes equipment using tubes developed in the past year. The section on vacuum tubes and semiconductors has been enlarged to accommodate numerous new tubes, crystal diodes and transistors; a complete listing of electrostatic cathode-ray tubes forms a part of the tube tables. The 1955 edition is packed with information useful to the amateur and professional alike!

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How's DX?

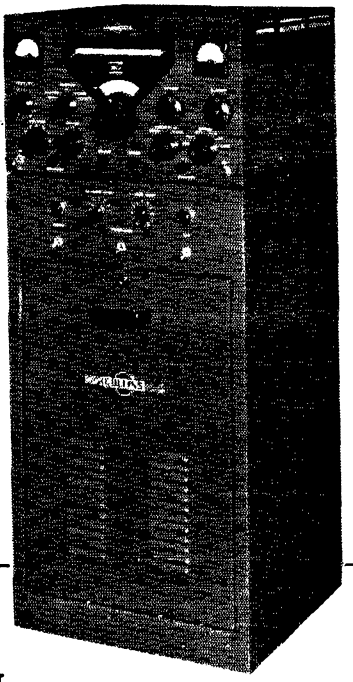
(Continued from page 69)

doubtful can things get!). ZC4FB further understands that there now are no private amateur stations permitted in Bulgaria; only club combos. Personal call signs are assigned but LZ1RF, the last private LZ installation operative, long has been QRT . . . . . K6EUV never quite made it to Gibraltar as ZB2N but John gave it a good try in late December and early January. Bogged-down transportation undid his plans after all other red tape laboriously had been severed. K6EUV, who had similar difficulties trying to get to St. Pierre a few years ago, advises all would-be DXpeditioners: "Make all possible investigation of transportation facilities. Also make allowance for 220-volt 50-cycle lines which are quite common outside North America. Take along many duplicate copies of your gear list to save time in placating hordes of customs officials. Have an ample supply of spare components, especially tubes, which you probably will find almost impossible to obtain in any rare-DX area." . . . . . W2JIL passes along WASP (Worked All Sicilian Provinces) details. Confirmations from five of these IT1 provinces are required: Agrigento, Caltanissetta, Catania, Enna, Messina, Palermo, Ragusa, Siracusa and Trapani. QSOs must be dated after July 1, 1952, and must be either all c.w. or all 'phone. The five pasteboards plus four IRCs should go to IT1TAI at Box 300, Palermo . . . . . DL4OR hit a brick wall in efforts to carry out his HV1OR intentions but still hasn't given up the idea.

South America — OA5G (ex-KR6LE-9BPR-W9FCJ, W6ZLH) is really roughing it in San Juan, 250 miles southeast of Lima. The nearest telephone is 50 miles away (and no prospects of TVI, either!) . . . . . W8GZ coördinated the efforts of many charitable U. S. amateurs who contributed toward outfitting FY7YE with an effective DX-band installation. Mario now pours out potent r.f. with his new TBS-50D and associated equipment . . . . . W4UEL paid a personal visit to widely-worked YV5FL where s.s.b. is the rage . . . . . VP8 notes via U.K.-bound ex-VP8AZ: VP8AQ QSYd from So. Orkneys to So. Shetlands. VP8BD (ex-VP8AK) holds forth from Port Lockroy, Grahamland. VP8BF radiates from So. Shetlands and so does VP8BH (Deception Isle). VP8BC works ZSs and Ws without much difficulty with his Falklands 7-Mc. 3-watter. VP8AZ barely managed to complete his WAS before closing down in late January; Mike also comments on the fine reception of W1AW's code practice and bulletins on 80 meters. South Sandwich hamming is nil with no prospects in sight, but South Georgia may see a new VP8 or two firing up shortly. VP8AY's first QSO from the Falklands was with W4YHD . . . . . W3AXT of *DXerama* fame points out that 7-Mc. c.w. candidates LUs 1XP 9YG and PY7RY represent very rare areas toward South American DX certificate awards.

Hereabouts — We regret to note the passing of inveterate DXers HC2JR and YS1RP. HC2JR's radiotelephone DX and DXpeditionary (Galapagos Isles) achievements are all the more remarkable in view of his confinement to a wheel chair for many years . . . . . Servicing of Navassa Light now is done out of Miami instead of San Juan, P.R. KP4KD reports that this change puts the quietus on KP4TF's anticipated KC4 lark . . . . . Huge joint meets of NCDXC-SCDXC and FRC-PVRC outfits livened up the wintry DX scene. Both affairs featured the appearances of various well-known DX personages and many yards of yarn were spun to the enjoyment and edification of all who attended . . . . . VP7NG, who has rolled up over 1400 QSOs with some 78 countries in just four months of Bahamas-style hamming, is coaching FG7XB on the finer points of the art. Glen also will provide Antoine with an ample stock of QSLs. VP7NG will remain on the air for another six months or so . . . . . Since November, 1945, KP4KD has knocked off different DX stations at a rate of slightly less than one a day — a 2912 total . . . . . First ticketed as 9AXS in '23, K6ENX has held numerous calls including Ws 3EHT 6NHC ØMWK and XU8MI. As XU8MI in Shanghai, 1939–1940, Otto's most memorable QSOs were with VP5PZ and W2BHW (now W8BHW) on 7 Mc. Now retired after 27 years of Navy service, K6ENX is hot on the DXCC trail . . . . . W1ATE, radiotelephone DX pundit in spades, becomes a Jersey W2 and doubtless will try his hand at a southern antenna plantation.

HARRISON HAS IT!



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3. **It's a complete KW transmitter!** VFO Exciter, VOX and push-talk control, blocked grid CW keying, regular AM, load matching output network, tubes, etc. are all included in the low, low total price of only $1,995. Just plug in and operate!

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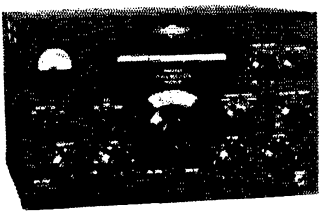

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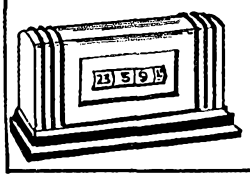

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Simulated Emergency Test

(Continued from page 64)

Newport Co., R. I. (W1JFF) [22,33]	106
Norfolk, Mass. (W1CLF) [27]	51
Norfolk, Va. (W4PAK) [18]	317
North Adams, Mass. (W1MKD) [28]	59
No. Baltimore, Md. (W3NAZ) [32]	——
Oak Ridge, Tenn. (W4SGI)	127
Onondaga Co., N. Y. (W2CYD) [33]	238
Orange Co., Calif. (W6DEY) [16]	201
Orange Co., Ind. (W9QYQ)	125
Ossining, N. Y. (W2PSH) [33]	72
Pinellas Co., Fla. [32]	——
Pipestone & Rock Cos., Minn. (WØKFN)	69
Pittsburg Co., Okla. (W5BGC) [6]	125
Pittsburgh, Pa. (W3OMA)	508
Polk & Haralson counties, Ga. (W4IMQ)	57
Pueblo, Colo. (WØNIT)	120
Queens Co., N. Y. (W2IAG)	135
Ramsey Co., Minn. (WØHKF)	220
Regina Area, Sask. (VE5CW)	112
Robeson Co., N. C. (W4SOD)	58
Rockingham Co., N. H. (W1CDX) [6]	99
St. Johns Co., Fla. (W4UHC) [6]	15
St. Joseph Co., Ind. (W9ZIB)	163
St. Louis, Mo. (WØRCE)	344
St. Louis Co., Minn. (WØEBX) [28]	93
San Fernando Valley, Calif., (W6HOW) [22]	122
San Francisco Section, Calif. (W6GGC) [32]	——
San Luis Valley, Colo., (WØKQD)	75
Sarasota Co., Fla. (W4LMT)	62
Schoharie Co., N. Y. (W2NAI)	96
Seneca Co., Ohio (W8WAB)	128
Sheboygan, Wis. (W9MYG) [33]	115
Springfield Area, Mo. (WØHUI)	136
Stark Co., Ohio (W8AL) [6]	163
Superior & Douglas Co., Wisc. (W9GUY) [33]	112
Tacoma, Wash. (W7RGD) [6]	79
Tompkins Co., N. Y. (W2QBZ)	——
Union Springs & vicinity, Ala. (W4PWS)	23
Vallejo, Calif. (W6ZZF)	62
Wabash River Basin, Ind. (W9TT) [33]	158
Waltham, Mass. (W1JSM) [22,33]	131
Wausau, Wis. (W9VHA) [25]	123
Weakley Co., Tenn. (W4FLW) [25]	37
Wheatland Co., Mont. (W7NPV)	108
Whittier, Calif. (W6LVQ) [13]	259
Wichita Falls, Texas (W5UUR) [29]	57
Winnebago Co., Ill. (W9CZB)	137
Winona & Houston counties, Minn. (WØLUX)	49
Winston-Salem & Forsyth Co., N. C. (W4TQU) [30]	256
Winthrop, Mass. (W1BB) [31,33]	227
Woodridge, N. J. (W2DMJ) [32]	——
Wyandot Co., Ohio (W8SPU)	20
Grand total for the nation	*18,369*

The following ECs reported that no SET was held: W1LKP (So. York Co., Me.); W3DUI (Luzerne Co., Pa.); W4CFV (Norton, Va.); W5LGY (Commerce, Texas); W5TGW (Lamb Co., Texas); W6JWD (Palo Alto, Calif.); W8OPU (Knox Co., Ohio); W9ZMU (Jo Daviess Co., Ill.). Give them credit for reporting, anyway. We should also mention that we received a message from W8DFC (EC, Princeton, W. Va.) indicating availabilities in his area. We have word from W8IPT that Montgomery Co., Ohio, participated in the SET, but nothing heard from the EC. Oregon SEC W7ESJ reports some SET activity in his section, although we have not heard direct from the ECs, except from W7ISP (listed above).

V.H.F. SS

(Continued from page 59)

Maine

W1TAM...216- 27- 4-AB
W1TJN....32- 8- 2-BC
WN1BBB...12- 6- 1-B

Eastern Massachusetts

W1ELP...1274- 91- 7-AB
W1NCO...868- 62- 7-B
W1JSM....830- 83- 5-B
W1VXW/1.800- 80- 5-B
W1YVB....696- 87- 4-B
W1JNX....584- 73- 4-B
W1AHE....540- 54- 5-B
W1LUW....520- 65- 4-AB
W1ZEN....400- 50- 4-B
W1DJ.....384- 32- 6-A
W1AGN/M
300- 30- 5-AB
W1SIV....300- 50- 3-B
W1PYM....294- 49- 3-B
W1AQE....264- 44- 3-B
W1NXY....252- 42- 3-B
W1QMN/1.246- 41- 3-B
W1LHV....240- 40- 3-B
W1ROC....240- 40- 3-B
W1IHL....222- 37- 3-B
WN1CGU...210- 35- 3-B
W1PEX....168- 28- 3-B
W1JYC....132- 17- 4-A
W1QIB....112- 14- 4-A
W1JCI.....110- 23- 2-B
W1PBM....104- 26- 2-B
W1YBT.....96- 16- 3-B
W1RDY.....84- 14- 3-A
W1YHM.....84- 21- 2-B
W1CTR.....48- 8- 3-B
W1QQW.....48- 12- 2-B
W1OMI.....40- 20- 1-B
W1TVK.....18- 9- 1-B
W1OOP (W1OOP, W6JWA)
1716-143- 6-ABCD
W1CBA (W1s BOA CBA ZCQ)....390- 65- 3-B
W1MHL (W1s VZR YTL, WN1DDN)
390- 65- 3-B
W1YIZ (W1s LJN YIZ)
240- 40- 3-B

Western Massachusetts

W1RFU..5668-218-13-AB
W2BVU/1.4764-199-12-AB
W1VNH..3410-155-11-ABCD
W1OBQ...1602- 89- 9-B
W1CJK...1092- 78- 7-B
WN1ZWL*
1078- 77- 7-B
W1RVW...840- 84- 5-AB
W1BXB...664- 83- 4-AB
W1NY....504- 63- 4-B
W1NLE...480- 60- 4-B
W1ESA...435- 47- 5-B
W1MNG...432- 72- 3-B
W1SWJ...408- 51- 4-B
W1CNS...368- 46- 4-B
W1TDO...330- 55- 3-B
W1RRX...312- 52- 3-B
W1JWV...280- 35- 4-B
W1TAY...264- 33- 4-B
W1KUE...240- 40- 3-B
W1EVZ...231- 39- 3-B
W1OY....208- 52- 2-B
W1PHU...204- 34- 3-B
WN1DHA/M
174- 29- 3-B
WN1ZXM..144- 24- 3-B
WN1CSF/1.116- 29- 2-B
W1WDW...84- 22- 2-B
W1BH....72- 18- 2-B
W1SRM....72- 18- 2-B
W1LPC....64- 16- 2-B
W1SQY....54- 9- 3-B
W1COD....52- 13- 2-B
W1ICY....48- 12- 2-A
W1OJV....24- 6- 2-B
W1MOK....10- 5- 1-B
W1VDE/1 (W1VDE, W3QKY)
1414-102- 7-B

New Hampshire

W1UIZ/1..5603-216-13-AB
W1AZK...1562- 71-11-AB
W1PDN...432- 27- 8-B
W1FZ....232- 29- 4-AB
W1WBM...102- 17- 3-AB
WN1CFL...28- 7- 2-B

Rhode Island

W1KCS...1302- 93- 7-AB
W1PXI....836- 53- 6-B
W1AJR....420- 35- 6-B
W1VDI....360- 45- 4-B
WN1CVF...222- 37- 3-B
W1UEF....120- 30- 2-B
WN1CPC...84- 21- 2-B

Vermont

W1MMN..368- 23- 8-B

NORTHWESTERN DIVISION

Oregon

W7INX[5]...156- 39- 2-AB
W7OKV[4]...156- 39- 2-BE
W7HBH....148- 37- 2-AB
W7NGW....144- 36- 2-AB
W7MTT....92- 23- 2-B
WN7WBA...88- 22- 2-B
WN7WQZ...48- 12- 2-B
W7BTF....44- 22- 1-B
W7SQP....38- 19- 1-B
W7JIP (W7s JIP OAY)
188- 47- 2-ABE

Washington

W7JHX....300- 50- 3-B
WN7WSP...188- 25- 2-B
W7NNR...104- 26- 2-B
W7LMZ....74- 37- 1-B
W7QKE....68- 34- 1-B
WN7VVB...68- 34- 1-B
W7AXS.....46- 23- 1-ABC
W7KO.....44- 22- 1-AB
W7PVZ (W7s POP PVZ RKS, WN7s VXR WGG YCN)....78- 39- 1-B
W7IYV (W7s GRM LCS)
38- 19- 1-B

PACIFIC DIVISION

Nevada

W7JU.....12- 3- 2-B

Santa Clara Valley

W6SAW..1140-114- 5-B
W6RQG...440- 45- 5-B
KN6HYW/6
360- 45- 4-B
W6ZBS....224- 28- 4-B
W6UW[6].....78- 13- 3-B

East Bay

K6ERR....940- 94- 5-B
W6UTX...450- 75- 3-B
W6SXK...432- 54- 4-B

San Francisco

W6AJF...510- 51- 5-ABD

Sacramento Valley

W6WFW...750- 75- 5-B
KN6HIT*..640- 64- 5-B
W6LSB....550- 55- 5-ABD
W6PIV....390- 39- 5-B
W6MIW...265- 27- 5-B
KN6HIK...260- 26- 5-B
KN6IYD/6.180- 30- 3-B
W6CIS.....4- 2- 1-B

San Joaquin Valley

W6OHQ/6.510- 51- 5-BD
W6GQZ....204- 34- 3-AB
W6EXH...120- 20- 3-AB

ROANOKE DIVISION

North Carolina

W4NHW....48- 24- 1-B
W4MRH....34- 17- 1-B
W4BUZ....32- 16- 1-B
W4CVQ....32- 16- 1-B
K4AMX....30- 15- 1-B
W4YSB....24- 12- 1-B
W4YLU....22- 11- 1-B
W4ACY....20- 10- 1-B
W4EKB....20- 10- 1-B
WN4EJU*..20- 10- 1-B
W4SMA....18- 9- 1-B
W4YJG....18- 9- 1-B
W4MDA....16- 8- 1-B
W4CPI....14- 7- 1-B
W4WDH....12- 6- 1-B
KN4AXF...12- 6- 1-B
KN4BJM...11- 6- 1-B
KN4AWL....8- 4- 1-B

Virginia

W4AO....3806-173-11-B
W4UBY...1862-133- 7-AB
W4DWU..1212-101- 6-B
W4JCJ....984- 82- 4-B
W4UMF...524- 66- 4-ABC
KN4ARV..228- 38- 3-B
W1BJS/4...156- 39- 2-B
W4RL.....150- 25- 3-AB
W6LON/4.108- 27- 2-B
W4APQ/4 (W4APQ, WN4EMN)
352- 44- 4-B

(Continued on page 140)

West Virginia

W8EP	60	10	3-AB
W4SRD/8 (W4S JCJ SRD)	192	24	4-B

ROCKY MOUNTAIN DIVISION

Utah

W7QDJ	10	5	1-B

SOUTHEASTERN DIVISION

Alabama

W4LNG/4	28	7	2-B
W4LSQ	18	3	3-B
W4TKL	6	3	1-B

SOUTHWESTERN DIVISION

Los Angeles

W6WSQ	2100	210	5-B
K6ACF	1368	171	4-B
KN6GMV*	1304	163	4-B
KN6GHJ	500	125	2-B
W6LIT	492	82	3-B
W6MRH	420	105	2-AB
W6MMU	348	58	3-ABDE
K6CJQ	240	60	2-B
W6HZ	184	46	2-ABC
KN6HDO	28	14	1-B
K6BNV (K6s BNV CXF, KN6IDB)	66	22	1-B

WEST GULF DIVISION

Oklahoma

W5HGH[5]	36	9	2-B
W5HXK[5]	36	9	2-B
W5NDE	32	8	2-B
W5DFU	28	7	2-B
W5VKH	28	7	2-B
W5PZ	24	6	2-B
W5EGC	6	3	1-B

New Mexico

W5FAG	50	25	1-BD
W5FPB	48	24	1-B
W5WIY	44	22	1-B
W5CGE	42	21	1-B
W5ECS	42	21	1-B
W5YXM	40	20	1-B
WN5DFJ*	40	20	1-B
W5DED/5	36	18	1-B
W5UEO/5	32	16	1-B
W5HAG	28	14	1-B
W5DNK	24	12	1-B
W5FJE	22	11	1-B
W5WBA	22	11	1-B
W5EEM	20	10	1-B
W5FMM	20	10	1-B
WN5DJQ	20	10	1-B
W5CFJ	18	9	1-B
W5OIA	18	9	1-B
WN5IUE	12	6	1-B
W5NSJ	4	2	1-D

CANADIAN DIVISION

Ontario

VE3DIR	1104	92	6-B
VE3AIB	712	89	4-AB
VE3DNX	576	72	4-B
VE3BOW	312	52	3-AB
VE3ATB	140	35	2-AB
VE3DMQ	108	27	3-B
VE3UT	108	27	2-B
VE3DHG	96	24	2-B
VE3CAU	84	14	3-AB
VE3BWE	64	16	2-B
VE3OJ	56	14	2-AB
VE3PL	36	9	2-AB
VE3KM	18	9	1-B
VE3DRV	10	5	1-B

[1] W3VB, opr. [2] Two-way tie for Technician award. [3] W2JCI, opr. [4] W2TUK, opr. [5] Two-way tie for section award. [6] Hq. staff; not eligible for award. [7] W1QIS, opr. [8] K6BBD, opr.

Logs for checking purposes were also received from W1AGB, W1BJP, W1LMU, W1MGP, W2VKP, W3AHQ, W4MKJ, W6DEF and W6UCR. Thank you.

Silent Keys

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

W1KCJ, Luther J. Cahoon, West Dennis, Mass.
W1MEF, Howard A. Perrigo, Hamden, Conn.
W1UPZ, Helen M. Wright, Brookline, Mass.
W2JDS, Mathias L. Connes, New York, N. Y.
W3PBK, John J. Kelley, Philadelphia, Pa.
W3QXY, Leslie W. Mill, jr., Prompton, Pa.
W4HK, Henry L. Kitts, Knoxville, Tenn.
W4OB, Patrick H. Wall, Tampa, Fla.
W5DM, Cleo H. Vannoy, Denton, Texas
W6EQM, Walter W. Matney, Tujunga, Calif.
W6ILS, Mervyn W. Wessenberg, San Francisco, Calif.
W6PW, John L. Stevens, San Francisco, Calif.
W6ZYI, Ernest T. Oftedahl, San Francisco, Calif.
WN7WXA, Jack Kellogg, Walla Walla, Wash.
W8DMP, Ernest L. Nelson, Detroit, Mich.
W9CSQ, Herbert G. Crome, Chicago, Ill.
WØCWW, Charles A. Pine, Overland Park, Kan.
WØNGX, James E. Boswell, jr., Lebanon, Mo.
VE3AP, Arthur M. Ford, Ottawa
VE6JJ, John J. Nott, Medicine Hat, Alta.
F3RI, Louis Druet, Sarthe
F8YR, Gilbert Turrin, Vosges
VK5XO, Alex W. Kelly, Berri

World Above 50 Mc.

(Continued from page 62)

W5FPB, Albuquerque, N. Mex. — Totaling 1954 v.h.f activity shows 338 contacts with 45 different stations on 144 Mc., and 10 contacts with three stations on 432 Mc. With at least 45 stations available, there should be better attendance on weekly net meetings. All locals are asked to try to be active on 146.8 Mc. each Tuesday at 1930.

W6NDR, Napa, Calif. — W6LSC reports conversion of 522 to 220 Mc., using the new 6524 in the output stage. Delivers considerably more output than with 832A.

W7JHX, Port Orchard, Wash. — Built phase-modulation exciter described by W1VLH in August, 1954, *QST*, and f.m. adapter for receiver. Checks with W7UVH, Olympia, who also has one of the exciters, show excellent results in comparison with a.m. Activity in V.H.F. SS best ever, but some scores low because of polarization problem. Switch to horizontal getting under way in Puget Sound area.

W7JRG, Billings, Mont. — 50-Mc. band open to W6 for at least three hours Jan. 29th. Heard W6s BWG KQO ABN NLZ and ILW. Abandoning s.s.b. on 50 Mc. after two years because of lack of favorable results. Too many operators on 6 do not recognize s.s.b. for what it is, and therefore make no attempt to tune it in properly. Inserted carrier method inefficient. Will be back on with a.m. rig essentially the same power as used so successfully from Sheridan, Wyo., some years back.

W8WRN, Columbus, Ohio — New stations coming on 144 Mc. all the time. New activity in Zanesville reported by W8JWV, and in Chillicothe by W8CSN. Interest in 220 Mc. also improving, with W8LGI and W8WRN looking for skeds on that band.

W9DRN, Des Plaines, Ill. — Had first crystal-controlled QSO on 432 Mc. Jan. 31st. after completing crystal-controlled converter. Uses 6AN4 r.f. stage, 6AM4 grounded-grid mixer, 6BK7 50-Mc. i.f. amplifier, into S-36. Transmitter uses 4X150A doubler from 220-Mc. rig, with frequency of latter brought down to 216 Mc. Work W9AGM, Chicago, regularly. W9ZQT and W9EFD also on 432 Mc.

W9KQK, Elmhurst, Ill. — Experimenting with 6AJ, F, M, and N4 tubes on 1215 Mc.

WØQMF, Perryville, Mo. — WØs LMK DFK RUF RTO QMF, and W9s PMN and KH in process of organizing 2-meter net. Also experimenting with duplex operation.

Strays

When W5QNK broke in on W5FAO and W5RRL on 75 meters, it became a real Baptist pastor's conference. W5QNK is pastor of the First Baptist Church, Chelsea, Okla.; W5FAO is pastor of the First Baptist Church, Vernon, Tex.; and W5RRL is pastor of the East Paris Baptist Church, Paris, Tex.

—···—

When W6HSZ goes on the air, strange things happen to his bath tub. It seems that it resonates around 75 meters. Whenever he's on 'phone with his kw., the bather, if there is one at the time, gets the surprise of a lifetime! More than once his signals have been modulated by a feminine scream. He plans to let the BTI (bath tub interference) stay as is — too much fun! — *K6BSW*

YL News & Views

(Continued from page 55)

Keeping Up with the Girls

W1WPO of Hq. adds the call of W2FZO to the list of YLs who are DXCC, published in our February column; Ginger has 100 on 'phone. . . . Each YL who has a bona fide QSO with K2BBW's OM, W2QAI, receives a real mink's foot along with Dave's QSL. . . . The new QTH of the YLRL chairman of the Sixth district, W6WSV, Carol, is 6852 Claire Ave., Reseda, Calif. . . . SCM for Eastern Mass., W1ALP, reports two new Novices: WN1DQF, Alice Perry, and WN1DRP, Phyllis Smith, XYLs of *W1s* BB and UOC respectively. . . . The new call of ex-WØYHD, Jenny, is K6JCL. . . . K6EXV, Lucille, K6HJZ, Jessie, and W9LAS, Rose, are now General Class. . . . VE2HI, Ethel, is a director of the Montreal A.R.C. . . . W9OTM's marriage to W9ODS raised the number of hams in June's family to five — mother is W9OTO, dad is W9OWD, and brother is W9MEM. . . . W9QMA, Dot, announces the arrival of a new harmonic in December. . . . New officers of the Long Island unit of YLRL are KN2EBU, pres.; W2KAE, V.P.; K2CFF, Secy.-Treas.; *W2s* KDP, UXM and KN2JHQ, board members. . . . New officers of the N. Y. C. YLRL Club are: Pres., W2IQP (re-elected); W2IGA, V.P.; W2MVV, Secy., Helen Zuparn, Treas. . . . W6QYL, Martha, home from an extended stay in the hospital, is operating 75 'phone from her bedside. . . . OM W6SXK/MM, aboard the liner *Hawaiian Rancher*, in the Port of Los Angeles for one week, worked sufficient YLs (10) to earn his Lads & Lassies Certificate from the L.A. YLRC. . . . W9LOY, Cris, reports the acceptance of new LARK members: W8ATB, W9s KFC, LDK; WN9IWP; WØLHP. . . . K6ANG, Billie, was elected Secy.-Treas. of the L.A. Council of Radio Clubs. . . . W6NAZ, Lenore, is editing a new YLRL directory, which will contain pertinent information about all YLRL members. Copies will be ready for distribution in April, and may be obtained by sending one dollar per copy to W6DXI, Gladys Eastman, 735 Glen Ave., Glendale 6, Calif. . . . W6QPI, Betty Gillies, is general chairman of the Ninth Annual All-Woman Transcontinental Air Race to be held in July. W1UKR, Eunice, is general radio chairman, with W2JZX, Vi, assisting. W6NZP, Evelyn, is radio chairman for Long Beach, Calif. . . . We were sorry to learn of the passing of W1UPZ, Helen M. Wright, Brookline, Mass., in January. . . . On Feb. 12th, 75 YLs and OMs enjoyed the annual YL-OM Valentine dinner banquet sponsored by the L.A. YLRC. Guests included VE3TEW, Ethel, and OM VE3TW; W9YWH, Evelyn; OM VK2US and family; and ARRL Southwestern Division Director Joos. W6PJU, Mildred, presided. . . . W6LBO, Mary, reports the following chairmen and committee members, in addition to those already reported, for the first YLRL International Convention: decorations, W6MFP; finance, W6NZP; program, W6QGX; prizes, W6KYZ; Sunday picnic, W6WSV and K6EIA; housing, W6JZA and K6ANG; favors, W6QYL, W6DXI, K6GMX, KN6EJE.

HAMFEST CALENDAR

CONNECTICUT — The Tri-City Radio Council will hold its eleventh annual hamfest at the Crocker House, New London, on April 16th — attendance by advance reservation only, $3.75. R. Y. Chapman, W1QV, General Chairman.

MINNESOTA — The Southwestern Minnesota Radio Club will have a dinner and a program featuring talks and demonstrations on April 30th, 6:30 P.M., at the Minnesota Cafe and J. C. Hall, in Marshall.

NEW JERSEY — The tenth annual Old Timers' Nite Round-Up and Banquet, sponsored by the Delaware Valley Radio Association, April 23rd, in the grand ballroom of the Stacy-Trent Hotel, downtown Trenton. Dinner served *promptly* at 6:30 in the ballroom. Tickets by reservation only, $5.00. General Chairman, E. G. Raser, W2ZI.

PENNSYLVANIA — April 16, the Arcadia Cafe, 27 West Orange St., Lancaster, the 10th annual banquet of the Lancaster Radio Transmitting Society. Activities start at 2 P.M. with contests and entertainment for the OMs, YLs, and XYLs. Dinner at 6:30. Registrations are in advance and may be obtained from A. C. Jacoby, W3OY, 589 No. Plum St., Lancaster.

Electronic-Key Manipulator

(*Continued from page 35*)

ease of operating, while still simple and within the ability of the average amateur to build. The design arrived at is presented here, and after some experimenting with the completed key for the correct adjustment, this design has stood up for a couple of years now.

An Army surplus Model J-36 key is the basis for the key built here. When revamping this model Vibroplex the staff support structure was turned 180 degrees from its original position. Two new holes were drilled in the base to match the mounting holes. Two more holes were drilled at the opposite end to mount the posts for the dot and dash contacts. As a rule some ⅜-inch stock can be found in the shack and posts made as required. These two posts are insulated from the base and wires are connected to them. The third or common wire is connected at the mounting screw of the staff support structure. Be sure that the resistance checks at infinity on an ohmmeter or trouble may result in the time-constant circuits of the electronic key. The three wires are connected to a microphone plug.

The arm or reed is cut from a piece of duralumin. It is stiff and springy — the sort used in aircraft construction and obtainable from a war-surplus store. Do not use soft aluminum as it is too easily bent. A steel reed will be too heavy and will cause undue vibration, since the reed has to be highly damped; for the same reason, keep the weight to a minimum at both ends.

On the contact end a small hole is drilled to match the contact posts and a piece of silver or contact material is forced or wedged in and left extending a bit to ensure a good contact at the points. The hole for the staff is drilled a thousandth smaller and the staff is pressed in. If a drill press is available, the following is a method of assuring a good fit: Clamp the reed in the drill press vise and with a drill ten thousandths smaller than the finished hole drill with a fast speed and easy feed. Every ⅛ inch or so withdraw the drill and clean off the chips. Use a thread-cutting oil if possible. After the first hole is drilled, redrill with the finish drill. Leave the reed in the drill press vise and chuck the staff in the drill press; then press the staff in to the desired depth. A good hardware store will be glad to measure the staff with a micrometer and furnish drills of the right size. Also, while at the hardware store, buy a ⅛-inch center drill and use it to true up the tapered bearings of the

(*Continued on page 148*)

ORIGINAL VAARO MOBILE PRODUCTS NOW MADE BY DAVIS ELECTRONICS

ORIGINAL VARIABLE SINGLE UNIT COIL

For 75-40-20-15-11 and 10 METER BANDS. NOW IN THE 1955 DESIGN with the NEW, IMPROVED "DUAL CONTACT" between the coil windings to provide a greater, more positive, more efficient contact. Coil can be INSTANTLY TUNED to ANY DESIRED BAND or FREQUENCY by ingenious locking device. Factory pretuned. Continuous coverage from 3750 kcs. to 30,000 kcs. Highest "Q" available in an all-band coil. Fits all whips and bases.

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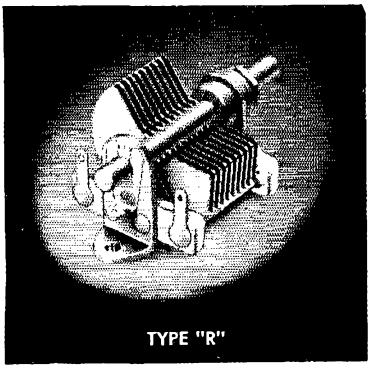

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support. Also true the staff bearing surfaces if worn. Sloppy motion must be kept to a minimum, because tolerances are close.

The springs which act against the reed were purchased in an auto parts store and although they are only about ⅛ inch in diameter they are very stiff and it is difficult to compress them between your fingers. Buy the stiffest spring possible in that size.

We are all different in our individual tastes, so thought has been given to meet as many fists as possible. The present design, I feel, will meet the requirements of a fast operator with a light touch. A slower operator or a person with a heavy hand who likes a lot of swing will need to move the two spring-supporting posts about ⅜ inch nearer the fulcrum of the key, as well as to use a spring of lighter tension. However, between the two positions and different springs I believe most conditions can be reached. The contacts as shown can be adjusted to a very few thousandths of an inch and the paddle only requires a whisper to move, but still the reed will center each time with no vibration.

The two adjusting screws near the paddle are there for the sole purpose of preventing damage to the reed from a person who has a heavy touch, or takes his wrath out on the bug instead of himself. As *QST* mentioned, adapt yourself to the bug and let it set the pace — you will never make it otherwise.

Correspondence

(*Continued from page 52*)

entitled *Historic Towns of the Connecticut River Valley*, published in 1906. I ventured no further than page 7 which discussed the five Indian tribes of the Connecticut Valley, one of which was the Podunk tribe situated at what is now East Hartford. A very enlightening discussion, I felt, and a very subtle explanation of the "Podunk Hollow Radio Club."

Hats off to all of you of the "Hollow" (despite your being in West Hartford) for your knowledge of Connecticut history — and to Gil for his portrayal of the club.

— *Jim Talbutt, WN8ZLD*

DX RCC

1223 Ninth Ave., South
Escanaba, Mich.

Editor, *QST*:

With regard to "Tips on Working DX" in the February issue, I should like to voice a small objection — in part. I realize that rare DX should be treated accordingly and all lengthy QSOs ought to be eliminated so that as many as possible may benefit from working the particular station.

However, in general, DX contacts can often contribute greatly to the amateur in many important ways if longer rag-chewing is made possible through favorable conditions, etc. The promotion of international goodwill and the exchange of common knowledge, operating and construction hints, everyday comment about topics of mutual interest, all provide one of the most rewarding aspects of amateur radio. Our DX contest is the time for the quickest QSOs, of course, and I am convinced that at other times, when possible, a more extended, friendly contact will be of great benefit to both parties concerned.

As a high-school instructor of social science, I have derived considerable value through the interchange of ideas and concepts through the medium of amateur radio, and lately have become very much aware of the possibilities on a truly international scale.

— *Donald W. Ickes, W8NSX*

(*Continued on page 150*)

NEW EXAM

East Main Street
Barnesville, Ohio

Editor, *QST*:

The following is suggested as a 1957 amateur license examination, if the present trend in FCC policy continues to its logical conclusion:

CODE: A dot plus a dash equals "A" ( ) Yes ( ) No
LAW: You must have a license before you transmit. ( ) Yes ( ) No
THEORY: Ohms and volts are different ( ) Yes ( ) No
PRACTICAL: Do you have $2500 to invest in a factory-built rig? ( ) Yes ( ) No
Do you intend to have an electrician install this rig? ( ) Yes ( ) No

If the answers to the above questions are "yes," what call do you want? Please give second choice.

— *Harold S. Davis, W8EOY*

NO RECIPROCITY

233 Appleton St.
Lowell, Mass.

Editor, *QST*:

Most of us hams eagerly devour a *QST* yarn spun by that Prince of Hamdom, the DX-peditioner, who, though the W pile-ups were rougher than a stucco bathtub, endeared himself more than somewhat to the DX fanciers among us by his generous provision of wall insulation.

If verbose, he will majestically expound on all subjects from how his rig loaded to the exotic native remedy for snakebite and how to obtain same.

Certainly though he will explain how he came to be there. Disregarding his personal problems and those of transport, we read that some beneficent foreign authority gave him permission to operate.

As we avidly read his tale does it occur to us that under our present ham regulations the turnabout which is fair play simply cannot occur? We find that, except in the case of Canadian hams, operation is barred to all but citizens.

Among us there must reside scores, if not hundreds, of responsible businessmen, students and scientists, whose keys are gathering rust because of these one-sided regulations. The "Passport Ham" suffers but these provisions handicap us also in negotiations for permission to fire up on foreign soil.

Contrary arguments based on "security reasons" are not valid as with proper screening our present leaky security net would not be enlarged in gauge.

"Send me your hungry, your stormtossed, your huddled masses, etc." does not seem to apply to the case of the visiting ham.

— *John L. Gilbo, W1SSZ*

QRP MOVEMENT

St. Bride's Presbytery
Cowdenbeath, Fifeshire
Scotland

Editor, *QST*:

I wonder if the ARRL would be prepared to initiate a QRP movement amongst hams. When we look at conditions on the ham bands today, it seems to me that it will only be by a return to (say) a maximum of 150 watts that order is going to be restored.

If some of the W stations had their QTH here in G-land and could listen to the 14-Mc. band when the DL4 stations are in full swing with their BC-610s and ET-4336s, they would see my point of view. To overcome these, some of the Continentals are jacking up their power, and the result is sheer bedlam. My present reaction is to trade in my equipment for a camera or butterfly-catching equipment since DX work is out of the question with high-powered DLs and high-powered (and often badly modulated) Continentals. What will happen if the 1-kw. transmitter ever becomes standard equipment. Well, my imagination boggles at the thought. When chasing the DX, could not such stations reduce power and thereby show some consideration for those whose power is limited by law?

To me, this tendency to increase power will eventually destroy the true amateur spirit. Instead of a real DXer, experimenting and building his own, in a few years' time he'll be forced to spend, e.g., $3850.00 for a 1-kw. transmitter and $1075.00 for his receiver. If he cannot afford to

(*Continued on page 152*)

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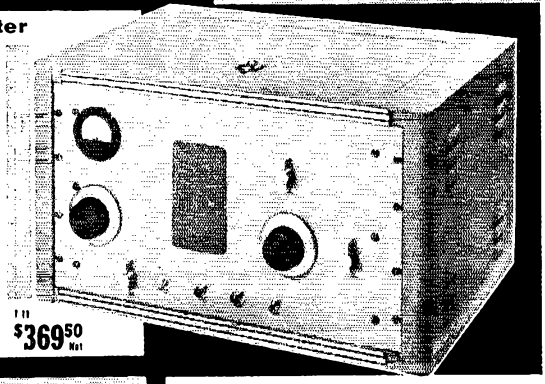

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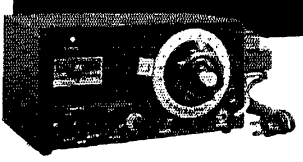

Today you have to look carefully to be sure a mobile whip is cut for a ham band. There are close to half a million commercial mobile rigs already licensed . . . with thousands added every month. Each one means folding money to the FCC-required maintenance man . . . quite often an amateur. That's why LAMPKIN METERS . . . with a 2nd class commercial ticket . . . can mean money to you!

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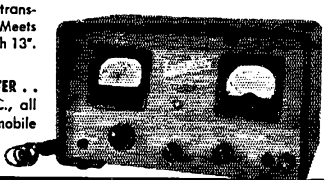

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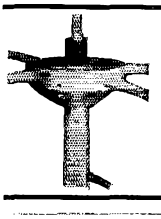

do so, he can kiss the DX good-by. And how many hams can afford to spend $5000 on their rigs?

Please do not think that this is an isolated opinion; there are many who think as I do. This opinion is not to be regarded as just another example of anti-American feeling in Britain.

— *Rev. S. J. Smith*

SWL REPORT

Union & Stony Point Rd.
Rochester 11, New York

Editor, *QST*:

Last year I received over 500 SWL cards. Other stations with greater operating hours have accumulated a greater total than this. I do not disapprove of this practice but wish to encourage the reporting in the right direction.

The average SWL, and future amateur, picks out easily readable signals within the popular 'phone bands and sends a card. The operator at the other end is well aware that he is getting out both through actual contacts and the deluge of SWL cards. Why doesn't the short-wave listener dig down under and pick out the weak signals? Likewise, as a potential amateur, he should spend time listening in the c.w. bands.

The low-power 'phone or c.w. station will appreciate that SWL card far more than one of the high-power boys and the chance of receiving a reply is far greater.

— *B. Kelley, W2ICE*

Receiver Hints for V.H.F.

(*Continued from page 37*)

approximate that of the bandspread dial. On most receivers this gadget is helpful for applications in addition to use with v.h.f. converters. It makes fishing for stations outside the ham bands more enjoyable, and it preserves the calibration of the general-coverage dial, which is upset if the bandspread dial is used as a vernier.

How badly a receiver needs such an accessory depends on several factors. One is the number of positions on the bandswitch; in other words how much frequency is covered on each tuning range. The small inexpensive receivers generally have four bands. They *require* the vernier mechanism. Some have five positions, but a fast tuning rate. They need it, too. Several medium-priced receivers have five positions and a good tuning rate. They benefit from the vernier drive, but they *can* be tuned accurately without it. The NC-173 and 183D are in this category. A few receivers have six bands. The HQ-140-X and SX-88 are two we've tried that tune quite well without vernier attachments. On Band 4 both receivers cover just a little more than 6 to 10 Mc. If the converter crystal frequencies are altered slightly from *Handbook* specifications, you have coverage of a band with a full sweep of the general-coverage dial.

Any planetary drive can be used. The National Velvet Vernier is one we've used several times. A mounting for the Type AM is shown in the second photograph. This gives the same tuning rate as the Croname type 599, but the latter has the advantage of permitting either direct drive or 5-to-1 reduction. The knob assembly supplied by the manufacturer can be used, but we prefer something larger. The lash-up shown in the first photograph was made by drilling out the center of a National HRT knob to pass the direct-drive portion of the 599 shaft. The knob on the vernier-drive shaft is a National type HRT-M. Many other combinations can be made up to take care of individual tastes or available parts stocks.

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 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, and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply. To expedite handling of your copy please state whether you are a member of ARRL.

(7) Because error is more easily avoided, it is requested 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.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 248 Madison Ave., New York City 16.

MOTOROLA used communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

SUBSCRIPTIONS. Radio publications. Latest Call Books, $3.50. Mrs. Earl Mead, Huntley, Montana.

WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9YIV, Troy, Ill.

WANTED: All types of aircraft radios, receivers and transmitters. Absolutely top prices. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

WANTED: Early wireless gear, books, magazines and catalogs. Send description and prices. W6GH, 1010 Monte Drive, Santa Barbara, Calif.

CODE slow? Try new method. Free particulars. Donald H. Rogers, Ivyland, Penna.

URGENTLY need AN/APR-4 items particularly tuning units for important defense contracts. New high prices. Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio.

WANTED: ART-13 transmitters. Write James S. Spivey, Inc., 4908 Hampden Lane, Washington 14, D. C.

OUTSTANDING ham list always. Our prices on trade-ins of all amateur brands are realistic and down to earth. We feature Johnson, National, Collins, Hallicrafters, Gonset, Elmac, Harvey-Wells, Morrow, Central Electronics and other leaders. We trade easy and offer our own time-payment plan tailored to fit you. All leading brands of new equipment always in stock. Write today for latest bulletin, Stan Burghardt, WØBJV, Burghardt Radio Supply, Inc., Box 41, Watertown, S. Dak.

DON'T Fail! Check yourself with an up-to-date, time-tested "Sure-check Test." Novice, $1.50; General, $1.75; Amateur Extra, $2.00. Amateur Radio, 1013 Seventh Ave., Worthington, Minn.

ANTENNA for bandswitching transmitters up to 300 watts input, approx. 120 feet long, centerfed with 75-ohm line, 70 feet included, low SWR, tunes 80–40–20–10 meter bands. U. S. Patent 2,535,298. Each one tested for resonance on all bands. Send stamp for details. $18.95 each. Lattin Radio Laboratories, 1431 Sweeney St., Owensboro, Ky.

NEED ART-13. R. Ritter, 4908 Hampden Lane, Bethesda, Maryland.

WANTED: Bargains in transmitters, receivers, laboratory and test equipment, also miscellaneous and unusual gear, etc. What have you? Please state price desired. Especially interested in husky power supplies, large filter chokes and condensers, etc. Also need plate transformers putting out about 4,000 V or more each side center. Harold Schonwald, W5ZZ, 718 North Broadway, Oklahoma City 2, Oklahoma.

FREE Bargain Bulletin. Visit store for thousands of unadvertised bargains. New BC610 tuning units TU-47, TU-48, TU-49, TU-50, TU-51, TU-52, $5.95 each. Surplus RG-8/U cable, 100 ft., $5.95; 250 ft., $13.25, 500 ft., $25.00. Selsyns, 110 volt size 5, $12.95 pr. 1000 Kc standard crystals, $2.95. Wanted: Surplus radio equipment, Navy synchros. Lectronic Research Laboratories, 719 Arch St., Phila., Penna.

WANT: Johnson rotator. Sell television receiver, $30. W4API, 1420 South Randolph St., Arlington, Va.

CASH for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmac, Gonset. Hallicrafters, Hammarlund, Johnson, Lysco, Master Mobile, Morrow, National and other ham gear. H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill.

QSLS?? SWLS?? Largest variety samples 25¢ (refunded). "Rus" Sakkers, W8DED, P. O. Box 218, Holland, Michigan.

QSTS: 280 issues — 1922–1950, $100, with covers. Stamp for list. Bud Gentry, W5VIM, 428 Maple, Richardson, Texas.

QSLS-SWLS Meade WØKXL, 1507 Central Avenue, Kansas City, Kans.

QSLS-SWLS. 100, $2.85 and up. Samples 10¢. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

QSLS, SWLS. America's Finest!!! Samples 10¢. C. Fritz, 1213 Briargate, Joliet, Ill.

QSLS, SWLS. Fair prices for excellent quality cards. Eleven styles for you to choose from. Samples, 10¢. Almar Printing Service, 423 Barker Bldg., Omaha, Nebraska.

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

QSLS-SWLS. Samples, free. Bartinoski, W1YHD, Williamstone, N. J.

QSLS. Samples free. Albertson, W4HUD, Box 322, High Point, N. C.

QSLS! Two colors, $2.00 hundred. Samples for stamp. Rosedale Press, Box 164, Asher Station, Little Rock, Ark.

QSLS "Brownie," W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSLS! Taprint, Union, Mississippi.

QSL-SWL cards, Sensational offer, Bristol stock 500 1 color $3.95, 2 color $4.95, 3 color $5.95. Super gloss $1.25 extra. Rainbow cards. Samples. QSL Press, Box 71, Passaic, N. J.

QSL samples. Dime, refunded. Roy Gale, W1BD, Waterford, Conn.

QSLS. Postcard brings samples. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere 51, Mass.

QSLS-SWLS, as low as $1.50 per color. Samples dime. Stronberg, P. O. Box 151, Highland Station, Springfield, Mass.

QSLS-SWLS, Samples 10¢. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

QSLS-SWLS, samples free. Backus, 5318 Walker Ave., Richmond, Va.

FLUORESCENT QSL-SWL cards. Samples 10¢. Kimball, 1545 Vine, Denver, Colorado.

QSLS. Nice designs. Samples. Beesparis, W3QCC, 207 S. Balliet St., Frackville, Pa.

QSLS! Exotic colors and designs; 2 days service. $3.85 for 100. Satisfaction guaranteed. Be surprised! Constantine Press, Bladensburg, Md.

FINE quality QSLs, 100, $2.75. Oscar Craig, Newark, Arkansas.

QSLS: 10% discount to back-logging eager beavers. 15 samples, "Super-Speed Specials," 10¢. Robinson, W9AYH, 12811 Sacramento, Blue Island, Ill.

QSLS-SWLS. Rainbows, Cartoons, others. Reasonable. Samples 10¢ (refunded). Joe Harms, W2JME, 225 Maple Ave., No. Plainfield, N. J.

QSLS. Distinctively different. Postpaid. Samples free. Dauphinee, K6JCN, Box 66009, Mar Vista 66, Calif.

DELUXE QSLs. M. Vincek, W2INT, 117 Center St., Clifton, N. J. Samples dime.

QSLS-SWLS: Varicolored. They're different! Samples 10¢. J. W. Snyder, W9HIU, 113 Harrison, Jeffersonville, Ind.

COMPLETELY different QSLS. Samples free. Harmon, WØIUB, 5019 Gramar, Wichita, Kans.

QSLS: 2-color, 150 $2.00. Samples 10¢. Bob Garra, Lehighton, Penna.

QSLS. Samples dime. Printer, Corwith, Iowa.

QSLS: New — Different — Samples 10¢. Graphic Crafts, Route 12, Ft. Wayne 8, Ind.

BEAUTIFUL QSLs. Samples 10¢, catalog 25¢. World Printing, 166 Barclay Ave., Clifton, N. J.

QSLS! Modern and futuristic designs. Samples 10¢. Tooker Press, Lakehurst, N. J.

LOS ANGELES Hams! For sale: 1 K.W. linear amplifier, AM, FM, SSB, c.w. custom-built. Only needs 10 watts drive. $600, Terms. Mr. W. P. Quinn, Dunkirk 3-5054.

SELL: Collins kilowatt modulation transformer, conservatively rated, $40, W6WZD.

MOBILE transmitter 80–40 M. xtal with Carter dynamotor, 400v. at 300 Ma. ATR inverter RSB input 6v. output 110 AC; 85 w. intermittent, $12.00 F.O.B. San Antonio 9, Texas. Johnston, Box 6703.

SELL: Vibrator power supplies, Model 2606 Hampack, 6VDC to 300VDC 100 Ma., $14; Heavy duty 5.6VDC to 420VDC 280 Ma., $25; 6VDC to 110VAC 50W, filtered, $17; combination 6VDC or 110VAC to 300VDC 100 Ma. and 6.3VAC, filtered, $22; 6VDC to 110VAC 100W maximum, filtered, $30. All commercially manufactured, in excellent condition. Miscellaneous other supplies. BC946 broadcast receiver with 110VAC supply, $25. F.o.b. St. Paul, Minn. WØBUO, Charlie Compton, 1011 Fairmount, St. Paul, Minn.

UHX-10 wanted. Advise condition, coils and price. W1KJG, Box 295, Morrisville, Vt.

SELL: 150-watt fone & c.w. HT-9 xmittr, antenna tuner, coax relay extra 866s and 814, low pass filter; no TVI, worked anything on the air, $250; 60 ft. aluminum 11" square tower, new prop-pitch motor 1 to 5 rpm. Hash-filtered, indicator control box, 110 v.a.c. op. Housing mount, extra selsyns, 10-meter Workshop (52 ohm cpl) beam, 20 meter VP beam, all parts but elements, $200; RME-45 Cal-O-Matic rcvr all new, Sprague 600V condensers installed, extra tubes; RME HF 20–15–10 meter converter. In excellent condx: $155. Cash and carry. Chet Angstadt, W3SNM, R. D. #3, Fleetwood, Penna. Phone Laureldale 9–0548.

FOR Sale: Hallic. S77-A rcvr, in gud condx, used 2 months, $80 cash. Write to KN2KHZ, Corsair, 53 Seymour Ave., Newark 8, N. J.

SWAP: Brand new Hq-140-X for HQ-129-X, plus cash. Reason: need the money. Best offer takes. K2BIB, 307 Richardson Drive, North Syracuse, N. Y.

HAM mobile xmittrs & recvrs, hi-fidelity equipment. Trade in your gear. Spera. 37-10, 33 St., L.I.C., N. Y.

TRADE U. S. stamp collection 90% mint catalog about $100 PM mounts Beardcraft album plus mint blocks singles, thousands used singles plus collection prewar Germany and Czech all for good receiver. All inquiries answered. W5DTJ, 535 Astor St., San Antonio, Texas.

WANTED: Broadcast coil sets E & F for HRO7. B. Wilenzick, 1608 Fairview, Monroe, La.

SELL: Mallory UHF converter, $10; Millen variarm VFO, $15; Millen exciter, $15; enclosed deluxe 21" rack, $8; 7 BVL coils, $6; 2 unused 4X150As, $25; power supply 1100/1000/500V 200 Ma. 450 volt 140 Ma., $15; 60 watt modulator $20; HQ-129-X, $130. Harold Gordon, W2RLG, 48 Main St. Little Ferry, N. J.

FOR Sale: QST, CQ, R9, Radio back issues. Write for list. Clifford Storch, 5 Winfield Terrace, Great Neck, L. I., N. Y.

ANTENNAS. Put a punch in your signal the cheap, easy way! Folded dipole, open wire construction, models for all bands, $4.95 up. For free brochure write to WØTJC, Dick Buchan, R. J. Buchan Co., P. O. Box 9, Bricelyn, Minn.

RECEIVERS repaired, aligned, by competent engineers, using factory standard instruments. Collins, Hallicrafters, Hammarlund, National. Our nineteenth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

VAN SICKLE has new models. Hallicrafters, National, Johnson and offers big trades. W9KJF, Gene Van Sickle, 1320 So. Calhoun St., Ft. Wayne 2, Ind.

BC221 AF, like new, for sale. WØMHN, 1801 Glen Moor, Denver 15, Colo.

MILLEN 90800 xmttr. Coils for 10, 20, 75. de-TVI'd, $30. Sams Photofact, volumes 1–10 with binders. Like new, $100. Wm. Gilley, W8VHS, 951 Mark Ave., Hamilton, Ohio.

XYL approved, the VS baby mobile antenna is beautifully chromed, only 4 ft. high. High Q, weatherproof plug-in miniature loading coils permit instant band changes. Top section resonates antenna to operating frequency. Becomes regular car whip when coil is removed. Perfect for 50-watt bandswitching transmitters. It's tiny but effective on all bands. Replaces regular cowl or fender broadcast whip. Easily installed in a few minutes. Coils available 75 thru 10 meters. With all mounting hardware and one coil, $12.95 ea. Specify band. Other coils, $2.75 ea. W6VS, Bill Davis, 225 Cambridge Ave., Berkeley 8, Calif.

2-METER aluminum Brownie beams, $22 and up. Write to H. W. Snyder, W3LMC, 4330 Glenmore Ave., Baltimore 6, Md.

SELL: Telrex 20-meter "Mini-Beam." Never unpacked. Make an offer. W5TBL, Joe Thomas, P.O. Box 504, Pickens, Miss.

SELL: HRO-7, in gud condx, 9 coils, pwr supply, matched spkr. All offers over $150 answered. WØJZP, Davis, 1506 Sunset St., Albert Lea, Minn.

SELL: Lysco Transmaster, Mod. 600; 35 watt VFO/xtal, TVI suppressed transmitter. Like new! Price: $90. Wanted: BC458. Arthur Crissey, W2KBD, Box 417, Sparta, N. J. Phone: Lake Mohawk 2141.

WILL Trade: Like new, RME-VHF152A, 2–6–10 meter converter, for Millen 90651 GDM also like new with 7 coils 1.5 to 300 Mc. G. H. Schmitz, W2MLQ, 17 Butler St., Pompton Lakes, N. J.

WANTED: Standard cabinet, about 26 inch panel space. 1250 VDC, 500 Ma. power supply; 150–200 watt MultiMatch mod. xfrmr or complete modulator. Jack Calhoun, 301 Washington St., Camden, Tennessee.

GOING SSB? Buy an L A 400 linear amplifier. See your distributor or write to P & H Electronics, 5 North Earl Ave., Lafayette, Indiana. Briefly, you get 75–40–20 meter operation at medium power in a compact cabinet, complete with power supply, for the low price of $169.95.

SUPER-PRO SP200-X with matching speaker for sale. In excellent condition; will sell for $145, or best offer. Want 75A-1 or HRO-50. Dave Smith, K2CHS/1, The Choate School, Wallingford, Conn.

FOR Sale: Viking II, SX42, JT30 mike, Heathkit VFO, all in excellent condx. First $485 takes all. Wesley H. Wiley, Box 181, 69th Bomb Sqdn, Loring AFB, Me.

FOR Sale: BC312M, unconverted, never used, $75; RCA amplifier, new condx, best offer takes; HT6, never used. Ham went into service: $100; QSTs 1-Dec. 1932, 1-1939; 1940–1946, gun in new condx, best offer; 90 Ma. Vibrapack, Hvy duty xfrmr, 75 watts, 110 v., 60 cycle. Mrs. J. Jacobs. KN2KBQ, 621 East 105th St., Brooklyn 36, N. Y.

5 IN. Panoramic adaptor, $45; VHF152A with 7 Mc. rec, $50; Bud VFO 21 (one set of coils) $15. Paul Schmidt, W9WFH, 9736 Reeves Ct., Franklin Park, Ill.

LYSCO 600 and Model 12 tuner, used 12 hours, and not tampered with for sale, $70. Cash and carry deal. John Moran, 90 Barrister Rd., Levittown, L. I., N. Y. LE 3-2967.

ROTARY Switch wanted from otherwise defunct Weston 665 analyzer. Donald Cameron, 1619 Milburn, Toledo, Ohio.

SELL: Proved excellent Novice transmitter. Bandswitching 75 watts on 40 and 80 shielded and filtered against TVI. 52 ohm coax output through Eldico lowpass filter, $55. W5CLK, 661 Lucas Drive, Beaumont, Texas.

600 Watt Deluxe transmitter, all band with HT-18 VFO microphone De-TVI'd. Many extras. Write to VE3AUJ, 511 Peel St., Woodstock, Ont., Can.

SELL: BC-342N & RA-20 power supply, $55; BC-348-L converted to 110 AC, $50; Lysco Transmaster Mod. 600, TVI suppressed, VFO, 35 watts, 160 thru 10 meters, $90. Ray Haeusler, W8IJS, 1005 Litchfield, Bay City, Mich.

SELL: Vibroplex original DeLuxe and case, absolutely new, $20. Cost $28. W6QEO.

REAL Bargains: New and reconditioned Collins, National, Hallicrafters, Hammarlund, Johnson, Elmac, Barker & Williamson, Gonset, Morrow, Babcock, RME, Harvey-Wells, Millen, Meissner, Lysco, Sonar, Central Electronics, all others. Reconditioned S40A, $69; S40B, $79; S76 $129; SX71, $159; NC57, $59; NC98, $119; NC125, $129; HRO60, $389; HQ-129-X, $169; SP400X, $259; 32V1, $345; 32V2, $445; 75A2, 75A3, Viking I, Viking II, Viking Ranger, HT9, NC183D, many others cheap. Shipped on approval. Easy terms. Satisfaction guaranteed. Write for free list. Henry Radio, Butler, Mo.

SELL-Trade: 5 complete 30-watt Novice xmttrs, like new, $25 each; 5 phono and mike amplifiers, like new, 10–20 watts, $15 each; 4 supplies: 600V, 700V, 800V, 1000V, all 300 Ma.; 4 Johnson dual kilowatt variable condensers, No. 200DD45; 6V dynomotor, 275V, 100 Ma., $5; 30 amp. battery charger, $20. Need: Receiver, grid-dipper, Or?? W8QKU, 2748 Meade St., Detroit 12, Mich.

HALLICRAFTERS SX-71 receiver, $135; Pentron 9T3 tape recorder, $65; both in excellent condition. Philip Schwebler, Jr., W2ZHE, Alcove, N. Y.

NY-NJ Hams! Selling out! Kilowatt parts, including matched xfrmrs, meters, relays, B&W rf components, much more. Perfect condition. Net value $500. Sacrifice for $175. W2GOQ. Phone NYC TO 7-3496.

SALE: Eldico TR1TV, 300 watts, phone/c.w. wired, month old xmttr, $300 F.o.b. Bryan, Ohio. Delmer Carlin, 402 E. Perry, Bryan, Ohio.

HUNDREDS of ham parts, your own price. Selenium rectifiers, 50¢; 3' rubber covered leads; clip one end, lug other end — 25¢. Also some QSTs, W8BSS.

FOR Sale: HRO 60 with coils A, B, C, D. Like new, in original carton: $400. R. E. Ridenour, 839 Wildwood Parkway, Balto 29, Md.

BARGAINS: With new guarantee: R-9er, $12.50; S-72, $59.50; SW-54, $35; S-38C, $35.00; S-40B, $79.00; Lysco 600S, $139.00; S-27, $99.00; S-38, $29.00; S-76, $149.00; SX-71, $179.00; SR-75 Novice transceiver $49.50; SX-42 $189.00; HRO-50 $275.00; Heath AT-1 $27.50; HT-17, $32.50; EX Shifter $49.00; Globe Trotter $49.50; Harvey Wells DeLuxe $79.00; Viking I $209.50, Viking II $259.00; New SS-75, $189.00; early HT-9 $139.00; Globe King 400B, $359.00; 32V1, $395.00; 32V2, $450.00; 32V3 $550.00. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

SELL: 1 Model X7018 Sylvania modulation meter and monitor. In A-1 shape, $20.00. VE5AY, Box 128, Lancer, Sask., Canada.

FOR Sale: SX-71 receiver, in good condx. Best offer over $130. F.o.b. James Kuiper, 521 Walnut St., Ann Arbor, Michigan.

G3IDG wants CQ January, March, April, June, November, December 1945; May 1946. Radio before 1936. R/9 before April 1935; QSTs before 1924. Copy of "Calling CQ" (deSoto). 95, Ramsden Road, London, S. W. 12 England.

SELL: National NC240D with speaker, $150.00. Looks like new. W9ZDS. James H. Buck, RFD 8, Ft. Wayne, Indiana.

WANTED: Single button Universal carbon Handi-Mikes, Mod. 200A. Any condition, good or bad, working or not. W1BB.

THORDARSON T15R61 Multivolt transformer 100 watts, 110 v. input, 5 v. 3 A. fil winding, plus 275–250–225–200–175–150 V. each side of center tap, $5.00; Kenyon S12851 fil. xfrmr 110 input; sec. 2 coils, ea. 7.5 V. CT at 15 amps, $8; UTC mod. xfrmr 500 watts, 1 Mp. ratio 2.25 to 1. (ex. pr 806s) by a pr. 806s) $25; UTC LS48 driver xfrmr p.p. (845s to 204 or 849 grids, Pri. 1 M.p. 1000 to 2000 ohms) $10; RCA A66 modulation monitor, $85; variable condenser split stator cap. per sec. 103 μμf, 11,000 — .350 air gap Johnson #100CD-110, $10; audio reactor T44160 15 hy. ½ amp. $10; UTC PA 238AX Varimatch drv xfrmr primary, $5; 116 Mc coax ant. (heavy duty, new) $20. Write for complete list. Prices F.o.b. W4EKI, Bob Goodman, 2131 Woodford Pl., Louisville, Ky.

MOTOROLA FM receiver, transmitter 147.3 Mc. with xtals. Converted to 110 VAC, $90. W8BYB, 12947 Woodbine, Detroit 39, Mich.

N. R. M. Wholesale Radio, 286 Teaneck Rd., Ridgefield Park, New Jersey. HU 7–0715, for National, Gonset, B & W, Bliley, Johnson, ICA, Eldico, Elmac, ARRL publications. Relays, Dow, Peterson xtals. Mail order also.

2 Meter beams; 6 element, horizontal or vertical, all seamless aluminum. $6.95 prepaid. Wholesale Supply Co., Lunenburg, Mass.

FOR Sale: SX24 Skyrider Hallicrafters rcvr 66" transmitter cabinet, large KW power transformer, large KW choke. Several smaller. Practically complete to assemble amateur station. Condenser, tubes, coils, etc. Bought for hospitalized veteran and not used. Will inventory five or six hundred dollars. Write for inventory. D. Thursdale, WØGFR, 1610 E. 11th St., Hibbing, Minn.

SELL: BC453, Q5R Navy model, like new condx, $12; Heath O-8 'scope, excellent condx, $35. W2HFM, 60 Lindgren, Merrick, N. Y.

FOR Sale: WRL 400 watt cw 'phone xmttr, $275; Bud VFO, $25; RME HF 10–15–20 converter, $65; NC240D with matching speaker, $145; Millen 90810 2–6–10 transmitter, $45. J. L. Jones, W3PEJ, 9700 Hilllard Road, Pittsburgh 37, Penna.

JOHNSON Viking II transmitter Hallicrafters S76 with matching speaker Astatic J 29 mike and a key, best offer takes all or each. Write or message W1SS. 3970 Kc. Will deliver anywhere in New England.

EICO 5 in. 'scope, BC-453, Model 25 teleprinter, other equipment and parts. Send for complete list. W. D. Thompson, W8SWZ, RFD 4, Springfield, Ohio.

CALL SIGNS — Three color, reflectorized (glass-beaded), aluminum. 4" x 12", $1.50 postpaid, includes mounting frame for car, rig or shack. Lackner, W9WFT, 2029 Bradley, Chicago 18, Ill.

26-New 24Gs for $20, or 5 for $4, postpaid. Merloni, R.D. #2, Coraopolis, Penna. W3ZDW.

HAVE complete chemistry laboratory to sell or trade for ham gear. Send for details. WN9JEQ, 124 North "E" St., Monmouth, Ill.

WANTED: HRO receiver, used. State model and coils available, working or all parts intact as left the factory. W8FXN, Mills, 405 Waggoner Rd., Reynoldsburg, Ohio.

SWAP: BC-221-AK (modulated); complete instruction, calibration books and commercially-built, regulated power supply, for Elmac AF-67 or Viking Ranger transmitter. Also consider swapping SX-71 and cash for SX-88 or 75A3. W4BBL.

FOR Sale: Collins 32V2 like new condition, $430; HQ129X receiver (less speaker) in A-1 condition: $115.00; Gonset VFO for use with communicator, in original carton, $45.00. Bill Harper, W9BWM, 4037 Eddy St., Chicago 41, Ill.

FOR Sale: 500 watt fone xmttr on 6 ft. open rack, G.O-9 Navy surplus xmttr., BC459, prop pitch motor, indicator, selsyns, SX-25 and others. $150 takes all. Come and get it. No shipping! W1MUM, 56 Nelson St., New Bedford, Mass.

FOR Sale: New 65-watt Globe Scout and new NC-125 w/spkr. $260.00 takes both items. W1AMJ, 55 So. View St., Waterbury, Conn.

WANTED: Low or medium power TVI-proof late model factory-wired transmitter, VFO and bandswitching. Also want receiver, Matchbox, etc. All must be in like-new condx and bargain for cash. Keel, W9OAK, 2106 N. 84th, Milwaukee, Wis.

75 Watt C.w. bandswitching (160–10) transmitter kit, $59.95. 25-watter, $19.95. Details free. Hart Industries, 467 Park, Birmingham, Michigan.

SELL: Complete modulator for 600 watt final. TZ40's. Varimatch xfrmr, power supply, all tubes: $100. Millen xmtter 90810 with 10 and 20 meter coils and all tubes: $30; 458A converted to 20 meters with VR power supply, $25; Class C final pair 810's, meters, coils for 10 and 20, $25. All above and solid steel cabinet, racks, panels, etc.: $175. Not TVI'd. Will not ship. W2DO, Livingston, N. J. Tel. 6-2266.

SALE: Gonset Super 6 converter, Gonset noise clipper, complete instrux. Both $45. D. N. Lathrop, 80 Town St., Norwich, Conn.

VIKING II factory-wired, clean, $235; S40B, new condx, $75; Collins 3 Kc. filter for HRO or Super Pro, $50; SX-71, $140. Trade Viking for Collins 310B1 and $60. Want HQ-129X in like-new condition. Cash or trade. WØBNF, Byars, Box 105, Kearney, Nebr.

SELL or swap: Gonset 3-30 converter, Johnson mobile VFO, Johnson mobile xmittr (factory-wired), 1 ea. 600 volt and 300 volt at 275 Ma. 6 volt Dynamotors, 50A 6 volt Delco hvy duty generator with regulator, NC125 rcvr with matching spkr, husky pwr supp. 3000 volt at 550 mils with Variac control. Write Leroy Flatt, W1BML, 19 Vernon Rd., Natick, Mass. Phone OLympic 3-8891.

GOOD used equipment: Mallory Vibrapack VP-552, $19.95; Mallory Vibrapack VP-557, $29.95; BC-221F, $99.50; Hallicrafters portable, $159.95; Gonset 3–30, $29.95; Collins 30K, $950; Viking II, $279.95; Meissner EX signal shifter, $35. Curle Radio Supply, 439 Broad St., Chattanooga, Tenn. 406 Meridian, Huntsville, Ala.

SELL: BC-457 (4 to 5.3 Mc.) Command xmitter adapted for use with multiphase exciters, $16; Heathkit audio wattmeter AW-1, wired and in perfect condx, $16.00. James M. Hartshorne, 502 Veteran's Pl., Ithaca, N. Y.

SELL: Viking II and Viking VFO, in perfect shape: $285.00. F.o.b. Pompton Lakes, N. J. David Beckwith, W2SHC.

FOR Sale: 1 KW 'fone/c.w. xmtter, Collins 70EA-8 VFO, PP 250TH final (80–10 mtrs, $350). Will not ship. Paul Haczela, 106 Marshall St., Syracuse 10, N. Y.

FOR Sale: HQ-129X and HT-9 TVI-suppressed, coils for 10, 20, 40 and 80: $300.00. Henry A. Martin, WØWEU, 1323 Spruce St., Denver 8, Colo.

TELEVISION camera components wanted: Cash or swap ART-13, SX-28, 200 and 100 watt phone rigs, Pentron tape recorder. I need deflection yoke, focus and alignment coils for image Orthicon, also want Vidicon or Staticon camera tube, service manuals or info on industrial and Broadcast TV equipment. What have you? Like to contact others interested in ham TV. Ernie Marko, W2MFQ/4, 1155F School Ave., Patrick Air Force Base, Fla.

WANTED: All tubes — transmitting, receiving, industrial 4X150A, 2K, 3K, 6AN5, 349A, 304TL-TH, 250TL-TH. Surplus equipment, receivers, transmitters, test equipment, tube checkers, Hickock, any condition. Will buy, sell or trade for standard or surplus. Get our "Tabogram". Your best deal is with "TAB", 111 Liberty St., New York 6, N. Y.

WANTED: APR-4, TN-19, TN-54, ART-13, CU-25, DY-12, BC-348, BC-342, BC-312, amateur receivers, BC-221, TS-173, TS-175, LM, other TS. ARC-1, RTA-1B, APN-9, TDQ, RA-34, RA-20, RA-87, teletype, Boehme, perforators, BC-610, BC-614, BC-939, 75A, 32V, ARN-7. Cash or trade for new Johnson Viking, Ranger, Barker & Williamson, National, Hammarlund, Elmac, Gonset, Teltrex, Hallicrafters, Jones Micro-Match, Harvey-Wells, Pentron, Hisher, Cornell-Dubilier, Morrow, Master Mobile. Write: Alltronics, Box 19, Boston 1, Mass. Richmond 2–0048 (Stores at 60 Spring St., Newport, R. I. and 44 Canal St., Boston, Mass.)

SELL: New and used Gonset mobile equipment. Also 2-meter and 6-meter communicators, etc. R. T. Graham, W1KTJ, Box 23, Stoneham, Mass.

FOR Sale: Mark II with all accessories; also Heathkit 30W xmttr and Comco MO-1 xmttr 60W with mobile power supply. Sonar MR3 mobile rcvr, WJWG, King, Prince Frederick, Md.

GIVEAWAY Prices! Army surplus, new radio gear: Filter chokes, 3 hys. (@ 320 Ma., 50¢; grab bag assortment, 5#, 88¢; output transformer and low pass filter, PRI 10,000 ohm, Sec. 4 ohm, pass frequency from 410 to 2000 cycles, 50¢; cooper antenna wire, single strand, outdoor covering, 100 Ft. 50¢. Cash with order or C.o.d. Army Surplus Outlet, 91 N. Second, Memphis 3, Tenn.

SELL: Teletype equipment, 12,000 ohm dpdt. relays, $1.75; RAK, RAX, low frequency receivers, $95 ea.; NC-100, $85; NC-100A, $100; TG-7-B Mod. #15 teletype, Ranger, wired, excell. condx. Want APR-4, TN-19, TN-54, APR-5AX, RA-20, RA-87, ART-13, AKN-7. Techn. manuals, supply catalogs. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. Tel. RIchmond 2–0916.

CLOSEOUT! Jumbo reflectorized callsign, $1.50; regular size, $1.00. Whitley, W2LPG. 133 Airsdale Ave., Long Branch, N. J.

BROWNING 1.7–53 mcs converter, $9.95; Eldico MR-2, $39.95; MD-40P, $39.95, GDO, $19.95; Hallicrafters S-20R, $44.95; SX-28, $124.95; S-38, $34.95, S-40A $69.95; SX-42, $179.95, SX-43, $129.95; SX-62, $250.00; S-72, $49.95; S-81, $34.95; HT-17, $39.95, HT-18, $69.95; Hammarlund 4–11, $34.95, 4–20, $44.95; Harvey-Wells APS-50, $29.95; VFO, $37.50; TBS-50C, $79.95, TBS-50D $99.95; Collins 32VI modified, $399.95; 32V2, $495.00; 32V3, $595.00; National NC-46, $64.95; NC-57, $69.95; NC-100X, $75.00; NC-98, $119.95; NC-200, $79.95; RME, DB-20, $29.95; HF10–20, $59.95; MC-53, $44.95; MCH-4, $24.95; VHF-152(A), $49.95; Babcock MT54, $69.95; Deltronic CD-144, $99.95; Meissner EX $44.95. Other used items available, free list from Carl, W1BFT, Evans Radio, Concord, N. H.

WANTED: Reasonably priced HQ-129-X or similar receiver. Also am interested in a RME-70, HQ-120X. Kirkman, WØZHJ, 2444 "D", Lincoln, Nebr.

NEW BD77 dynamotor: $17.50. Trade for a 2-meter converter. Cliff Moir, Rte. 4, Bath, Me.

FOR Sale: Complete mobile set up in perfect condition: Gonset 3–30, Subraco, MT-15X transmitter, PE103, Master Mobile antenna mount and whip, best offer takes this for a quick sale. Russell Weissman, W2BRN, 82–50 210th St., Hollis, L. I., N. Y.

COLLINS complete station, like new! Tremendous savings! Sacrifice for fast action! 32V2 conversion xmittr with Collins TVI filter; 75A1 receiver with matching speaker, new Johnson Matchbox, electronic Mon-key, straight key, Cardax 950 mike, spare tubes and co-ax connectors, hot 10 and new 20 Shortbeam. Everything like new in appearance and now operating. All must go at one price for everything: F.o.b. $575. Local price, no shipping, $495. W2PHB, 261 Forest Ave., Glen Ridge, New Jersey, Phone Glen Ridge 7–1544.

FOR Sale: Sams Photofact, Volumes 1 through 18, complete and in like-new condx, $250. Will deliver within 250 miles; Stancor battery eliminator, 6 volts, 12.5 amps, $20; three VT127A, $2 each; five each 1625 and 1626 at 45¢; one 100TH, $9.50; two 5514, $4.00 ea; Meck T60 transmitter, complete, best offer; three new chassis, two 10 x 17 x 3"; one 7 x 17 x 2½: $1.50 ea. Calvin J. Evans, W9LTR, 327 W. Spring, LaGrange, Ind.

WANTED: Johnson Matchbox antenna coupler. Also Preselector in gud condx. Sam Nock, KN4ASE, Box 61. Hallwood, Va.

FOR Sale: Collins 70E8A PTO used one year, $70; 550W RCA modulation transformer, uncased, unused 1:1 ratio with extra sec for screens, $15; mod. transformer for BC610, $15; two new 810s, $7 each, one new 813, $5. W4WOX, 545 Beech, Clarksville, Tenn.

SELL Gonset 2-meter convertor, $20.95 and Johnson mobile ECO, $25.95, in excellent condition. W3IHF, Strite, 31 No. Grant, Waynesboro, Penna.

FOR Sale: National HRO-60 recvr. Coil sets A, B, C, D, E, F, and AC included. Freq. range: .5–30/ Mcs, B.S. coverage for 80, 40, 20, 15, 11 and 10 metrs. Was purchased new Nov. '54 and is still in perfectly new condx, inside and out, less than 4 months use. Guaranteed for 3 months. Will ship prepaid insured anywhere within U. S. Postal money order, telegraphic money order, check or monthly payments accepted. All inquiries answered promptly. Write, wire or 'fone: Ronald L. Cummings, W5YMB, Communications Div., U.S.S. Northampton (CLC-1), C/o Naval Operating Base, Norfolk, Va.

WANTED: Code practice tapes for TG-34-A code keyer. Philip Will, W8HPB, Box 205, Canal Winchester, Ohio.

SELL: Sonar SRT-120P xmttr. with VFO, $145. W2SME, 324 West 70th St., NYC.

FL8 audio filters, two for $2.00 prepaid in USA. FT154 shock mounts for BC348, $2.00 each; BC614 speech amplifier; BC638A frequency meter 100–156 Mc. Will trade for mobile equipment. M. D. Haines, W5QCB, 1316 S. W. Military Dr., San Antonio 4, Texas.

GONSET Tri-Band $27.50; Master Mobile Mount ant. $5.00; P.E. 103, $18.00; BC459, converted, $20; 150 μμfd dual variable $8.00, new B&W 80TVL, $3.00; JVL, $1.25; Lettine 240 xmttr, $60. Tex Dallas, W3RZV, 233 W. Broad St., Tamaqua, Penna.

ELDICO TR 75-TV2 transmitter. Used less than a year, plus Eldico 40 watt modulator in matching case — assembled but never used: $105. Heath AT1 transmitter, complete, and ready to go: $18. Tubes for the above included. Shipped express collect. Niel Talmage, Wayfaring Road, Norwalk, Conn.

MOBILE: Home station complete. Elmac A54H dynamic mike xmittr. Two power supplies PA500 matching AC for fixed station. Eicor dynamotor for car. Gonset Super Six converter, noise limiter, Web Bandspanner antenna, mount, mike, relays, condenser suppressors, etc.: 50 watts in a car or home. Like new, $199.50. Also complete 80 meter 'phone/c.w. ARC5 station. Transmitter 65 watts, receiver, three power supplies, mike, $50 for all. Ben Robin, W2BIG, P.O. Box 155, University Branch, Miami 46, Fla.

FOR Sale: Heathkit fone-c.w. xmttr, driver with VFO (35 watts). Also ant. coupler in A-1 condx: $90. Dave Martin, 3295 S. Dahlia, Denver 22, Colo.

FOR Sale: 32V1 in excellent condx, with spare final tube: $325. E. T. Pennington, W8WUH, 202 Chestnut St., Huntington, West Virginia.

WANTED: Communications receiver, used, good grade, HQ-129-X, NC183, SX42, ARR 7, etc. Give price, history. Morrissey, WØALY, 5700 W. 28th Ave., Denver 14, Colo.

SELL: Harvey-Wells TBS-50D and power supply, $150; Harvey-Wells VFO, $25. All in excellent condition. Ian R. Underwood, 265 Grace Church St., Rye, N. Y.

WANTED: Tube RK20. Write Gordon C. Edwards, W4ABF, Rte. 2, Box 254, Springfield, Virginia.

SELL: Gonset-super-celver, Viking mobile, Johnson xmittr. Factory tuned all bands. Both 12 volts. $170. J. Michane, 2436 Mountain Ave., Scotch Plains, N. J.

HAMFEST! Another Big Annual Affair for the Midwest hams, their families and friends. The Starved Rock Radio Club Hamfest, June 5, 1955. For details, see Hamfest Calendar or write W9MKS, Utica, Illinois.

WOULD like to buy, borrow or rent copy of "Two Hundred Meters & Down". Book urgently needed for school report. W9APV, 1248 Glencoe Ave., Highland Park, Ill.

COLLINS 75A1, excellent condition. Modified per W6SAI article. In original shipping carton, $250; Collins 32V2, Gonset Triband with clipper, $30. W8YEL, 829 N. Elizabeth, Dearborn, Mich.

PASS amateur theory exams. Check yourself with sample FCC-type questions & Novice and General class examinations. All for only 50¢. Ameco Electronics, 1203 Bryant Ave., New York 59, N. Y.

SWAP new 3¼ x 4¼ Pacemaker Speed Graphic outfit, complete, also telephoto lens, etc. for an HRO60 or equal. R. Long, 933 E. Broadway, So. Boston, Mass.

MUST Go. Best offer buys 10-54P Electromatic Test Master, 60 cycle. Converted 19 Mark II tank set, 110 volt power supply with spare tubes. Also Vibroplex Deluxe Speed Key. Write X. F. Zacher, Reaume Rd., RR #1, LaSalle, Ont., Can.

WANTED: Communications receiver. I have to swap: ES500A Precision 'scope; SP-5 probes, Hickok 610A sweep gen; Mallory 12RS60 battery eliminator, Vol. 15 Rider's manual; RCA isotap transformer; Heathkit AR-2 receiver and case; Regency R-100 UHF converter; 3AP1 tube, 7 in. TV set. F. Garove, W8UNJ, 722 Thayer St., Akron 10, Ohio.

WANTED: Gonset 3-30 converter; also 1946 ARRL Radio Amateur's Handbook. Please quote price in first letter. W7WLB, 2120 E. Grant Rd., Tucson, Ariz.

SELL: Sonar XE-10 $12.00; McMurdo Silver wavemeter, $4.00; W. E. handsets, $2.00; 4 x 5 Graflex F.P.A., $3.00. Samkofsky, 264 Division Ave., Brooklyn 11, N. Y.

PORTABLE 15-watt 10 mtr. 'phone xmitter (crystal and mike included); (telescoping 82" ant.); 400V. Vibrapack, metered, all built into aluminum carrying case. Designed to plug into car cigarette lighter, ready transmit. Will sacrifice for $50. W3TNX, Groff, 120 Westland Drive, Pittsburgh 17, Penna.

SELL: BC-221, new, guaranteed, $100. Wilson, 4624 Woodfield Rd., Bethesda, Md.

FOR Sale: Heathkit transmitter AT-1, $25; Heathkit VFO VF-1, $15; Eldico modulator MD-40, $30. All in gud condx. Peter G. Montague, The Choate School, Wallingford, Conn.

FOR Sale: Bandmaster Deluxe with power supply and VFO, in new condx, $125. Complete NC57 receiver, $55. W9RMZ, 21 E. Brayton St., Chicago 28, Ill.

CRYSTALS: Marine, aircraft and general communications frequencies. Write for information. C-W Manufacturing Co., Box 2065, El Monte, Calif.

SELL: Heathkit transmitter, $27.50; excellent VFO, $24.50; MS-710 code practice oscillator, $5.50; antenna tuner, $3.50; clean 1939 Chevrolet for mobile use, $150. K2BAY.

SELL Bandspread coil sets AA and AC fit late models HRO receivers, both for $22.00. In perfect condx. W3BFF.

FOR Sale: Eico tube tester #625, with pix tube adapter, $32; Eico condenser checker #950, $16.50; Eico battery eliminator, #1040, $17.50; all units factory wired, excellent. Prices f.o.b. Henry Mohr, W3NCX, 1005 Wyoming St., Allentown, Penna.

FOR Sale: Complete 1 Kw xmitter, built to commercial standards, in enclosed rack. Remote Collins 310B-1 drives pp 813's; coils for 80, 20 and 10; D-104 mike; self-contained speech amplifier and self-contained pp 805's modulator. Best cash offer as unit. W9DGM, 1636 S. Biltmore St., Indianapolis, Ind.

FOR Sale: HT-9 with coils for 80, 20, 10, $135; Millen Variarm, $15. W0MQO, Windom, Minn.

RUBBER Stamp with your call letters, name and address, $1.50; stamp pad thirty-five cents. El Kay Stamps, Box 5-WT, West Toledo Station, Toledo 12, Ohio.

FOR Sale: Complete ham station 3 months old, including factory-wired Johnson Viking Ranger, Hammarlund HQ-140X, Telrex 20-meter Mini-beam, CD TR 4 rotor, mike and bug: $450.00. Don Heller, K2JQX, 31 Joyce Rd., Tuckahoe, N. Y.

FOR Sale: Johnson Matchbox, never used! In original carton, with manual: $38.50. Bill McFarlen, W8KJC, 1015 Lake Park, Birmingham, Mich.

SELL: Meissner 150-B transmitter. Speech amplifier included: $130 or highest offer. Also, 3000 volts at 400 mil. pwr supply, Variac, H.V. meter, 866-A; $75. Both units delivered within 150 miles of Boston. W1WXC, 24 Monument St., Concord, Mass.

TRADE: Lysco 600-S, guaranteed TVI suppressed, and Kodak Speed Graphic for de-TVI'd Viking I, or will sell xmittr for $100. W8SHG, Collins, 416-B Montrose Dr., South Charleston, W. Va.

SELL: QSTs, October 1939 through December 1954, complete, $35.00 or best offer; also CQ August 1946 through December 1952, complete, except two issues: $12.50 or best offer, all F.o.b. Merrick, N. Y. Mark Devaney, W2NQR, 61 Henry St., Merrick, L. I., N. Y.

LYSCO 600, in perfect condx: $80. Roger Simmons, W8OZL, 338 Walnut, Ashland, Ohio.

S-76 Hallicrafters, in exc. condx; modified per Nov. '54 QST, excepting tuning dial changes. Looks like factory work. Best offer over $100. F.o.b. Terre Haute, Ind. Arthur Drake, W9QPD, 17 Marigold Dr., Terre Haute, Ind.

COLLINS 32V3: $595; 75A3, $425 — both: $995. Perfect condx. Thurston, W9BCG, Lake Forest Academy, Lake Forest, Ill.

FOR Sale: Eldico MD4OP modulator, power supply, excellent: $45.00; B & W Balun coils, wired mounted: $5.00. Dr. L. C. Silvern, K2BN1, 16 Mountainview Ave., Albany 8, N. Y.

FOR Sale: Benoix automatic bandswitching transmitter, 100 watts, fone/c.w.; also BC459 and BC455. Will swap for NC-183. Hoffman, W8ET, 366 Canterbury Road, Bay Village, Ohio.

SELL: 250-watt rig, including osc.-buffer, pr. 813s final, sp. ampl., modulator, two 1000v. and 2 low voltage pwr supplies, switching panel, 10-160 meters: $100.00 takes all. Walt Keen, W2SGN, 37 Dewitt St., Lowville, N. Y.

FOR Sale: From estate of W5DM: HRO-60; complete KW transmitter, mobile equipment. Write to W5NW, Box 586, Odessa, Texas.

COLOSSAL — See the Hamfest notices for information on the annual "Western New York Hamfest" offered by The Rochester (N. Y.) Amateur Radio Association on Saturday, May 21st.

WANTED: Instructor for Radio, Television servicing with ham license, negro. Salary $80 per week, split shift. Davis Trade School, 607 So. 10th St., Louisville, Ky.

ENGINEERING Degrees, E.E. major electronics earned through home study. American College of Engineering, Box 27724 (D), Hollywood 27, Calif.

VIKING II with Viking VFO, low pass filter, antenna relay, D104 mike, built-in push-to-talk, factory-wired: $325.00. Hallicrafters SX-28 with bass reflex speaker: $125.00; 2-element 20-meter beam, 40 ft. aluminum tower, prop pitch motor, transformer and cable: $125.00 (or best offers). David Greene, 20 Vernon Ave., Newark 8, N. J. Tel: ESsex 2-6411.

FOR Sale: Globe Champion transmitter, $200.00; Instructograph, $10.00; Howard receiver, $25.00. B. J. Parisi, Box 1005, Onset, Mass.

SELL: Proceedings of the IRE: September 1947 through December 1954. Also engineering texts. Write for list. J. Woestman, 331 Leconey, Palmyra, N. J.

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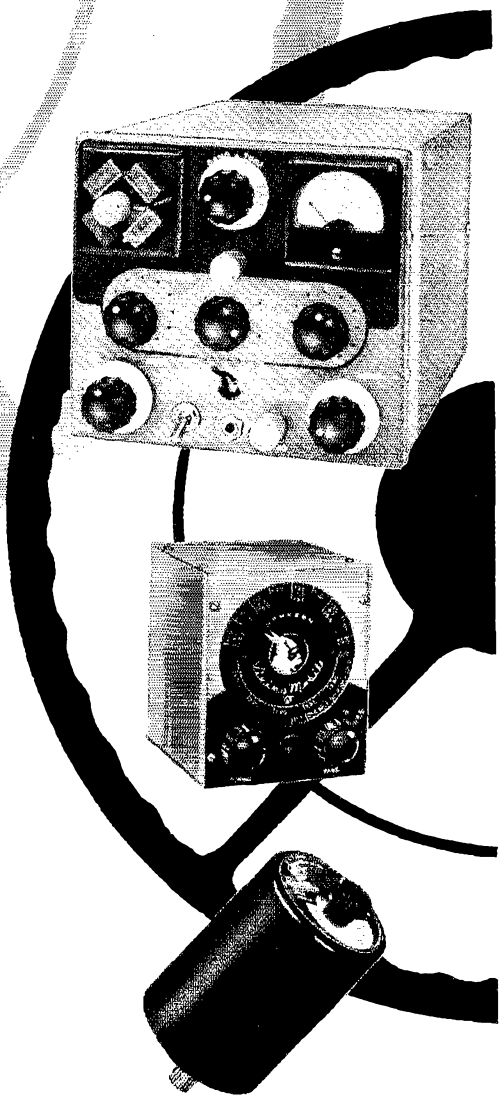

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Most Powerful Audio—PP807's modulating a single 807! Terrific audio punch for cutting through QRM.

Bandswitching—75, 40, 20, 15, 11 and 10 meters. Compact—measures only 6" high by 7" wide by 10" deep. Flexible—operates with 300 volt supply as well as with 600! Available for 6 or 12 volt operation. Dynamotor base kits for use with your dynamotor or complete dynamotor power supplies are available.

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Built-in VFO? Absolutely not... not for mobile where confined space would compromise performance. Designed for separate, steering post mounting, the Johnson Mobile VFO is today's most stable mobile VFO. It's extra safe for tuning while in motion, since your eyes need not stray far from the road! Wide range temperature compensation, voltage regulation and rugged ceramic insulated tank components provide exceptional freedom from drift and FM effects. Its bright, edge lighted dial calibrated for all bands permits fast, accurate tuning by day or night. 75 and 40 meter and 10.5 mc. output. Plugs into Viking Mobile or may be used with any mobile transmitter.

Viking Mobile VFO Kit less tubes..**$29.45 Amateur Net**

Viking Mobile VFO kit wired and tested, less tubes.....**$44.95 Amateur Net**

Exclusive Bandswitching Mobile Antenna Loading Coil—The ultimate in whip-loading systems. Covers 75, 40, 20, 15, 11 and 10 meters! Continuous tuning on 75 meters—quick, easy QSY with exact antenna resonance! Airwound, large diameter high Q coil. Rugged fibreglass housing—attractive in appearance. Fittings furnished for standard mobile whips.

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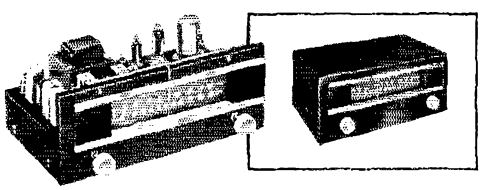
94 PA 159. Net only.....**$157.95**

93 SX 312. Knight 12-Watt "Space Saver" Amplifier only. Net only.....**$59.50**



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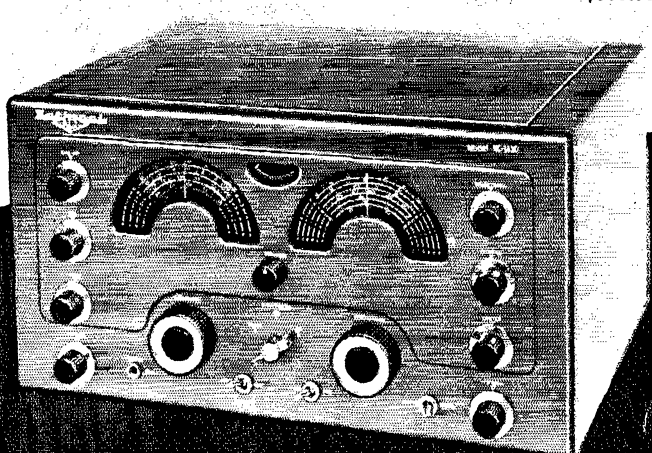

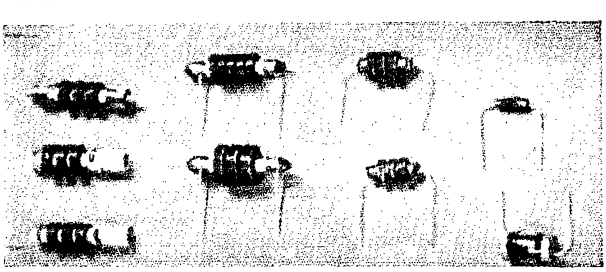

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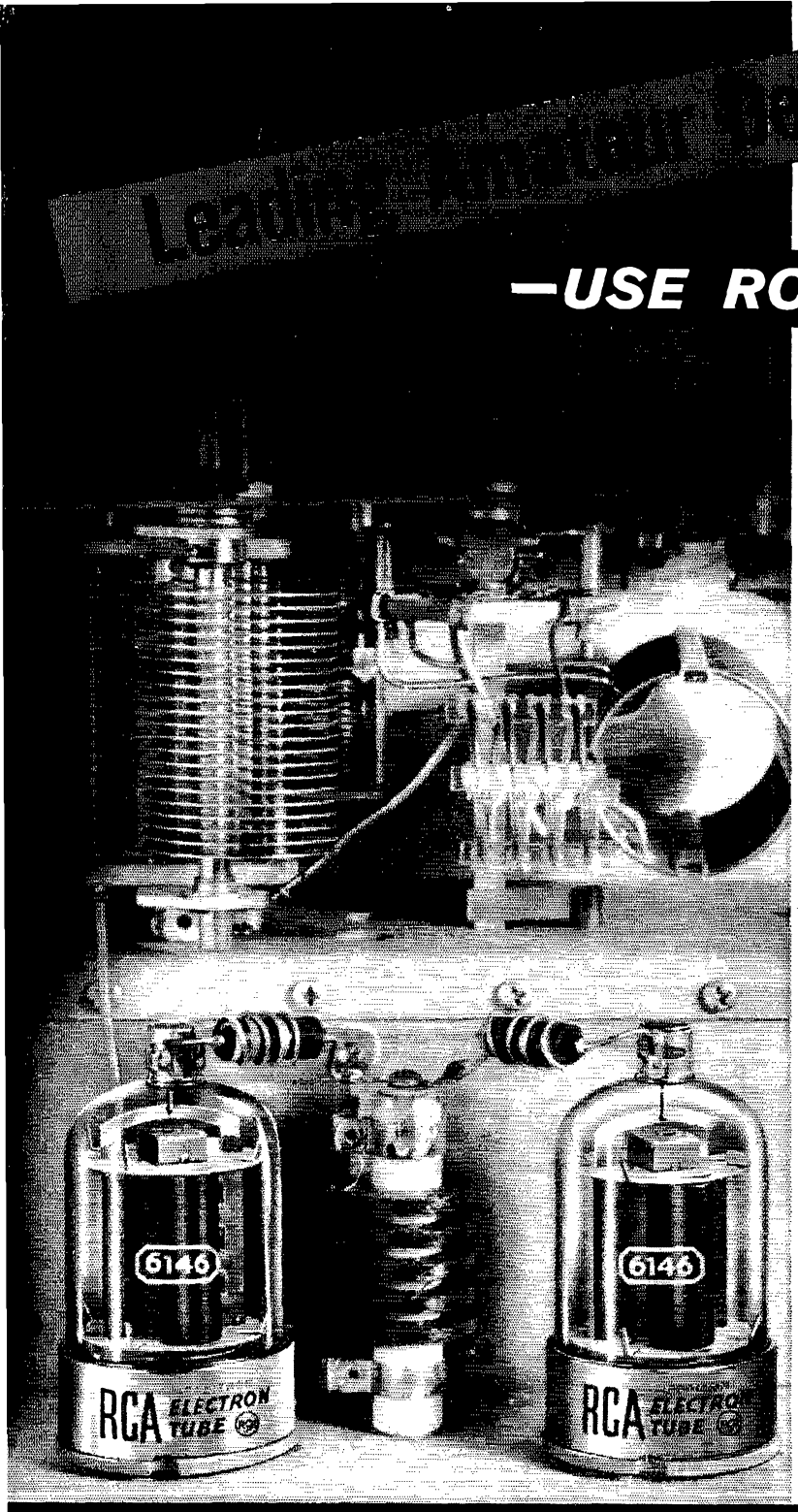
Leading Amateur Designs

—USE RCA TUBES



For instance, look at the Barker & Williamson "5100" in this picture.

Known throughout the bands for the authoritative signal it packs, this transmitter uses two RCA-6146's in parallel in the "final"—and two more RCA 6146's in the class AB modulator.

Here are basic reasons why leading amateurs—and commercial designers like B&W—specify "RCA."

RCA power tubes make it practicable to get any power you want—at relatively low plate voltage. RCA power tubes are built to handle peak plate loads with ease—have tremendous reserve emission. RCA power tubes are economical *in service!*

You can get RCA high-perveance power tubes—beam power types and triodes—from any RCA Tube Distributor. You can get technical data on any particular type from RCA, Commercial Engineering, Section D37M, Harrison, New Jersey.

◀ **Final amplifier of the B&W 5100 using two beam power RCA-6146's in parallel.**

90 watts ICAS input on CW; 67.5 watts on 'phone. In class AB modulator service, two RCA-6146's can deliver 120-130 watts ICAS. ▶

RADIO CORPORATION of AMERICA

ELECTRON TUBES **HARRISON, N.J.**