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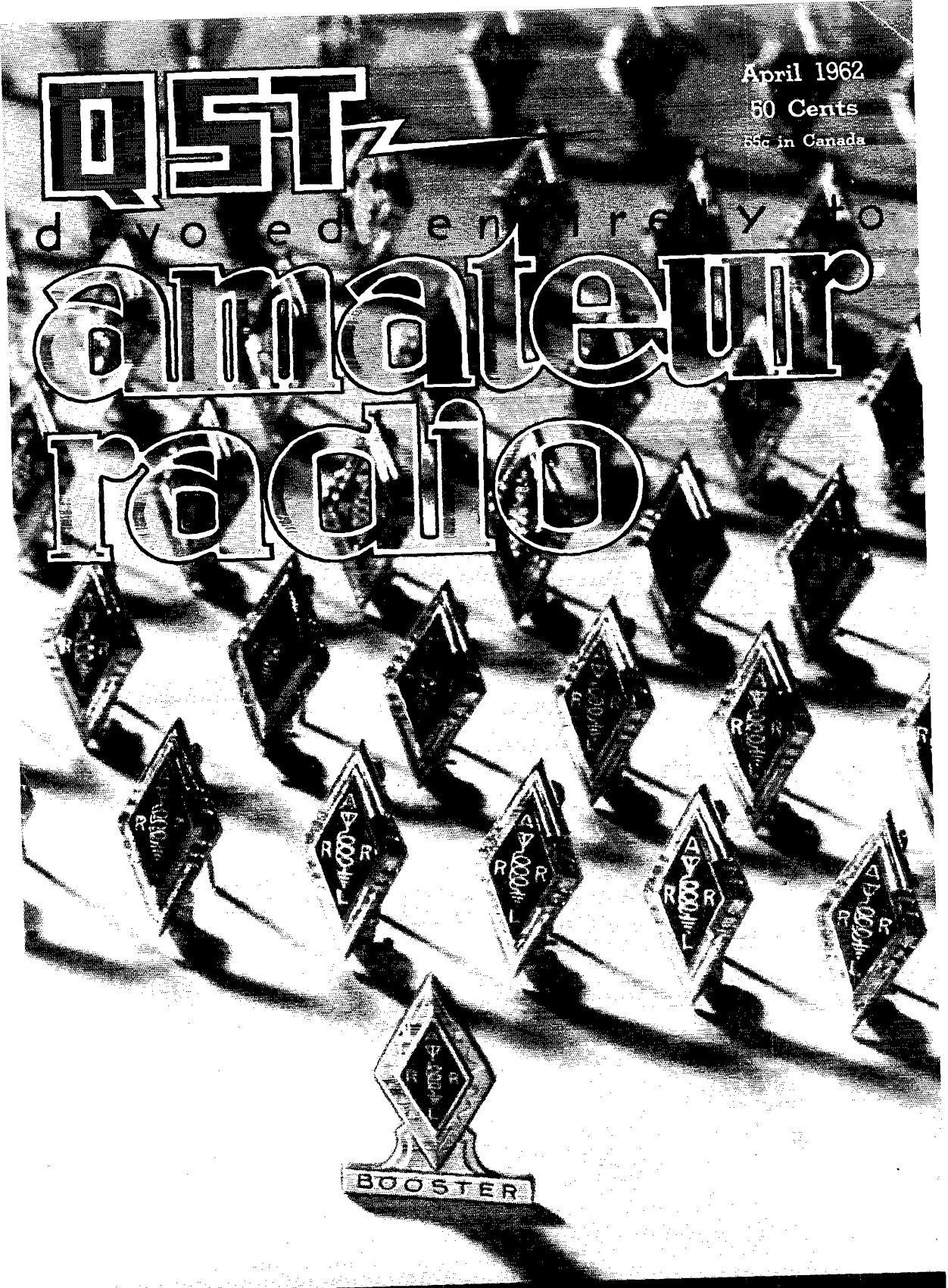

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APRIL 1962

VOLUME XLVI • NUMBER 4

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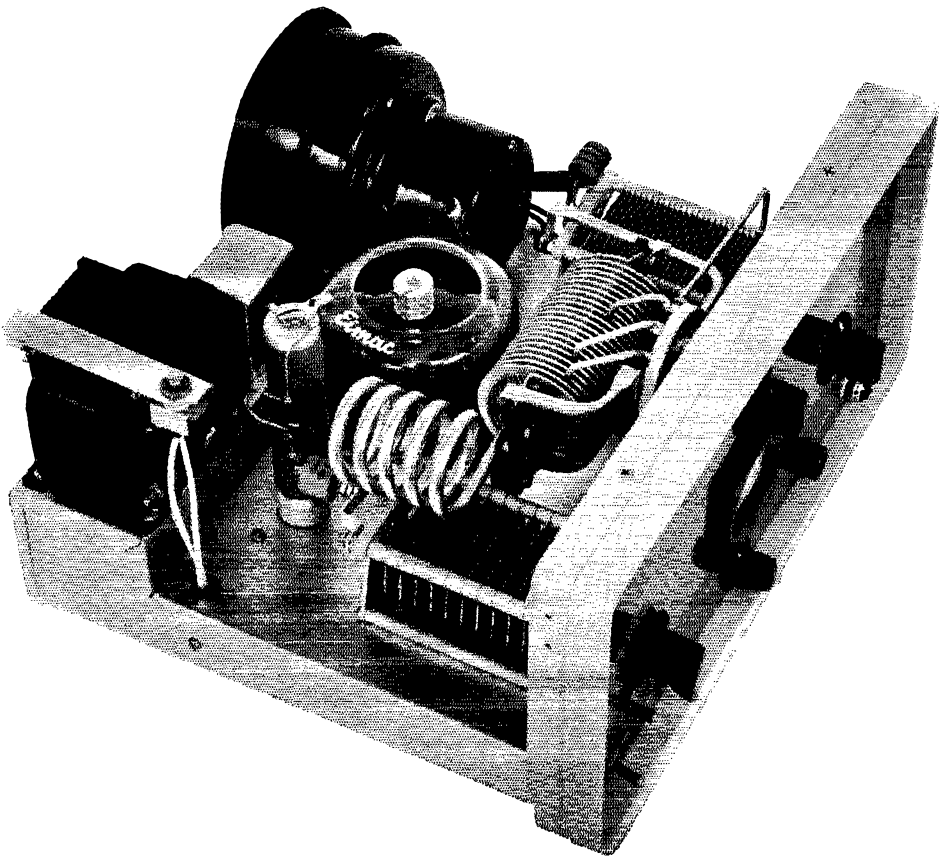

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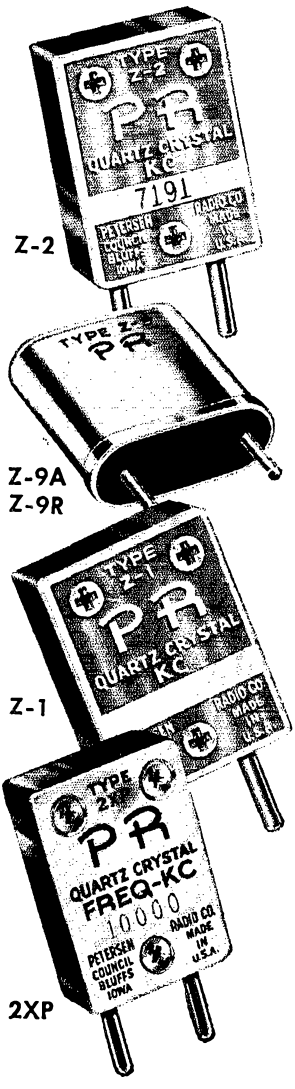

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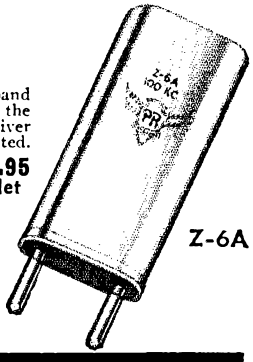

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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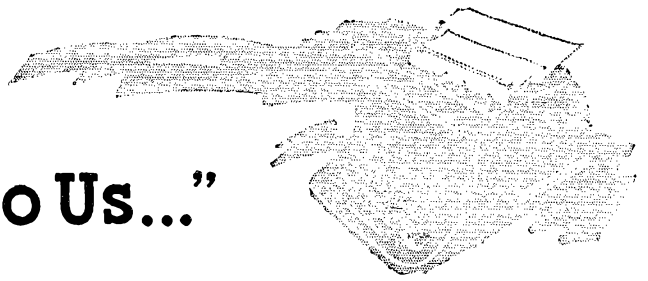


"It Seems to Us..."

LICENSE FEE — OR TAX?

THE Federal Communications Commission has now formally proposed an extensive schedule of fees for its various licensing and regulatory activities. The text of the notice of proposed rule-making appears in "Happenings" this month. Comments are invited [1] with a deadline of April 16. The ARRL Executive Committee will determine the League's official view at its meeting late in March. For the information of members we should record that on previous proposals the League has opposed fees for the amateur service.

The proposed fee for amateur applications is $5. This is, we repeat, for *applications* — not licenses. An applicant taking the Novice route to amateur radio will be charged at least $10 — the second $5 for his subsequent application for a permanent grade. In an extreme case, fees might cost an amateur $25 or more within a year's time — e.g., (1) he fails an exam; (2) he qualifies for Novice; (3) he moves up to Technician; (4) he moves up to Conditional or General and (5) he changes address to another location. Heaven help him if, as in the military he changes address frequently!

Amateurs, we're certain, don't want to be a financial burden to the Government. But there are ways other than cash contributions in which we can — and do — stand a "fair and equitable" share of the cost of regulation. We would point out once again that something like two-thirds of all amateur license exams are conducted and supervised by amateurs, not by Commission personnel. The amateur body is largely self-policing, greatly reducing supervisory and monitoring responsibilities of the Commission. We take care of our mutual interference difficulties within amateur bands. The investigative load on FCC for problems of interference to other services is largely shouldered by amateurs — e.g., TVI committees. Further we believe that the voluntary, public-spirited contributions to our national life by the self-trained specialists making up the body of amateur radio are in themselves a potent argument against payment of a license fee to the Government of the people we serve.

On a broader scale, we confess to some difficulty in understanding the basis for the Commission's schedule of fees.

The legislation on which the Commission bases its action, the Independent Offices Appropriation Act of 1952, authorizes the establishment of "fair and equitable" charges. The dictionary is quite clear on these two terms. Yet some pencil-doodling with FCC fee proposals based on applications filed in fiscal 1961 indicates that our Safety & Special Radio Services would foot two-thirds or more of the yearly bill for fees. (Besides amateurs, S&SRS includes aviation, marine, fire, police, RACES, etc.) Broadcast stations, common carrier and commercial radio operators would provide the bulk of the remainder.

It is understood that the total "take" from fees will approximate one-half the FCC budget. And indeed, our computations, though admittedly rough, indicate that fees from broadcast services will provide about half the cost of operating the Broadcast Bureau; and from common carrier services, about half the cost of operating the Common Carrier Bureau.

But they further indicate that fees from Safety & Special Radio Services, including amateurs, will provide about three times its $1,500,000 budget for the coming year!

Is one bureau of the Commission now to subsidize another? Are the amateurs, fire, police and similar services — yea, even including Citizens — now to contribute to the cost of regulating broadcast and common carrier activities? What happened to the "fair and equitable" thesis? Either Mr. Webster is wrong in his definitions, or there is some kind of FCC arithmetic we don't understand.

The application fee for amateurs conceivably can be justified if it bears some relation to the actual cost of processing and issuing licenses. We doubt that the Commission would admit gross inefficiency which would be implicit in any attempt to defend $5 as an application processing cost. The difference between $5 fee and the reasonable cost to the Commission represents a tax. Taxation is a responsibility of the Congress, not the Commission.

QST

[1] In accordance with FCC procedure, an original and 14 copies of comments are required. (This is to permit distribution to the chiefs of the numerous FCC branches concerned.) Amateurs wishing to express their views but finding it impracticable to meet this requirement may write Headquarters; a summary of such comment will then be included in the League's filing. We request a copy also of any direct filing, to further assist preparation of the ARRL comment. Remember that a simple "for" or "against" opinion is relatively ineffective, and that specific arguments are what the Commission seeks.

OUR COVER

The strength of the League is in its membership, and we are embarked on a campaign to increase ARRL membership and thus make your League ever stronger. Our cover this month depicts an ARRL Booster marching along at the head of a host of loyal League members. To find out how *you* can become one of these League Boosters, please turn to the special insert at page 64 of this issue.

MICHIGAN STATE CONVENTION

Grand Rapids, Michigan—April 13-14

The 15th annual Michigan State Convention will be held in the Pantlind Hotel, Grand Rapids, with convention activities starting at 2000 EST, Friday, April 13, as an "Early Bird Get-together." The convention sponsor is the Grand Rapids Amateur Radio Association.

A full program is planned for Saturday, April 14, with registration and FCC exams at 1000 EST. Many displays and distributor exhibits, along with a Swap and Shop, are to be featured. There will be meetings for Army and Air Force MARS, Michigan Post Office Net, s.s.b., DX hounds, Wolverine Net, BR/MEN, v.h.f.-u.h.f., and the QMN Nets, along with an antenna demonstration and a program and entertainment for YLs and XYLs.

A Single Sidebanders dinner (à la carte) is set for Saturday night. The evening program will feature a prominent speaker and presentation of the Cosmo G. Calkins Award.

Talk-in transmitters will operate Saturday, on 75 and 6 meters.

Hotel reservations should be made with the Pantlind Hotel, 187 Monroe Avenue, N.W., Grand Rapids 2, Michigan. Convention preregistration is $1.75 until midnight, Friday, April 13. After midnight, registration will be $2.00. Convention registrations, checks and requests for information should be sent to the Grand Rapids Amateur Radio Association, Box 333, Grand Rapids 1, Michigan.

Strays

Stations needing a South Dakota QSO — the Huron (S. Dak.) ARC will have its club station on the air continuously over the week end of April 20-21. Look for WØQDN/Ø on 3695, 7145, 7225, 14,075, 14,260, and 28,800 kc. A.m. and c.w. will be the primary modes, although s.s.b. may also be used on 20 and 40. When operating 80 and 40 c.w., they will also tune the Novice bands. They will be on the air from 1400 GMT, April 20, until 0600, April 22. (This is Good Friday and Saturday, S. Dakota time.) QSL via Vincent A. Van Der Hyde, 747 14th St. SW, Huron, S. Dak.

Hamfest Calendar

Alabama — The Montgomery ARC will sponsor a hamfair at the State Coliseum, Montgomery, on April 15. We have no further information, so contact the Montgomery ARC, P.O. Box 6187, Montgomery 6, Ala.

Florida — The Orlando ARC will hold its annual hamfest on May 4, 5 and 6 at the Cherry Plaza Hotel. There will be a state civil defense forum, and a combined MARS and civil defense meeting. There will be group dinners, forums, and the annual business meeting of the Floridoras. *QST*'s YL Editor, W1QON, plans to be present. The hamfest dinner will be held on Sunday, May 6, at 1300, with a program and speaker. Equipment displays. For further info contact Orlando ARC Hamfest Committee, Box 2067, Orlando, Fla.

Michigan — The annual "Old Timer's Night" at Greenfield Village and the Henry Ford Museum in Dearborn will be held on Saturday, April 7. This year's event is being sponsored by the Catalpa Amateur Radio Society, with Archibald C. Doty, jr., K8CFU, Box 573, Franklin, Michigan, as program chairman. Featured speakers from the Antique Wireless Association will be Bruce Kelley, W2ICE, and Lincoln Cundall, W2QY.

Missouri — The annual WØ DXCC dinner and meeting will be held at the Holiday Inn Motel, North, St. Louis, on April 28. The meeting opens at 1300 local time, with dinner to be served at 1900. Reservations at $6.00 each are available from Sam Halley, WØIJW, 5022 Queens Ave. St. Louis 15, Missouri.

North Dakota — The North Dakota State University Amateur Radio Society will sponsor a hamfest on April 29, from 0800 to 1700, on the NDSU campus, Fargo. Lunch will be served, and there will be contests. For complete details, write NDSU ARS, Electrical Engineering Department, NDSU, Fargo, N. Dak.

Oklahoma — The 10th annual Northfork ARC Hamfest will be held April 28 and 29 at Quartz Mountain State Park, Carter, Oklahoma. Speakers, contests, Sunday lunch—all included in the registration fee of $3.00. Make reservations with Earl L. Street, K5JCH, Route 1, Carter, Okla.

Pennsylvania — The Tri-State Sidebanders are sponsoring a dinner on April 28, at 1830, at Johnny Garneau's Smorgasbord Restaurant, 3800 William Penn Highway, Monroeville, Pa. (one mile west of Pittsburgh Interchange on Route 22). Cost per person is $4.00. Reservations must be in prior to April 21. Contact F. K. Mikesell, K3EVR, 243 Poplar St., Monroeville, Pa.

Texas — There is to be a hamfest in Amarillo on May 5 and 6, but no other details are at hand. Contact the North Texas SCM.

COMING A.R.R.L. CONVENTIONS

April 7-8 — New England Division, Swampscott, Massachusetts.
April 13-14 — Michigan State, Grand Rapids, Michigan.
May 19-20 — Roanoke Division, Roanoke, Virginia.
June 1-3 — Southwestern Division, Anaheim, California.
July 7-8 — West Virginia State, Jackson's Mills (near Weston).
July 21-22 — Rocky Mountain Division Denver, Coloradio.
August 3-5 — West Gulf Division, Corpus Christi, Texas.
September 1-3 — ARRL National, Portland, Oregon.
September 1-3 — Delta Division, New Orleans, Louisiana.
October 13 — Hudson Division, New York, N. Y.
October 19-20 — Ontario Province, Toronto.

The idea of shortening an antenna and loading it inductively to raise the input resistance has long been used with the ground-plane antenna and occasionally with other types. However, the method has not had much use in home-built Yagi-type beams. Besides showing how to go about designing and adjusting the "hairpin match, this article also introduces its complement — the "capacitor match." Both systems are simple to apply.

The Hairpin Match

BY J. D. GOOCH,* W9YRV; O. E. GARDNER,* W9RWZ; AND G. L. ROBERTS *

THE comparatively small size and high gain of a Yagi beam make it an extremely popular antenna. However, such features as close element spacing, small element diameters, adjustment for absolute maximum gain, and location near the ground, all contribute toward a low input resistance. This input resistance, often called driving-point resistance, appears to be as low as 6 to 8 ohms in some close-spaced designs. It is almost always lower than the characteristic impedance of standard coaxial cable or other transmission lines. This means the antenna alone cannot properly terminate the feed line, and a system of impedance-matching between the antenna and feed line is required to obtain a good v.s.w.r. on the line.

While the gamma match provides one solution to the problem, a weatherproof gamma capacitor is difficult to construct.

Hairpin Matching System

An alternative matching method appeared interesting, so the system described in this article was investigated and constructed. This uses a divided or "split" driven element which has both halves insulated from the boom. The antenna is matched to the transmission line by forming an equivalent parallel-resonant circuit in which the antenna resistance appears in series with the capacitance. The impedance of this type parallel-resonant circuit varies almost inversely with the series antenna resistance, and therefore can cause a very small antenna resistance to appear as a very large resistance at the terminals of the resonant circuit. The values of inductance and capacitance are chosen to transform the antenna resistance to a resistance value equal to the characteristic impedance of the transmission line.

The capacitive portion of this circuit is produced by slightly shortening the antenna driven element. For a given frequency the impedance of a shortened half-wave element appears as the antenna resistance and a capacitance in series, as indicated schematically in Fig. 1. The inductive portion of the resonant circuit is a hairpin of heavy wire which is connected across the driven-element center terminals. The feed line is then connected across this equivalent parallel-resonant circuit.

The inductance and equivalent-capacitance product is chosen to be parallel-resonant at the operating frequency, and the inductance-to-capacitance ratio is chosen to transform the antenna resistance to match the feed-line characteristic impedance. The completed structure of the match is shown in Fig. 2.

Procedure for 20-Meter Beam

It was decided to use this system of matching on a new 20-meter beam. The antenna driving-point resistance was determined by a bridge measurement and was double checked by consulting published charts which are listed in the section

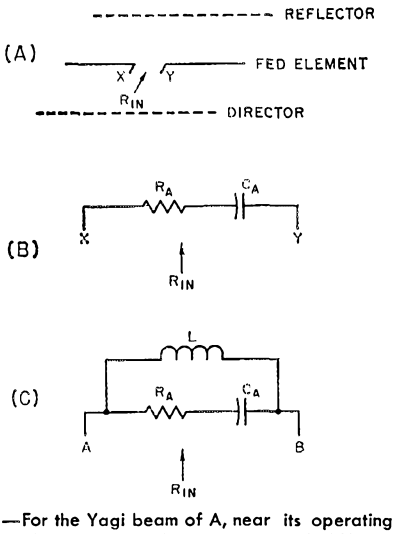


Fig. 1—For the Yagi beam of A, near its operating frequency, the input impedance at terminals XY appears equivalent to the circuit shown in B, if the driven element is shorter than its resonant length.

By adding an inductor, as shown at C, and making L and C_a resonant values, a low value of R_a is made to appear equal to the feed-line characteristic impedance, R_L.

* Coordinated Science Laboratory, University of Illinois, Urbana, Illinois.

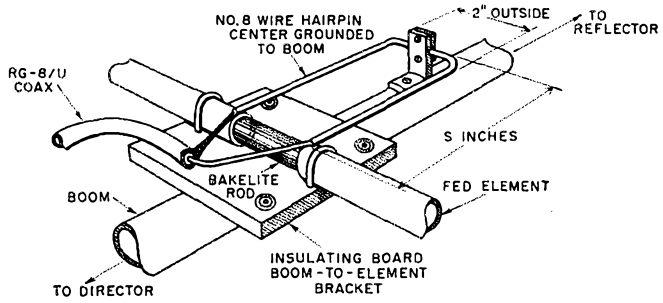


Fig. 2—Construction details at the center of the driven element when using the hairpin match.

"Determining Antenna Resistance." The results of Appendix A were used to calculate the value of hairpin inductance required to match various values of antenna resistance to a 52-ohm coax transmission line, and the graph shown in Fig. 3 was plotted for frequencies centered on 14.280 Mc. From it can be read the correct value of hairpin inductance to use for a particular antenna. The length of hairpin giving this inductance is obtained from Fig. 4.

The value of capacitance to be inserted by shortening the driven element need not be calculated. With the proper hairpin inductor in place, the v.s.w.r. of the line can be monitored and the only cut-and-try adjustment required is that of the driven-element length. This length is adjusted in small steps to bring the v.s.w.r. on the line to near unity.

Construction Details

The driven element was sawed in half (previously a gamma match had been used) and a bakelite rod was telescoped into the two halves of the driven element at the center. A plate of thick micarta resistor-board material, drilled for U-bolts, was used as the insulating element-to-boom mounting bracket.

To measure the antenna resistance and adjust the match, the beam was supported a few feet above the roof of the house and an electrical half wavelength [1] of RG-8/U cable attached. An r.f. impedance bridge was attached to the input end of the cable. Note that no hairpin inductor was connected on the antenna assembly at this time. After adjusting the driven-element length to make it appear resistive or "resonant" in the beam, the antenna resistance was measured and found to be 12 ohms. This was the value of R_a for our antenna. On the graph of Fig. 3, opposite 12 ohms, it is seen that a hairpin inductance of 0.32 μh. is required to match an antenna resistance of 12 ohms to a 52-ohm transmission line, when operation is centered on 14.280 Mc. Fig. 4 is then used to find that an inductance of 0.32 μh. is obtained from a hairpin 8 inches long, made of No. 8 wire, and spaced 2 inches. The hairpin inductance was installed across the driven-element center terminals. With a v.s.w.r. meter in the transmission line, the length of the driven element was varied, keeping the two halves equal in length. After some adjustment the v.s.w.r. on the line was unity. The beam was then raised to 75 feet and a 100-foot length of coax attached. The v.s.w.r. was again measured and found to be about 1.1 to 1. After trimming the hairpin by bending the 2-inch spacing slightly wider, the v.s.w.r. again measured unity a few kc. away from 14.280. Apparently, raising the beam increased the antenna resistance and made a slightly larger inductance optimum. Raising

[1] An electrical half wave of RG-8 U or similar solid-dielectric cable is equal to $\frac{324}{\text{Freq. in Mc.}}$ feet.

For 14.280 Mc., this is 22 feet, 8¼ inches.

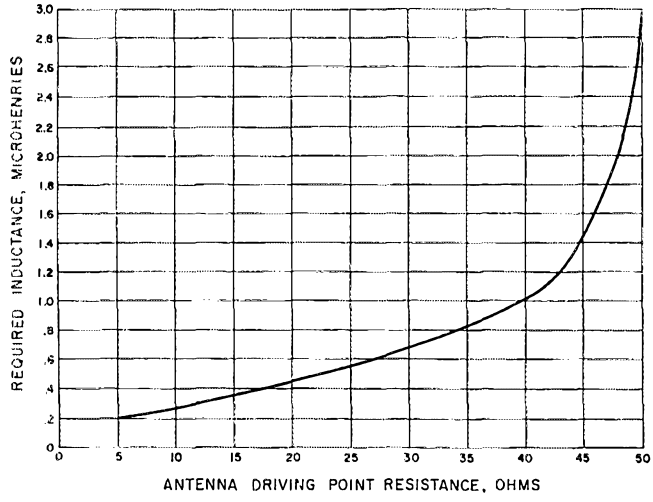


Fig. 3—Inductance required to match various antenna driving-point resistances to a 52-ohm transmission line when operation is centered on 14.28 Mc.

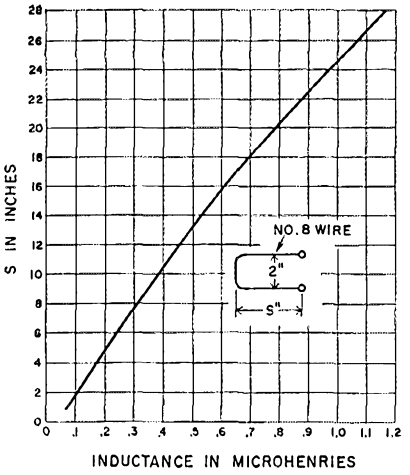


Fig. 4—Length of hairpin inductor, made from No. 8 wire with 2-inch spacing, required to give various values of inductance.

the beam changed the v.s.w.r. very little and trimming it on top of the tower was not actually necessary.

The procedure used eliminates a large amount of cut-and-try in the adjustment of the matching system. If the antenna resistance is determined initially, the correct hairpin inductance can be obtained from the graph or by calculation, and only adjustment of the driven-element length is required to bring the v.s.w.r. to a satisfactory value.

Determining the Antenna Resistance

To design a matching system as described, the antenna resistance, R_a, must be known. If an approximate value of R_a is not known, many combinations of hairpin inductance and driven-element length may have to be tried before a low v.s.w.r. is obtained. (This can be done in a fashion similar to the adjustment of a gamma match, where the gamma capacitor and gamma rod length must both be adjusted.) When an approximate value of R_a is determined first, the method presented can be used to obtain the required hairpin, and only the driven-element length need be adjusted to bring the v.s.w.r. near unity.

The most direct method of obtaining R_a is a bridge measurement at the antenna, or at the end of a connected electrical half wavelength of feed line, before the hairpin is connected. A bridge such as shown in the *ARRL Handbook* [2] is useful. Care should be taken to have the driven element at its resonant length in the beam when the resistance measurement is made. This will be indicated by a deep null on the bridge, rather than a broad minimum.

It is also possible to get an approximation of R_a using published information. Two sources are referenced below.[3,4] An error in determining R_a will lead to use of the wrong design value of hairpin inductance, and inability to get a low v.s.w.r. by varying the driven-element length. However, the inductance can be easily trimmed to a more correct value by bending, or by incorporating a shorting bar on the hairpin.

The Capacitor Match

A different but related system of matching a beam antenna resistance to the feed-line or balun resistance is possible. If the driven element of the beam of Fig. 5A is longer than its resonant length, the input impedance, Z_{in}, appears equivalent to a resistance and inductance in series as in Fig. 5B. The presence of inductive reactance is indicated in Fig. 6 where the element length is greater than approximately 0.5 wavelength. A capacitor added externally across the center terminals of the divided, insulated driven element takes the place of the hairpin inductor shown in Fig. 2. In the equivalent circuits of this capacitor match and the previous system, the capacitor and inductor have been interchanged. The equation for computing the capacitor required in this matching system is given in Appendix B, but the capacitive *reactance* required here is identical to the inductive reactance required in the previous system. Therefore, Fig. 7 can also be used when designing a capacitor match, to determine the capacitive reactance, X, required to match an antenna resistance, R_a, to a transmission line impedance, R_t. The capacitance having this reactance is then:

$$C = \frac{1}{2\pi f X}$$

where X is in ohms, C is in μf., and f is in Mc. The adjustment procedure is the same as previ-

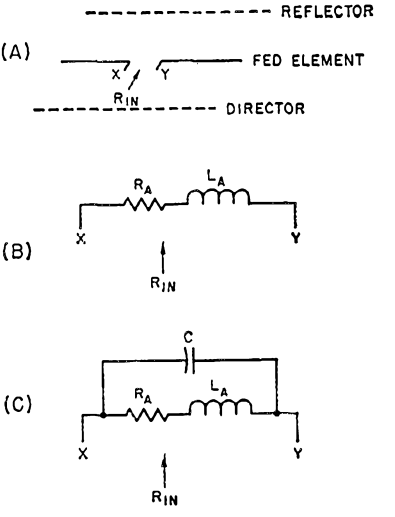


Fig. 5—A capacitor match is formed by making the driven element of the antenna shown at A longer than its resonant length, causing the input impedance at XY to appear equivalent to the circuit shown at B. By adding proper capacitance, as shown in C, the antenna resistance, R_a, is transformed to R_t, the transmission line or balun impedance.

[2] *The Radio Amateur's Handbook*, 38th ed., 1961, p. 379.
[3] *The A.R.R.L. Antenna Book*, 8th ed., p. 59.
[4] Uda & Mushiake, *Yagi-Uda Antenna*, Maruzen Co., Ltd., Tokyo, Japan, 1954, pp. 112-117.

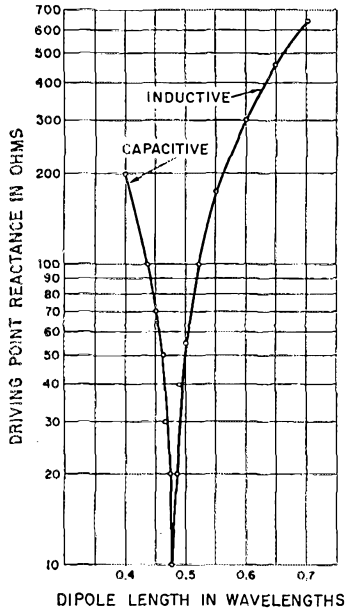


Fig. 6—The left curve shows typically the capacitive reactance appearing in series with the antenna resistance when a dipole is shortened, and indicates how C_a is formed. The right curve indicates inductive reactance of a lengthened dipole, and demonstrates the principle used in the capacitor match.

ously described except that the driven-element length is *increased* from its resonant value to provide inductive reactance which resonates with the externally added capacitor. Thus, when the correct external capacitor has been connected, the v.s.w.r. of the line is monitored while the driven-element length is adjusted to make the v.s.w.r. approach unity.

The "capacitor match" system allows mopping up of a small parasitic capacitance that exists between the center ends of the divided driven element. This parasitic capacitance was not included in the equivalent circuit of Figs. 1B and 1C, and might become important at v.h.f. Also, lengthening the driven element to introduce inductance raises the antenna driving-point resistance a few per cent, and this might be desirable.

Theory

The antenna resistance, R_a, appears in series with one of the elements of a parallel-resonant circuit in both Fig. 1C and Fig. 5C. In this location, if the resistance is changed, it causes the Q of the parallel-resonant circuit to vary almost inversely with the value of resistance. If the series resistance is low, the Q of the circuit is high. The impedance seen across the parallel resonant circuit is high when the Q is high. Therefore, a lower antenna resistance tends to present a higher resistance at the terminals where the transmission line is connected.

One other factor is involved. This is the L/C ratio of the circuit. When a specific matching system is to be designed, the antenna resistance is fixed by the choice of the particular antenna. Similarly, the choice of a transmission line fixes that resistance. The job of matching, then, is to select the L/C ratio which will transform the antenna resistance to the transmission line resistance, while also having the LC *product* which makes the parallel circuit resonant at the operating frequency. In the very low-Q circuits which are required in many of these designs, parallel resonance is more complicated than in high-Q circuits, because changing the value of series resistance alters the resonant frequency, even though the L and C values remain fixed.[5]

Fortunately, this is all considered rather simply in the work of the Appendix, and values of reactance required for matching are easily graphed. They are presented in Fig. 7. For most designs, values can be obtained in a straightforward manner from the graphs.

(Continued on page 146)

[5] The equivalent circuit will be recognized to be an L network, with the antenna resistance on the series side and the resistance to be matched on the shunt side. The usual L-network formulas apply (see Grammer, "Simplified Design of Impedance-Matching Networks," Part I, *QST*, March, 1957, for principles and derivation of formulas).—*Editor*.

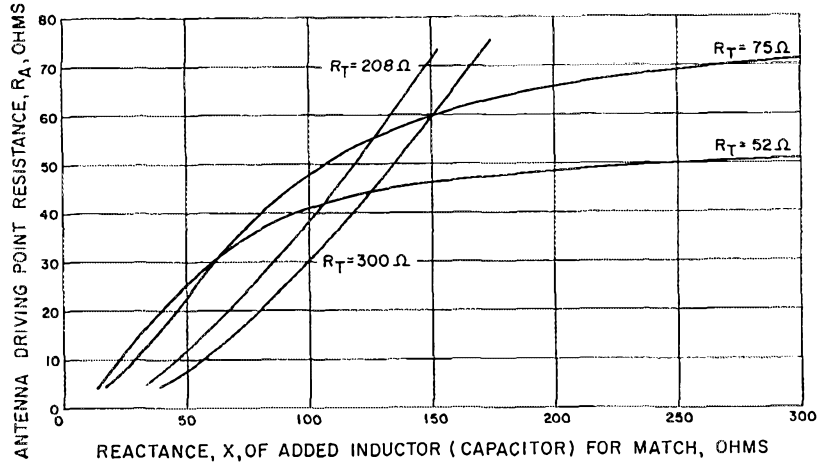


Fig. 7—Reactance required to match various antenna resistances to common transmission line or balun impedances.

Listening for Satellite Tracking Transmitters on 136 Mc.

AMATEUR interest in reception of signals from satellites has not been particularly high, as a general rule. We had a go at listening for the first Sputnik, back in 1957, and the chirpy "HI" of Oscar I attracted a lot of attention around the world recently because of its stature as a legitimate amateur effort, but in between we tended to ignore satellite signals. They don't say anything we can understand, ordinarily, and their frequencies are for the most part remote from amateur bands, so that special receiving and antenna installations are required.

But now comes another reflecting balloon satellite, this time designated Echo A-12. As suggested in "The World Above 50 Mc." in February *QST*, this second of the Echo series has at least marginal v.h.f. possibilities for amateurs. It will carry tracking transmitters putting out signals in the 136-Mc. region. If we are to make use of the new and larger Echo for reflection of amateur v.h.f. signals, it would be nice to be able to monitor the balloon transmitter, as an aid to lining up antennas. Checks with several representative 2-meter converters indicate that this should not be hard to do.

Converter Changes

If you have a 2-meter converter and a general-coverage communications receiver the chances are that you can listen on 136 Mc. with no effort other than that required to move the receiver dial. The Nuvistor converter described by the writer in October, 1961, *QST*, works very well on 136 Mc. merely by resetting the communications receiver from 14 to 6 Mc. No change whatever is required in the converter itself to develop more than enough sensitivity at 136 Mc. for the job at hand. Most v.h.f. converters have more gain than is needed anyway, so you can afford to throw away some at the intermediate frequency without any bad effect. To peak up the converter at the lower intermediate frequency, connect an 82-$\mu\mu$f. capacitor across the mixer plate coil, L_5. The higher circuit Q that this introduces is no problem, as we are not concerned with obtaining a broad i.f. response when listening on 136 Mc. All the satellite signals you'll want to hear will be close to this frequency.

Having found this to be such a simple matter we then dug out the 108 144-Mc. converter, described by W1VLH in *QST* for November, 1956, and (with modifications for lower cost) December, 1957. As originally built, this converter made provision for an i.f. range of 7 to 11 Mc. Obviously you can't drop this i.f. far enough to pick up 136 Mc. without changing the crystal that furnishes the injection frequency! So, turns were removed from the mixer plate coil, L_7, until it tuned to around 14 Mc., and a crystal for 43.333 Mc. was plugged in. This changes the converter for 14-Mc. i.f. The oscillator coil, L_8, had sufficient range with its tuning slug to hit both 45.667 (the original frequency) and 43.333 Mc. A 4-turn version of L_9 was needed to hit the 130-Mc. injection frequency. Even with the front-end coils tuned up for 144-Mc. reception, the converter showed adequate sensitivity at 136 Mc. with no further changes

One reason that moving to 136 Mc. is so readily done is that the input circuits of most low-noise converters are resonant well below 144 Mc. to start with. The selectivity of the r.f. circuits is not very great, even when some attempt is made to provide r.f. selectivity, so the response of the front end is not likely to fall off much in going down to 136 Mc. It is safe to say that most 144-Mc. converters will be usable on 136 Mc. with no more trouble than we describe above. Exceptions may be found where an effort has been made to develop a bandpass response in the i.f. circuitry of the converter. Tapetone's XC-144 is one such. The mixer plate circuit has two slug-tuned coils arranged for a humped response at 14 to 18 Mc., which results in a large drop in gain when one goes down to 6 Mc. for the i.f., but even in this converter the sensitivity at 136 Mc. may be enough to hear a tracking transmitter. We are interested primarily in hearing the signal over line-of-sight paths, so maximum sensitivity is not a critical matter.

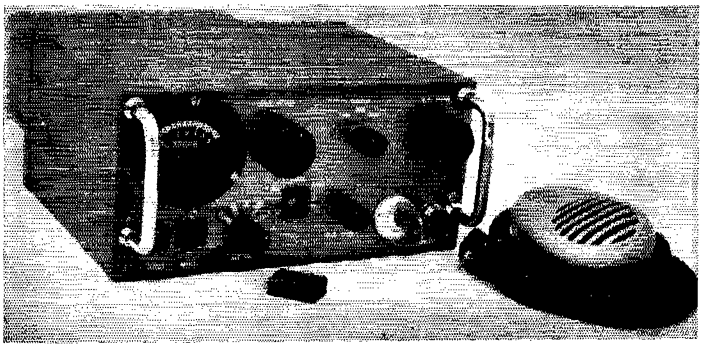
Converter systems that include i.f. amplifiers may be more of a problem. The best solution with these, and with converters of the humped i.f. response circuitry, is to change the injection frequency so that the original i.f. range can be used. With converters for the 14-Mc. range this usually means putting in a crystal for 40.667 Mc. and retuning the multiplier to 122 Mc. The front-end selectivity will almost certainly not be sufficient to cause any great loss in r.f. and mixer performance in 136-Mc. reception.

Antennas

The usual Yagi antenna used in 144-Mc. work probably has more selectivity built into its design than does the front-end circuitry of the receiving system. A 144-Mc. collinear 16- or 32-element array may do an acceptable job at 136 Mc., but most Yagis will not. Their pattern will be so full of minor lobes that the array will be of little help in tracking at 136 Mc. The best bet then would appear to be a dipole or small Yagi for 136 Mc. The usual formula dimensions should be close enough:

Dipole — 40¾ inches.
Reflector — 42¾ inches.
First Director — 38¾ inches.
Other Directors — 38¼ inches.
Element Spacing (0.2 wavelength) — 17 inches.

— *E. P. T.*



Front view of the transmitter: The controls are few and simple. The appendage at the rear of the cabinet is a heat sink on which the modulator transistors are mounted.

Five Transistors— Two Tubes— 35 Watts

A Unique Scheme for Mobile Controlled-Carrier Phone

BY JOHN A. MEISSNER,* K5CXN

ASSUMING a reasonably efficient antenna installation, the factors which contribute the most intelligibility to a mobile signal are power input and modulation percentage. Large inputs, however, are severely limited in the casual mobile installation by the inefficiencies of power conversion and subsequent power use. It has been estimated that mobile installations rarely consume less than three watts of primary power from the automotive system for every watt of final amplifier input.[1] It is the author's opinion that ordinary mobile efficiency is on the order of 15 per cent, or approximately seven watts of primary power for every watt of input. This fact alone is the principal reason that the majority of mobile transmitters are in the 7- to 20-watt class. The particular transmitter described here is an attempt, through controlled-carrier techniques and quick-heating filament tubes, to get more power input with much less battery drain and still keep the modulation percentage as high as possible.

Electrical and Mechanical Design

In the interests of flexibility, the transmitter is constructed to operate on three bands — 75, 20, and 10 meters. Crystal frequencies in the 40-meter range are doubled for 20 meters and are quadrupled for 10-meter operation. Straight-through operation is used for 75-meter frequencies. To simplify control, switch wafers above (final amplifier) and below (oscillator) the chassis are mechanically linked so that a single knob does the job of changing bands. Also included is the simultaneous switching of the appropriate crystal socket for 75- and 20/10-meter operation.

The homemade steel cabinet measures 9¼ by 7¼ by 4½ inches high. The standard 9 × 7 × 2-inch aluminum chassis which supports the majority of the components fits it nicely. As the dust of the Great Southwest seems to be drawn magnetically into a mobile transmitter, and since the rig needs very little cooling, no ventilation holes of any kind were made in the cabinet.

The heat sink on the rear of the unit was removed from a transistor power supply of unknown manufacture. It was designed to dissipate at least 75 watts and doesn't even get warm. An excellent substitute for this item is manufactured by the Delta Corp., Model NC-403.

Operating Principles

Although a detailed examination of the transmitter schematic may lead to some confusion, the

Here is a completely self-contained mobile rig which develops a 100-per-cent-modulated 35-watt input in a minimum of space, and does it at the expense of only 10 amperes total drain from a standard 12-volt system. Standby drain is nearly zero, and total drain occurs only on voice peaks.

* Gulton Industries, Inc., 15000 Central Ave. S.E., Albuquerque New Mexico.

[1] Mix, *The Mobile Manual for Radio Amateurs*, ARRL, 1955, p. 8.

operating principle of the rig is basically simple. The r.f. circuitry is quite standard,[2] but the modulator circuitry is a somewhat different story.

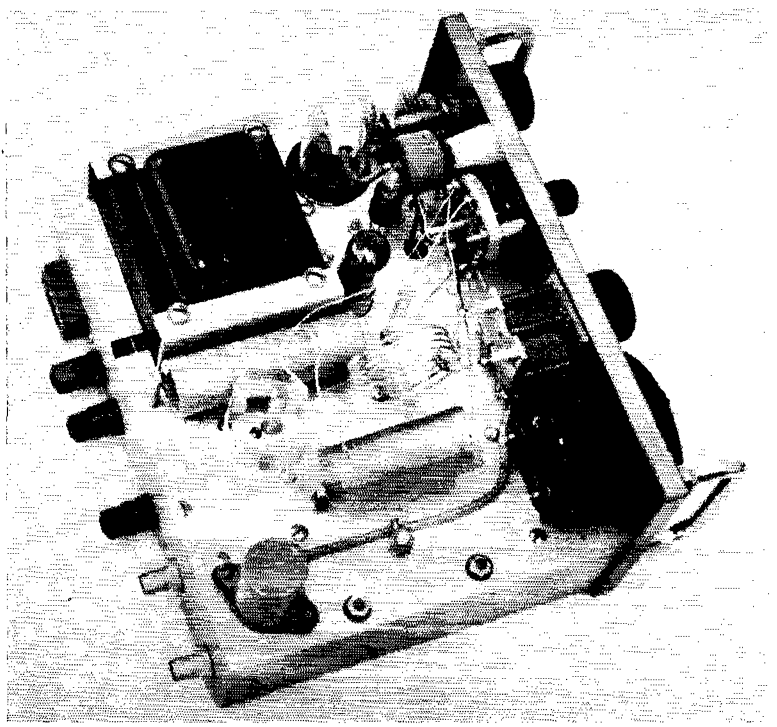
On closing the microphone push-to-talk switch, the primary power relay, K_1, applies 12-volt d.c. from the automobile electrical system to the transmitter. The filaments begin to heat, and the power supply (dotted enclosure) delivers 200 volts d.c. through one set of contacts on relay K_2 to the 2E30 oscillator/multiplier. The oscillator/multiplier operates continuously to provide grid drive for the 2E24 final amplifier. Battery drain at this time is approximately 1.5 amperes for the 200-volt supply and 1.0 ampere for the filaments, a total of 2.5 amperes. The filaments are not operated in series because the cathode current of one tube would flow through the filament of the other tube, resulting in excessively high filament current for the second tube. No carrier is generated at this time as no plate voltage has been applied to the final.

Now let sound fall upon the carbon microphone and the resulting audio voltage be amplified by Q_1 Q_2, and Q_3. This generates a voltage in each of the two secondary windings of T_4. Voltage from the power winding is rectified, filtered, and passed through the other winding where it is modulated and then delivered to the final amplifier. With modulated d.c. potential applied, the final generates a carrier, as would any properly-functioning Class C amplifier. As the final operates at a syllabic rate (approximately a 20 per cent duty cycle), its power-handling capabilities can be overrated somewhat, and the 2E24, normally rated at 28 watts input, can be operated at inputs as high as 40 watts. The author has operated a 6CU6 Class C final in this fashion for extended periods of time at inputs of 110 watts with no apparent tube damage.

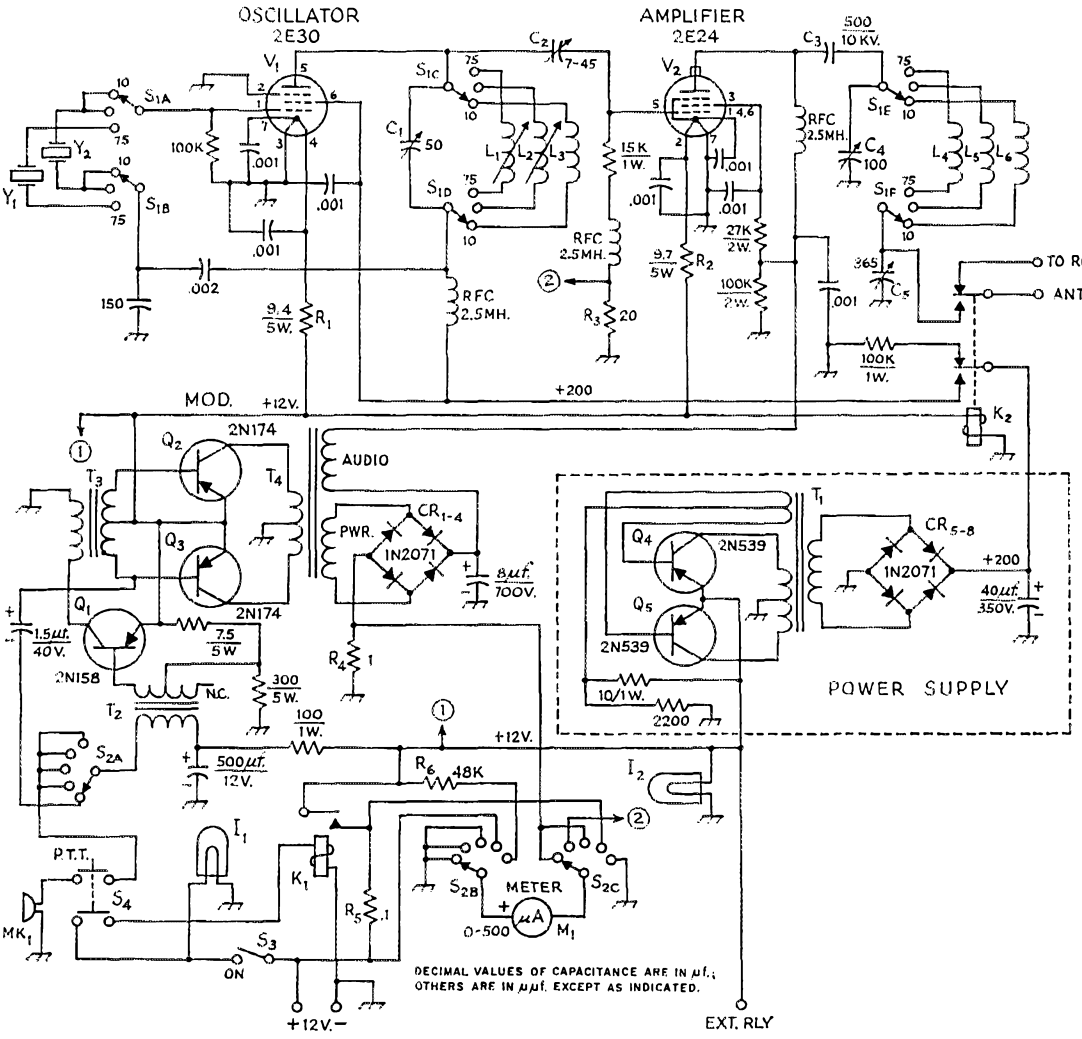
In theory, the two voltages generated within the modulation transformer should be equal, for 100 per cent modulation.[3] In practice, however, a few extra turns are added to the power winding to allow for rectifier loss and capacitor voltage lag. In any event, the efficiency of the modulator/power supply is quite good and, considering the modulated d.c. power generated, rises as high as 57 per cent on voice peaks. This means that under key-down conditions with full modulation, the entire transmitter consumes slightly less than 10 amperes from a 12-volt source — and does it on only a 20 per cent duty cycle. Moreover, precisely the correct amount of carrier is gener-

[2] McGinnis, *The Mobile Manual for Radio Amateurs*, ARRL, 1955, p 182-3.

[3] This is true if the power-supply filter capacitance is large enough to hold the rectified output voltage at the a.c. peak value at all loads. As this is an unlikely condition, it is advisable to use more turns on the power winding than on the modulation winding. How many more will be required will depend on the voice waveshapes, filter capacitance, loading, and so on. — *Editor*.



Behind the panel: The large transformer is T_4, and the electrolytic next to it is the 8-μf. filter capacitor. The upright cylindrical object in the foreground is relay K_2. The band-switch linkage goes through the hole in the chassis behind the panel section of the switch (see Fig. 2). The rectangular receptacle on the chassis back mates with a plug on the transistor heat sink, which is mounted on the back of the dust cover. The two bolts, with insulating washers, at the near edge of the chassis, are the mountings for Q_4 and Q_5.



ated for any given quantity of audio, and the result is 100 per cent modulation for any intensity of speech.

The obvious advantages of this system are:

1) Much reduced power consumption.

2) Low standby drain (60-ma. pilot lamp).

3) An effective, 100 per cent modulated signal.

4) Reduced construction cost (no large d.c. to d.c. power converter).

Transformer Construction

As a transformer of the design required by this modulation circuit is not made commercially, hand-winding techniques must be employed. This is not as difficult as might be implied, because the number of turns is relatively small and the coils can be simply scramble-wound on the core. Old power-transformer cores seem to be capable of good modulator efficiency, are readily available, and are easy to work with. Approximately one square inch of core area should be allowed for each 20 watts of desired final amplifier input. The particular core used in this transformer has an area of 2.23 square inches. Turns required for the transformer windings can be calculated from the formula:

$$N = \frac{E}{.1} \times 1.568$$

where N is the number of turns (double the value of N for the number of turns in the entire collector winding), E is the voltage impressed on N turns, or the voltage that is desired to be developed by N turns, and A is the area of the core in square inches. A stacking factor of 0.85 is incorporated into the equation as is an audio design frequency of 400 cycles. A 3-per-cent increase in the number of turns on the power winding provides the necessary compensation for rectifier loss and capacitor voltage lag. It is best to use a minimum design voltage of 11 volts each side of the center tap for the collector winding, to allow

Fig. 1—The mobile transmitter circuit. Resistances are in ohms; resistors are ½-watt composition unless indicated otherwise. Fixed capacitors with polarities marked are electrolytic; others are disk ceramic.

C_1—50-$\mu\mu$f. variable, APC type with shaft.
C_2—7-45-$\mu\mu$f. ceramic trimmer (Centralab 822-BN).
C_3—500-$\mu\mu$f. 10,000-volt doorknob-type ceramic.
C_4—100-$\mu\mu$f. variable (Hammarlund MC-100-S).
C_5—365-$\mu\mu$f. variable, broadcast-replacement type.
CR_1-CR_8, inc.—Silicon diode, 600 volts p.i.v., 750 ma. (Texas Instruments 1N2071 or equivalent).
I_1, I_2—12-volt dial lamp (No. 53).
K_1—S.p.s.t., 12-volt d.c. coil, 60-amp. contacts (Potter & Brumfield MB3D or equivalent).
K_2—D.p.d.t., 12-volt d.c. coil (Potter & Brumfield KT11D or equivalent).
L_1—Approx. 50 μh.; 60 turns No. 30 enam. on ½-inch diam. slug-tuned form (CTC PLS7-2C4L/H or equivalent).
L_2—Approx. 4 μh.; 25 turns No. 20 enam. on same type form as L_1.
L_3—7 turns No. 20, ¾-inch diam., 16 turns per inch (B & W 3011).
L_4—55 turns No. 24, ¾-inch diam., 32 turns per inch (B & W 3012).
L_5—10 turns No. 18, 1¼-inch diam., 16 turns per inch (B & W 3019).
L_6—4 turns No. 16, 1¼-inch diam., 8 turns per inch (B & W 3018).
M_1—0-500 microammeter.
MK_1—Carbon microphone.
Q_1—2N158, 2N155 or 2N156.
Q_2, Q_3—2N174 or 2N277.
Q_4, Q_5—2N539 or 2N256.
R_1—10-ohm, 5-watt wire-wound in parallel with 150-ohm, ½-watt composition.
R_2—10-ohm, 5-watt wire-wound in parallel with 330-ohm, ½-watt composition.
R_3, R_4, R_5—Meter shunts; value depends on internal resistance of M_1. See Table II for ranges.
R_6—Voltmeter multiplier; value shown is for 24 volts full scale with 0-500 microammeter at M_1.
S_1—Ceramic rotary; ganged—Above chassis: 2 poles, 5 positions, 2 positions not used (Centralab type 2515 or equivalent with one section removed). Below chassis: 5 poles, 3 positions—1 pole not used (Centralab type PA-2015 or equivalent).
S_2—Rotary, 3 poles, 6 positions, 2 sections, 2 poles per section (Centralab PA-2011 or equivalent, 1 pole unused).
S_3—Ignition-type lock switch.
S_4—D.p.s.t. push-to-talk (on microphone).
T_1—Transistor power transformer; see Table I and text.
T_2—Microphone input, 100 ohms to 200 ohms c.t., 2 watts (Argonne AR-504).
T_3—Transistor driver, 20 ohms to 36 ohms, c.t.; max. pri. current 400 ma., 1 watt (Stancor TA-16).
T_4—Power-modulation; see Table I and text.
Y_1—3.8-4-Mc. fundamental.
Y_2—7-Mc. fundamental.

for good transmitter operation under adverse battery conditions.

The toroidal transformer T_1 can be wound with the number of turns indicated in Table I on a Deltamax 4635-D2 core or on one of the many available equivalents. For benefit of the interested amateur, articles have appeared in past issues of *QST* which will provide many hints and techniques of transformer construction.[4]

Tune-Up

One of the drawbacks of this controlled-carrier system is the difficulty of loading and tuning the final amplifier when the plate current is fluctuating with modulation. This problem is solved with the "tune" position on the meter switch. In this position, the meter is connected in the final plate/screen circuit and the primary winding of T_2 is switched from the microphone to the secondary of T_3 through a 1.5-μf. capacitor. This closes a feedback loop and sets the audio amplifier into oscillation. The resulting audio note is sufficient in magnitude and stability to enable straightforward tuning of the final amplifier. Other positions on the meter switch, in order, allow monitoring of grid drive, final plate/screen current, total primary current consumption, and primary supply voltage. Expected meter readings in these switch positions are tabulated in Table II. Plate voltage applied to the final amplifier is between 565 and 600 volts, depending on the input voltage from the automotive system.

Of particular interest in the circuit is the 100K 2-watt resistor from the final-amplifier plate supply to ground. This resistor, by functioning as a bleeder, prevents puncturing transistors Q_2 and Q_3 through the elimination of voltage spikes generated in the otherwise unloaded modulation transformer during filament warm up. Current flowing through this resistor, along with the final-amplifier screen current, is registered on the plate milliammeter and must be mentally subtracted when tuning the final.

Also of interest is the reason for the lower value of filament resistor for the 2E30 than for the

TABLE I

Transformer Winding Data

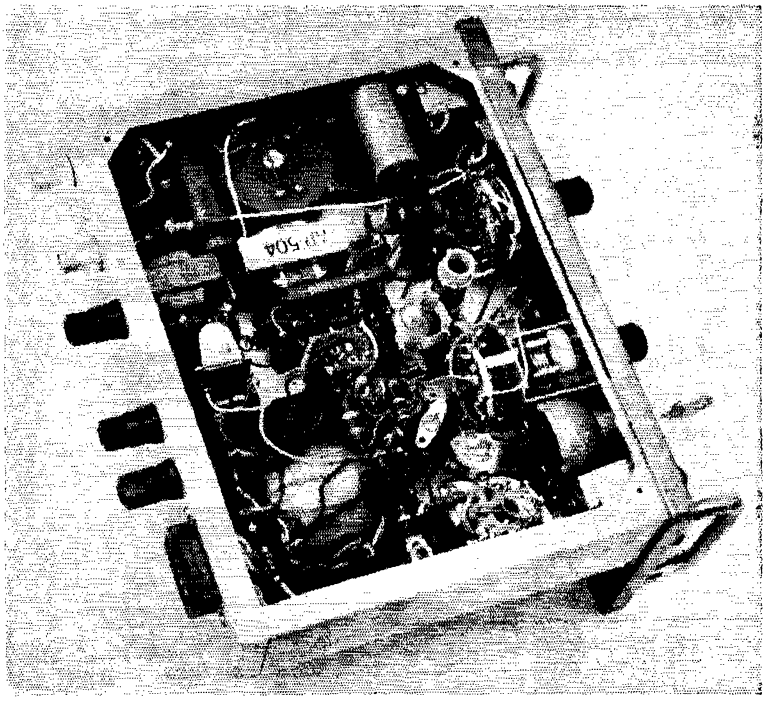
Power Transformer, T_1.

Core: Tape-wound (0.002-inch high-permeability tape) toroid; inside diameter 0.906 in. outside diameter 1.469 in., height 0.383 in. (Arnold Deltamax 4635-D2).
Primary 1 (collector): 56 turns No. 20 enam. each side center tap; bifilar wound.
Primary 2 (base): 20 turns No. 26 enam. each side center tap; bifilar wound.
Secondary: 1200 turns No. 30 enam.

Modulation-Power Transformer, T_4.

Core: E-1 laminations, silicon steel. Core area 2.23 square inches; outside dimensions 3 15/16 in. long by 2⅞ wide by 1¼ high.
Primary (collector): 13 turns No. 14 enam. each side center tap; bifilar wound.
Secondary 1 (power): 515 turns No. 30 enam.
Secondary 2 (modulation): 500 turns No. 30 enam.

[4] Tetz, "Design and Construction of Transistor Power Converters," *QST*, April, 1960.
Coats, "A Cool Kilowatt Plate Transformer," *QST*, September, 1959.
Maresca, "More on Homemade Transformer Design," *QST*, November, 1960



The underside of the chassis is well filled with components. The circular object between two tubular electrolytics is the toroidal transformer T_1. The oscillator portion of the band switch is mounted on a frame behind the p.a. grid tuning capacitor.

2E24, in that its filament is rated at 6.0 volts as compared to the 6.3-volt filament of the 2E24. This value assures that the oscillator will warm up and develop final-amplifier bias before the 2E24 becomes operative. Excessive final plate current might otherwise flow with the meter switch in the "tune" position and the microphone switch depressed. The increased filament voltage of the 2E30 remains safely within the published 6.0-volt ± 10 per cent range.

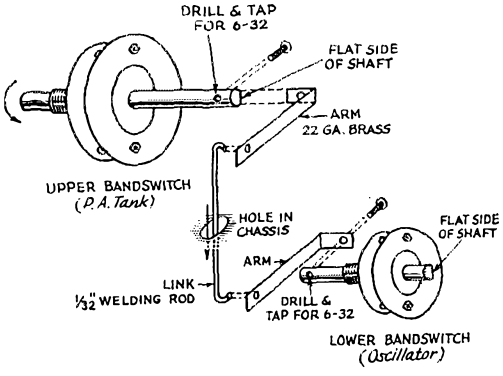


Fig. 2—Detail of band-switch linkage. In the author's case the extra length of shaft at the rear resulted from removing a switch section, but a long-shaft index assembly with a single switch section could be made up from components.

TABLE II

Expected Meter Readings

Switch Position	Meter Range	Normal Indication	Measurement
Tune	0-120 ma.	72 ma.*	P.A. Plate
Grid	0-6 ma.	5-6 ma.	P.A. Grid
Plate	0-120 ma.	0-72 ma.*	P.A. Plate
Amp.	0-12 amp.	2.5-10 amp.	Input Current
Volts	0-24 volts	12.6 volts	Input Voltage

* Normal load current. Subtract 10 ma. screen and bleeder current for true plate current.

Conclusions

This transmitter is not to be considered a final design. Although it has provided the author many hours of enjoyable QSOs and has proven to be a practical device, it represents little more than the consolidation of an idea. The power range of this type of transmitter is limited only by the power capabilities of the modulation transistors and the ingenuity of the builder. It might also be mentioned that this type of transmitter should be an excellent driver for a high-power linear amplifier in mobile service . . . certainly an interesting thought.

Strays

MEMBERSCRIPTIONS ANYONE? See page 165.

Almost Four Thousand AREC Members Turn Out for October Test

Simulated Emergency Test—1961

BY GEORGE HART,* W1NJM

IN MOST respects, the 1961 SET topped them all. Not for a good many years have we been able to say this, and it gives us great pleasure; for the Simulated Emergency Test, unlike most ARRL operating activities, has had an uphill climb. Starting in 1947 with reports from 54 ECs, it developed rapidly, almost quadrupled by 1952 at the height of the RACES boom, then fell dishearteningly off until, by 1957, we were looking for a quiet way to drop it overboard without a splash. But during 1958 our AREC people began to re-appraise their status and their civil defense and Red Cross connections and get rid of some dead wood. Dependence on the government for direction is gradually giving way to dependence on *ourselves* and to realization of our own responsibility for being prepared to provide a useful and adequate public service.

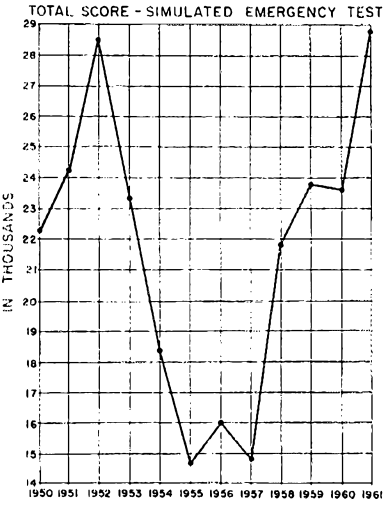
The total of points compiled in 1961 for the first time exceeds the total compiled in 1952, our previous peak year. Most other data were also up: we had more EC reports, more total participation and more AREC-member traffic handled. We were still slightly under our 1952 peaks for number of mobiles and portables in operation, number of fixed stations on emergency power and number of EC radio reports. But we think the boom is on, that the SET will become an increasingly important part of our amateur year "on the air" until the 1952 peak year will look puny and insignificant by comparison.

What Is the SET?

For those readers who may not know what this is all about, a word of explanation: The Simulated Emergency Test is an annual activity of the Amateur Radio Emergency Corps, the amateur's own public service organization, sponsored by the League. It is at once both a test of our own facilities for evaluation purposes and a public demonstration of our abilities along this line. The test is sponsored locally by the Emergency Coordinator (appointed by the Section Communications Manager on the recommendation of the Section Emergency Coordinator) in cooperation with whatever agencies are interested in being served, such as Red Cross, civil defense, utilities, public safety or other government agencies. An emergency is simulated and AREC members are put through their paces, while the public and the press look on. Some of the tests are small, token efforts, others are widespread and highly publicized, depending almost entirely on the groundwork and reputation previously accomplished by the Emergency Coordinator and his planning staff of AREC members. In some places, section-wide or state-wide tests are held, in which a single simulated emergency situation provides the hypothesis for all AREC groups in the area concerned.

* National Emergency Coordinator, ARRL.

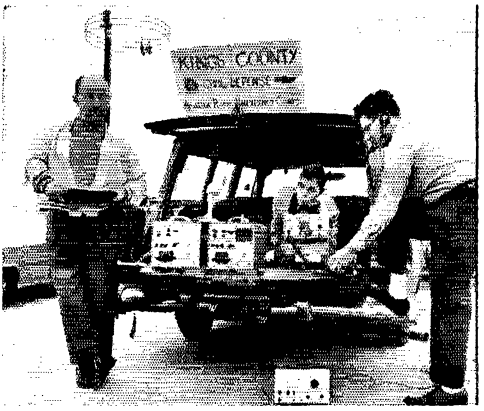
At Casper, Wyo., SET planners gather in the shack of EC W7LKQ (seated, holding mike). Facing him is W7BHH, RACES chief. At his left is the Natrona County c.d. director. Standing is Asst. EC K7LJB.



This line graph shows how the fortunes of SET (paralleling the fortunes of AREC) have fluctuated since 1950, when we first started keeping "score" in these tests. In 1961 we exceeded "RACES boom high" of 1952 for the first time, after a long, hard climb from the 1955–57 doldrums.

National Aspects

The SET is not just a series of simultaneous but unconnected local exercises. In fact, many AREC groups chose to take advantage of the option of conducting their exercises at times other than the designated October 7-8 week end, more in keeping with their own conveniences and in bet-



Kings County, N. Y., is Brooklyn, and this covers a lot of people. Above is part of the Kings Co. SET operation on 2 meters, with Asst. EC K2LOE (left) in charge while WA2HVK and K2AAL operate the rigs.
(Photo by *The News*, New York, N. Y.)

In Jackson County, Mich. SET operation was controlled from the county AREC truck. Here are K8JKI (left) and K8JRT operating from inside the truck.

ter coordination with to-be-served agencies. National-level traffic was destined for Red Cross, civil defense and ARRL headquarters through networks of stations sponsored by each agency; but in the SET they all worked together and handled much of each others' traffic. The Red Cross's considerable amateur facilities were put into full-scale operation, under the direction of Assistant Director Allen Richter, W4PHL. Traffic destined to the Red Cross was funneled through collecting stations and relayed to AMCROSS headquarters through the extensive teletype network, some radio and some wire. Liaison was maintained throughout with AREC, MARS and RACES groups. In this way, a great number of messages were relayed from local Red Cross chapters to national headquarters through amateur radio.

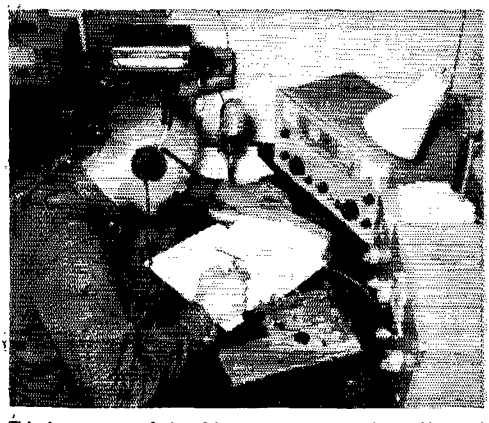
Regional offices of the Office of Civil Defense and the operational headquarters at Battle Creek were contacted prior to the test, and most of them had stations on the National Calling and Emergency Frequencies ready to accept traffic for their regions or the national headquarters. However, there was little civil defense traffic flowing at the federal level. It appears that local

This is K4JYL, EC for Orange and Louisa Counties, Va., directing the SET from his home station in Orange, Va.

c.d. directors, lacking the incentive to do so that is supplied by the Red Cross, are far less inclined to originate traffic. Most of the regions reported no traffic; others reported only a few messages handled.

Each AREC Emergency Coordinator was requested to report by radio to ARRL headquarters. Of the 194 ECs who reported by mail, 124 indicated that they also reported by radio. At ARRL headquarters, 73 such messages were received. If we took this at its face value, this would mean that over 40% of the messages originated were never received at headquarters. This is so completely ridiculous (even if we're bad, we're not *that* bad) that we won't even consider it as a statistic. We think that many ECs simply reported by radio to their SECs and considered this their radio report. A total of 201 amateurs were heard from by radio, including the 73 messages received from ECs[1]. Also heard from were a few dignitaries, such as the C.D. Director for Mills County, Iowa; Red Cross Chapter Manager of Dade County, Fla.; Presi-

[1] Individual AREC members were not encouraged to send messages to ARRL headquarters, but some of them did so nevertheless. We acknowledge all messages received from amateurs by call letter: *K1s* BZD DGK DYG HGW IMI OLS OYM OLT QNQ, *W1s* ADW AWA CKA EPZ GRG JSM JCI KSI KYQ KVA NXY NLE OBR; *K2s* HNW JYA LFL OVN SJN UBE ZFI, *W2s* DMJ MTA/4 PUC PYC, *WA2s* BNF CCF CEA DGI GGQ KAP TVN; *K3s* JSX KNO KPZ NZD NYX PIY, *W3s* BJQ BUD CUK DGX DUI ELM JLM KUQ LXQ LSE MIM ORJ OKI PHH SAY UIY WRE WRC ZNW ZRQ; *K4s* CDC GCC IWT JYL KGB KUN MKO POI/Ø QVD TTA UCF UCH YOQ, *W4s* BWH CTU/9 CWD DDY GWF IYT IIM JVM PIM WBK WHK; *K5s* JOA KTW LZF PDM UZL, *W5s* AIR ACS ADC IJR MFX PAA WAX ZHN; *K6s* BBF RYI, *W6s* DEF MLZ SLX UAA WAW ZRJ, *WA6s* BFC EIC; *K7s* AXF CSW DKZ IVK IOW IAY ILD JED KXX LBW LJB, *W7s* BXY COH HJ JU LVU LKQ NNX PXE SZZ UFB YSF YFO; K8JSQ, *W8s* DTZ EPJ EMD GQ MFY VFU; *K9s* ARU CRS DWR GEO GMH HEL HDZ HBZ KOW OCU OZM QFL QCU REN ZRD ZTS, *W9s* ASG BXP CHG/4 DES FVH FYC HPG HEP IMU SAA ZSK; *KØs* BUW DYR DQU EXN ERD HI IVQ LXL MHB OLW OVI PDT RQY TAM VHR WNZ YVT ZBJ ZKZ, *WØs* AWW DVB FDM GDT PMA QYQ SCT YOZ; VE2AEW; VE3CZG.



This is a view of the 80-meter position of the Hancock County AREC Control Center at the Community Center of the county fair grounds in Augusta, Ill. K9QON is shown handling traffic.

In the Central Los Angeles area SET, W6PYN, WA6LNI and WA6MZM operate the v.h.f., landline and s.s.b. positions respectively (left to right) from the shack of WA6HWB, assistant EC.

dent of Brooklyn Boro, N. Y., and President of the New York City Council; Secretary of New London Red Cross; and the Information Chief, Plans and Operations Chief and Communications Officer of Illinois C.D. Traffic to ARRL headquarters was again less voluminous than has been the case in years gone by, and again W1AW handled the bulk of it with 69 messages received and delivered to the National Emergency Coordinator. Other delivery stations included W1BDI (56), W1NJM (23), W1YBH (17) and W1DAV (14). Some messages, mailed from far afield, were not considered received by radio.

Local Aspects

We received so many fine, complete, detailed reports, that we wish we had room for complete articles on each.[2] However, we can cover some of it in "comments" later on. Some of the boys really went all out to put on a big splurge in 1961, and their efforts are reflected in the tabulation of scores below. The SET is not a contest among individuals, but the spirit of organization rivalry is rampant as Indiana and Eastern Florida fight it out for the "top dog" position. Last year Indiana won out by a hair, and this year Eastern Florida is the winner. Ratings were based on total reports, mail reports, *radio* reports and total "score" contribution to the national total. Naturally, under such a system the section with the biggest population has the best potential to place high. That they don't always do so is evidenced by the ratings as you find them listed below in order of sections. Groups are listed under the section headings in order of score alone. The thing to do is compare this with your 1960 score and standing and with your potential. In the summary, figures in parentheses are 1960 scores for comparison.

[2] The mail from Florida alone filled a complete file drawer, resulting in the "Hurricane SET" article published in *QST* last month.

Total Reports Received: 236 (219)
By Mail: 194 (181)
By Radio: 96 (113)
By Hearsay: 20 (7)
AREC Members Represented: 7142 (6063)
Total known participation: 3890 (3050)
Mobiles & Portables: 1113 (952)
Fixed Stations on Emerg. Power: 221 (149)
AREC Messages to SEC: 3210 (1657)
EC Radio Reports Sent to ARRL: 124 (150)
Total Points Compiled: 28,862 (23,586)
AREC Units also heard from in 1960: 96 (89)
AREC Units bettering 1961 Score: 42 (33)

Area of Jurisdiction	*Reported By*	*Points*
1. EASTERN FLORIDA (24 Reports)		3419
N. Dade County[1,33]	W4ELR	753
Hillsborough County[1,2,33]	K4YOQ	454
Monroe County[1]	W4MLR	280
Polk County[1,33]	W4DPD	206
Volusia County[1]	K4UJW	197
Lake County[1]	W4SXJ	193
Orange County[1]	W4NKD	150
Lee County[1]	K4GUE	147
Palm Beach County[1,3]	W4GWF	123
Manatee County[1,33]	K4ILB	119
St. Lucie County[1]	K4JZU	99
Martin County[1,3]	K4KGB	83
Osceola County[1]	W4DDW	62
Indian River County[1]	W4BBE	37
Clay County[1,3]	W4WHK	29
Pasco County[1]	K4MTP	27
Okeechobee County[1]	W4AYD	23
Alachua County[4]	W4ZZZ	...
Broward County[4]	.....	...
Charlotte County[4]	W4OEG	...
Collier County[4]	W4ACT	...
Highlands County[2]	K4JJZ	...
Pinellas County[2]	K4PMK	...
2. INDIANA (23 Reports)		1935
Steuben County[1,3,14]	W4CTU/9	200
Madison County[1,3]	W9FWH	166
La Porte County[1]	K9STH	164
Allen County[1,13]	K9OET	143
Elkhart County[4]	.....	134
Goshen[1]	W9WDQ	134
DeKalb County[4]	.....	126
White County[1]	W9JFF	121
Tippecanoe County[1,3]	W9IMU	118
Miami County[1]	K9LVV	94
Boone County[1,3]	K9CRS	92
Jackson County[1,33]	W9RTH	90
Porter County[1,33]	K9ISA	75
Floyd County[1,3,10,33]	K9HEL	65
Morgan County[1,3]	W9ZSK	63
Cass County[3,30]	K9GMH	51
Jay County[1]	K9ULW	47
Harrison County[1]	W9VZF	29
Ripley County[1]	K9PYM	23
Crawford County[3]	K9KOW	...
Muncie[3]	W9FYC	...
Orange County[3]	W9QYQ	...
Vanderburgh County[3]	K9GEO	...
3. OKLAHOMA (11 Reports)		1164
Comanche County[1]	K5BYF	295
Tulsa County[1,2,3]	W5JJR	234
Washington & Nowata Cos.[1,3,5]	K5UZL	162
Muskogee County[1,3]	W5WAX	121
Pottowatomie County[1,3]	K5LZF	95
Craig County[1,24]	K5BPV	76
Hughes County[1,3,33]	W5ADC	46
Seminole County[1,3]	K5PDM	45
Wagoner County[1]	W5AAJ	23
Ottawa County[3]	K5JOA	...
4. IOWA (12 Reports)		955
Polk County[1,6,33]	WØMJH	512
Story County[1,3,11,33]	WØIII	178
Humboldt County[1,3]	WØFDM	82
Webster County Area[11,6]	KØOFI	64
Crawford County[1,6]	WØDUA	44
Shelby County[1,3]	KØVHR	27
Jackson County[1,15]	WØJAJ	26
Jefferson & Van Buren Cos.[1,6]	KØIQV	22
Linn County[2,32]	WØGQ	...
Ida County[3]	KØLXL	...
Mills County[4]	.....	...
Sac County[3]	.....	...
5. MICHIGAN (10 Reports)		2703
Oakland County[1]	W8LOX	852
Genesee County[1,3,18,33]	W8DTZ	482
Kalamazoo County[1,3]	W8EMD	287
Jackson County[1]	K8JKK	268
Wayne County[1]	W8LOX	256
Berrien County[1,11]	W8QQO	188
St. Clair County[1,33]	W8QFQ	123

	Emmet & Cheboygan Cos.[1,25]	W8RHD	104
	Manistee County[1]	W8OCU	87
	Hillsdale County[2,33]	W8IUC	65
5.	OHIO (10 Reports)		1016
	Stark County[1,33]	W8AL	203
	Erie County[1,3]	K8JSQ	179
	Lorain County[1]	K8DNS	162
	Montgomery County & Dayton Area[1,3]	W8GQ	161
	Lucas County[1]	K8LMI	134
	Scioto County[1]	K8BNL	99
	Richland County[1,3]	W8TAJ	78
	Cuyahoga & Geauga Counties[2]	K8EXL	...
	Cuyahoga County[3]	W8VFU	...
	Lawrence County[3,33]	W8EPJ	...
7.	SOUTH DAKOTA (11 Reports)		539
	Lawrence County[1,3,6,33]	WØDVB	96
	Minnehaha County[1,3,11]	KØDYR	74
	Codington County[1,3,5]	KØZBJ	73
	Lincoln County[1,3,6]	KØMHF	65
	Davison, Hanson, Aurora & Sanborn Counties[1,3,25]	WØGWW	57
	Kingsbury & Miner Cos.[1,2]	WØPMA	51
	Grant & Roberts Cos.[1]	WØRSP	50
	Deuel County[1,3,5]	KØTAM	23
	Butte & Harding Cos.[1,6]	KØZMA	20
	Lake County[1,3,6]	KØBSW	20
	Clark & Hamlin Cos.[1,3,5]	KØRQY	10
8.	SANTA CLARA VALLEY (5 Reports)		1297
	South San Francisco Area[1,33]	W6QIE	441
	Redwood City, Atherton, Menlo Park[1,3,33]	W6DEF	393
	San Jose[1,33]	WA6HVN	193
	Santa Clara County[1,3]	WA6EIC	190
	Palo Alto[1,3]	K6BBF	80
9.	LOS ANGELES (7 Reports)		
	Arcadia & vic.[1,3]	WA6BFC	226
	Central Los Angeles Area[1,3]	W6WAW	148
	Redlands & vic.[1]	K6GGS	118
	Pasadena[1]	W6ORG	75
	Long Beach[1]	K6RYQ	49
	Glendora[3]	W6NAA	...
	San Gabriel[3]	W6MLZ	...
10.	ILLINOIS (6 Reports)		1035
	Chicago[1]	W9SPB	558
	Montgomery County[1,33]	W9VWJ	214
	Winnebago & Boone Cos.[1]	K9QYY	131
	Hancock County[1,3]	K9OCU	112
	Monroe County[1]	W9ICF	20
	Cook County[3]	W9HPG	...
11.	TENNESSEE (4 Reports)		780
	Memphis & Shelby Cos.[1,3,33]	W4WBK	424
	Hamilton County[1,3,33]	W4JVM	268
	Roane County[1,10]	W4VNU	45
	Henderson County[1,3]	K4TTA	43
12.	MISSOURI (6 Reports)		739
	St. Louis County[1]	WØANT	225
	Springfield[1,33]	WØHUI	221
	Buchanan County[3]	KØERD	166
	Harrison-Mercer-Davies Cos.[1,3]	KØOLW	127
	Jasper County[4]	.....	...
	Morgan County[4]	KØMMR	...
13.	WESTERN NEW YORK (8 Reports)		428
	Steuben Cunty[1]	K2UMY	158
	Delaware County[1]	W2TFL	88
	Oneida County[1,27]	W2IXR	68
	Herkimer County[1,3]	W2PYC	62
	Montgomery County[1]	W2ZZG	54
	Chemung County[2]	K2DNN	...
	Clinton County[2]	WA2GCH	...
	Oneonta County[2]	W2QHL	...
14.	NEW YORK CITY-LONG ISLAND (3 Reports)		2371
	Nassau County[1,3,22,33]	W2FI	1468
	Kings County[1,2,33]	K2OVN	774
	Queens County, 10 Meters[1]	W2IAG	129
15.	MARYLAND-DELAWARE-D.C. (5 Reports)		380
	Baltimore Co., Md.[1,3]	K3KPZ	227
	St. Mary's County, Md.[1,3,33]	W3BUD	99
	Calvert Co., Md.[1,3,33]	W3ZNW	54
	Anne Arundel Co., Md.[4]	W3HLE	...
	Kent County, Del.[2]	W3JFR	...
16.	MAINE (6 Reports)		181
	Waldo County[1]	W1FKH	75
	Androscoggin County[1,3]	K1IMI	64
	North Aroostook[1]	K1CYJ	32
	Franklin County[1,3]	W1KVA	10
	Hancock County[3]	K1DYG	...
	Kennebec County[3]	K1BZD	...
17.	KENTUCKY (4 Reports)		673
	Louisville & adj. Cos.[1,3,10,33]	W4BAZ	372
	Henderson Area[1,17]	W4CSN	111
	Barren Co. & area[1,16]	W4TQD	101
	Fayette County & area[1]	W4JSH	89
17.	OREGON (5 Reports)		381
	Lane County[1,6]	K7CJB	116
	Benton County[1,21]	K7CNZ	109
	Coos County[1,3,10]	K7AXF	99
	Clackamas County[1]	W7UQI	57
	Union County[2]	K7KZP	...
19.	SAN DIEGO (3 Reports)		1203
	SW San Diego Sect.[1]	W6LYF	607
	San Diego[1]	W6EWU	493
	N. San Diego County[1,3]	K6RYI	103
20.	CONNECTICUT (5 Reports)		236
	Danbury[1,3,7]	W1ADW	74
	Bloomfield[1]	W1PRT	69
	Newington[1,8,33]	W1NJM	51
	Stonington[1]	W1WAZ	42
	Bristol[3]	W1KYQ	...
20.	EASTERN MASSACHUSETTS (4 Reports)		398
	Winthrop[1,10]	W1BB	225
	Groveland[1,33]	W1MRQ	87
	North Reading[1,3]	W1AWA	86
	Waltham[3]	W1JSM	...
22.	EASTERN NEW YORK (3 Reports)		534
	Schenectady County[1,3,33]	K2HNW	219
	Dutchess County[1,11]	W2HZZ	209
		K2GCH	
	New Rochelle[1,3,33]	K2SJN	106
23.	VIRGINIA (4 Reports)		301
	Fairfax Co. & Falls Church[1]	W4OP	106
		W4RHC	
	Scott County[1]	W4MLZ	102
	Orange & Louisa Cos.[1,3,26]	K4JYL	93
	Lynchburg[3]	K4MKO	...
24.	EASTERN PENNSYLVANIA (3 Reports)		632
	Montgomery County[1,12,33]	W3AWH	188
	Schuykill County[1,11]	K3KNP	96
	Northumberland County[1,3,12]	K3JSX	48
25.	MONTANA (3 Reports)		388
	Missoula Area[1,3]	W7COH	162
	Billings[1,11]	K7GHK	141
	Harlowton[1]	W7RZY	85
26.	WESTERN FLORIDA (9 Reports)		209
	Leon County[1]	W4MLE	114
	Gulf & Franklin Cos.[1]	K4RZF	63
	Taylor & Lafayette Cos.[1]	K4KQP	32
	Bay County[4]	.....	...
	Calhoun County[4]	K4FTJ	...
	Escambia County[4]	.....	...
	Okaloosa County[4]	.....	...
	Santa Rosa County[4]	.....	...
	Walton County[4]	.....	...
27.	NORTH TEXAS (3 Reports)		410
	Tarrant County[1,23]	K5MZW	236
	Taylor County[1]	W5ANK	103
	Terry County[1]	W5NFO	71
28.	WESTERN PENNSYLVANIA (2 Reports)		277
	Centre County[1,3]	W3SAY	110
	Cambria County[1,3,28,33]	W3WRE	137
29.	COLORADO (3 Reports)		300
	Pueblo[1]	KØBOH	205
	Mesa County[1]	KØRJD	61
	Montrose County[1,6]	KØEGJ	34
29.	WISCONSIN (3 Reports)		251
	Brown County[1,33]	W9HDV	148
	Milwaukee County[1]	K9KJT	103
	Washington County[3]	W9SAA	...
31.	SOUTHERN TEXAS (2 Reports)		909
	West Harris County[1,33]	K5RDP	873
	San Patricio County[1]	W5BRZ	36
32.	MINNESOTA (3 Reports)		197
	Nobles County[1,20,33]	WØMZR	104
	St. Louis County[1]	KØSNC	73
	Le Sueur County[1,19]	KØMEQ	20
33.	NORTHERN NEW JERSEY (5 Reports)		313
	Morris County[1,3]	K2ZFI	121
	Union County[1]	K2TWZ	118
	Englewood & vic.[1,3,21]	WA2CCF	74
	Belleville & vic.[3]	WA2BNF	...
	Rahway[3]	WA2IGQ	...
34.	KANSAS (2 Reports)		362
	Zone 3[1]	KØLHF	196
	Wyandotte & Johnson Cos. (Zone 5)[1]	KØBXF	166
34.	SAN FRANCISCO (2 Reports)		117
	Fortuna[1,33]	K6EKC	66
	Eureka Area[1,3,33]	W6SLX	51
36.	NEVADA (1 Report)		162
	Boulder City[1,3,33]	W7HJ	162
37.	WASHINGTON (1 Report)		155
	Benton County[1,3]	W7YFO	155
38.	ONTARIO (2 Reports)		52
	Elliot Lake[1,3,6]	VE3CZG	52
	London[1]	VE3CFR	...
38.	QUEBEC (1 Report)		143
	Chambly, Vercheres, Napierville, Laprairie & Lowville Cos.[1,3,6]	VE2AEW	143
40.	MISSISSIPPI (1 Report)		84
	Gulfport[1,3]	W5ACS	84
41.	NORTH DAKOTA (1 Report)		65
	Grand Forks County[1,3]	KØIVQ	65
42.	EAST BAY (1 Report)		233
	Southern Alameda County[1,9]	K6HTJ	233
43.	ALABAMA (2 Reports)		33
	Morgan County[2,31]	W4PKA	...
	Walker County[4,5]	W4CIU	33
44.	WYOMING (1 Report)		119
	Natrona County[1]	W7LKQ	119
45.	UTAH (1 Report)		42
	Bingham County[1,7]	K7OAL	80
46.	WESTERN MASSACHUSETTS (1 Report)		...
	Springfield[3]	W1NLE	...
47.	IDAHO (1 Report)		44
	Latah County[1]	W7VQC	44
48.	LOUISIANA (1 Report)		43
	Ruston & vic.[1]	K5BWZ	43
49.	ARIZONA (1 Report)		...
	Phoenix[4]	.....	...
49.	NEW HAMPSHIRE (1 Report)		...
	Merrimack County[4]	.....	...
50.	ALL OTHER SECTIONS (S.N.J., Ark., Nebr., R.I., Vt., Alaska, Hawaii, Sac. Val., San J. Val., N.C., S.C., W. Va., N. Mex., Ga., W.I., C.Z., Santa B., Maritime, Alberta, B.C., Manitoba, Sask.) — *NO REPORTS*		

[1] Mail report received. [2] Mail report received without point total. [3] Radio report received. [4] Hearsay report, EC not heard from directly. [5] Oct. 22. [6] Oct. 15. [7] Oct. 16. [8] Oct. 29. [9] Oct. 27. [10] Oct. 9. [11] Oct. 14. [12] Oct. 12. [13] Oct. 2. [14] Oct. 7–15. [15] Oct. 4. [16] Oct. 5. [17] Oct. 6. [18] Oct. 10 & 11. [19] Nov. 13. [20] Sept. 20. [21] Oct. 31. [22] Includes following ECs: K2KSP, *W2s* ZAI BTA AZA KRP UAL ELK JKX. [23] Sept. 4. [24] Sept. 8. [25] Oct. 25. [26] Nov. 5. [27] Oct. 28. [28] Oct. 3. [30] Details supplied by SEC. [31] Sept. 16 & Sept. 30 [32] Oct. 19. [33] Bettered 1960 Score.

Comments

W1AW and W1NJM maintained scheduled watches on various of the National Calling and Emergency Frequencies during the test, but very few calls were received. Most ECs apparently preferred to rely on chance to get their headquarters messages delivered, or forward them through net channels. The delivery percentage (ooh, let's not mention it!) shows, however, that whatever methods were used were not the best. We suggest that ECs make a mental note, for this year's SET, to see that their radio reports get into the hands of a NTS member so they can be relayed to headquarters through the League's official system. Receipt of your radio report gives your section's rating a boost. W1AW and W1NJM will monitor the NCEFs again this year, but on an "at random" basis, because the scheduled monitoring seemed to make traffic receipts lower.

As mentioned above, many fine, detailed reports were received, and the rest of this report will be dedicated to them and to comments by individual ECs. Florida reports

and comments will be omitted, because Florida got a pretty good write-up in last month's *QST* in "Hurricane SET."

RM KØONK of Missouri put the Mo. Slow Speed Net through its paces for an SET; six net members handled eight test messages. W4POI, OCD Region 3 Communications Director, reports no traffic received during the Oct. 7-8 period, but five messages were received via W4UCJ on Oct. 10. Wisconsin SEC W9BCC reports receiving 23 messages regarding the SET, including two from county c.d. directors expressing gratification at the results.

We wish to congratulate Indiana and SEC W9SNQ for a fine showing by that section. Although Chalky says that only about 25% of the counties reported, 23 reports is no disgrace, nor is it a disgrace to have been just nosed out by Eastern Florida for top rating. We also wish to point to the record of South Dakota under hard-working SEC WØSCT; for a low-population section, seventh place is a most noteworthy achievement.

"What impressed me was that all nets seemed to realize the types of emergencies that might arise and devoted their time to doing things to maintain communications and serve the public need. This is really the basis on which these tests are founded, so weaknesses can be found and corrected prior to actual need. All in all, I think we had a good SET." — *KØLTP, SEC Missouri.*

"The Miami Valley AREC is proud of its setup and hopes that it can supply the community with good emergency communications if ever needed." — *W8ILC, EC Montgomery County, Ohio.* "The exercise was a success, but it awakened us to the fact that we need more of the same." — *WØGQ, EC Linn County, Iowa.* "We had RACES officials cooperating with us as well as local police and fire departments; publicity has brought in more AREC registrations." — *K2ZFI, EC Morris & Sussex Cos., N. J.*

W7AY, OCD asst. director of communications, Region 8, reports no traffic received during their advertised monitoring schedule, one message received later. "Last year we did such a poor job that I didn't submit a report. This year we had a turnout of nine, out of 13 members, and two of the missing were away at college. I think this is our best AREC average yet." — *W1ADW, EC Danbury, Conn.* "We feel that this was the most realistic, best planned and best executed SET that we have conducted to date." — *W2HZZ & K2GCH, ECs Poughkeepsie & Dutchess County, N. Y.* "Some uncertainty as to call-up procedure indicates poor detail work on the part of the EC, which has its lesson for 1962. Our total participation reaches over 70%!" — *K2SJN, EC New Rochelle, N. Y.* "The exercise revealed a need for more activity and better advance planning, but everyone had a chance to practice emergency procedures." — *K9QYY, EC Winnebago & Boone Counties, Ill.* "Largest turnout ever for any exercise, surpassing wildest expectations." — *K9OET, EC Allen County, Ind.* "The Red Cross got quite a workout and were surprised at what we could do for them; we were told it was a most valuable lesson." — *W9WDQ, EC Goshen, Ind.* "This EC would like to see some sort of a drill next year on a national or at least a statewide basis." — *W4CTU/9, EC Steuben County, Ind.*

"This was my first SET and thoroughly enjoyed. Listened for W1AW, but never did hear it. Where were you guys?" — *K4TTA, EC Henderson County, Tenn.* "The SET-61 for Clinton AREC was a great success." — *WA2GCH, EC Clinton County, N. Y.* "Our EC is not active, so local hams set up their own exercises. — *W2TFL, Delaware County, N. Y.* "Cambria County AREC is very proud of the fact that weekly drills have been in effect for the past seven years without a break." — *W3WRE, EC Cambria County, Pa.* (now SEC, West Pa. Section). "In accordance with ARRL recommendations, this EC is deputy c.d. radio officer and the county r.o. is asst. EC." — *W3SAY, EC Centre County, Pa.* "C.D. advised on day before SET that station must be operated by RACES personnel. This last minute change limited our operation." — *K9KJT, EC Milwaukee County, Wis.* "A very successful drill was held, and plans formulated for a larger organization." — *W7LKQ, EC Natrona County, Wyo.* QST

U.S.S.R. DX Contest

MAY 5-6

This c.w. contest, "CQ World," is being held from 2100 GMT on May 5, 1962, to 2100 GMT on May 6, 1962. Although logs are solicited for the entire 24-hour period, only contacts made over a *continuous* 12-hour period will count for score. So you can work as much as 24 hours, but pick your best 12-*consecutive*-hour stretch in figuring your score. Contacts should be established on 28, 21, 14, 7, or 3.5 Mc., c.w. only. The contest call is "CQM" (M being the first letter of the Russian word for World). The exchange consists of a six-digit number made up of RST and QSO number, starting with 001. Your first exchange might be 599001. Work as many different countries as possible. Stations may be contacted only once *per band;* stations may be worked again on different bands. The one change from last year's rules is that contacts with one's own country *are permitted;* what is not allowed are contacts "within a populated place," i.e. cross-town QSOs. The ARRL Countries List shall be the official list of countries for the contest. *Scoring:* Each completed contact counts one (1) point. Final score is the number of contact points multiplied by the number of different countries worked on all bands, *not* the sum total on each band. A single discrepancy on a contact will void that contact. *Awards:* Award winners will be from each country for both single-operator and multiple-operator scores. Winners will also be determined for single-band entries for both 7 and 3.5 Mc. Single-operator awards of a certificate and contest badge will be awarded to the five highest scoring single-operator entries from each country. Multiple-operator awards of a certificate will be awarded to the five highest scoring entries from each country with a contest badge to each operator. All participants who establish contact with 100 different Soviet operators will be awarded a "W100U" award; all participants who establish contacts with six continents will receive the "R6K" award; and contact with 150 different countries will merit the "R150S" award. QSLs are not necessary; logs are sufficient. Each participant, irrespective of the number of points scored, should make a report following the sample below, not later than May 15, 1962, to Chief, Judging Board, Post Office Box 101, Moscow, USSR.

U.S.S.R. INTERNATIONAL TELEGRAPHIC CONTEST, MAY 5-6, 1962

Call Sign..... *Name*.....

Address.....

Country..... *Transmitter Input Power*.....

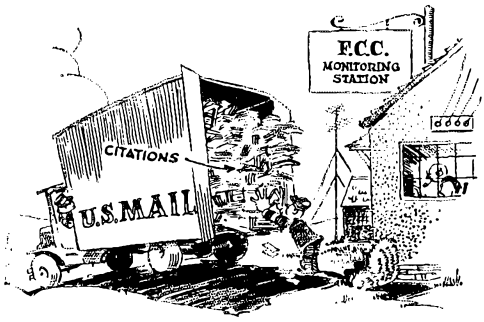
Receiver..... *Antenna*.....

Date	*Band*	*Time GMT*	*Station Worked*	*Control Number Received*	*Control Number Sent*	*Points*	*Jury's Notes*
1	2	3	4	5	6	7	8
May 5	14 Mc.	2103	OK1AX	569003	579001	1	
May 5	14 Mc.	2106	UR2AA	579002	589002	1	

Number of Points for Contacts..... *Number of Countries*.....

Total Number of Points.....

May..... *1962* *Operator's Signature and Call*



A "Must" Subject

for the Newcomers

BY LEWIS G. McCOY,* W1ICP

How To Avoid Radiation of Spurious Signals

As many Novices have found to their sorrow, being crystal controlled doesn't necessarily mean that the transmitted signal will appear only on the band it is supposed to be on. Let's take one example to show what can happen. Suppose we have a transmitter operating in the 80-meter band, crystal-controlled at 3725 kc. Let's also assume that the transmitter is the common garden variety used by so many beginners, consisting of a crystal oscillator whose output drives an amplifier stage. The antenna is an 80-meter half wave, center-fed with coaxial cable, with the other end of the cable attached to the output connector on the transmitter. Sound familiar? How can such a setup cause signals to be radiated that are not on 3725 kc.? Believe it or not, quite easily.

Even though we want to generate only a 3725-kc. signal and amplify it, multiples of the fundamental frequency are also generated, unfortunately. Along with our 3725-kc. signal we can expect harmonics, and possibly parasitics, to be present in the amplifier tank circuit and be fed to the antenna. If these spurious signals are strong enough, they can cause interference. In the case of our 3725-kc. setup, the harmonics will all fall in nonamateur frequency ranges. For example, the second harmonic, 7450 kc., is well outside the 40-meter band. If it is strong enough, you can be sure that you will be cited by the FCC or receive a notice from an ARRL Official Observer.

The example just given is only one of many possible combinations that can get you into trouble. This article will discuss most of the possibilities and how to keep spurious radiation at a minimum.

Given in Table I are the crystal frequencies used by Novices who want to operate in the 80-, 40-, or 15-meter bands. Also included in the table are the possible frequency ranges in which signals, both fundamental and spurious, could be radiated. For example, you'll note there is one

* Technical Assistant, *QST*.

Table I

Spurious-Signal Data

Novice Crystal Used	*Desired Frequency*	*Spurious Signal Possibilities*
3700 to 3750 kc.	3700 to 3750 kc.	7400 to 7500 kc. (Harmonic or Mistuned) 11,100 to 11,250 kc. (Harmonic) 14,800 to 15,000 kc. (Harmonic)
3575 to 3600 kc.	7150 to 7200 kc.	3575 to 3600 kc. (Submultiple or Mistuned) 10,725 to 10,800 kc. (Harmonic) 14,300 to 14,400 kc. (Harmonic or Mistuned) 21,450 to 21,600 kc. (Harmonic)
7150 to 7200 kc.	7150 to 7200 kc.	14,300 to 14,400 kc. (Harmonic or Mistuned) 21,450 to 21,600 kc. (Harmonic)
7034 to 7083 kc.	21,100 to 21,250 kc.	7034 to 7083 kc. (Submultiple) 14,068 to 14,166 kc. (Submultiple or Mistuned) 28,136 to 28,332 kc. (Harmonic or Mistuned) Also harmonics that fall in TV Channels 3 and 6.

crystal range of 3575–3600 kc. Many Novices buy such crystals and use them to double to the 40-meter Novice band. Don't misunderstand, there is nothing wrong in using an 80-meter crystal to double to 40, but it can cause trouble if the proper precautions are not followed. In this case, the frequency you start with in the oscillator is on 80. If there isn't enough selectivity in the circuits in the rig, it is very possible that the 80-meter oscillator signal will feed through and reach the antenna along with the 40-meter desired signal. Consequently, you end up with signals on both bands at the same time. The undesired 80-meter signal is usually referred to as a "submultiple" frequency, being less than the desired frequency. What is needed here to correct the trouble is additional selectivity in the transmitting circuitry. The additional selectivity can usually be achieved by installing a transmatch between the transmitter and antenna feed line.[1]

Proper Tuning of the Transmitter

It is not unusual for ARRL Hq. to receive letters stating that the writer has every indication that his transmitter and antenna system are working; he calls and calls, but receives no replies, and wants to know what is wrong. It may be a case of incorrect tuning of the transmitter.

With many transmitters, both commercial and home-built, it is possible to tune up on the wrong band, even though the band switch is switched to the band you want. Suppose, for example, you want to tune up on 15 meters. When you tune the tank circuit of the final amplifier you may find that there are two plate current dips, one near minimum capacitance and the other near maximum. The one near minimum is probably the correct setting and then if you should tune to the one at maximum you'll probably end up on 20 meters. Everything will *appear* to work right, but you'll be out of the Novice band and in trouble with the FCC.

In some homemade rigs, separate band switches are used for the different stages in the transmitter. It is possible to end up on the wrong band by simply making a mistake in the switch settings when going on the air. Always make it a point when tuning up to double-check the switch settings.

Most transmitter manufacturers warn of such possibilities in their instruction manuals, but unfortunately, many hams are notorious for being nonreaders of instruction manuals. One way to insure tuning up on the correct band is to use an absorption-type wavemeter. This is a simple device that will provide a visual indication that you are on the correct band.

[1] This article does not describe the construction of any of the devices needed for correcting the problems to be discussed. *QST* has carried such articles and they are listed in a bibliography that appears at the end of this article. The issues of *QST* listed are still in print and available from ARRL Headquarters for 50 cents per copy. Also, the 1962 edition of *The Radio Amateur's Handbook* carries construction details for all of the devices mentioned in the article.

The 80-Meter Second Harmonic Problem

We've already mentioned the problem of second harmonics from 80-meter operation, but a few more words are in order. Without a doubt, the largest number of amateurs who find themselves in hot water with the FCC are 80-meter Novice operators with second harmonics falling in the 7400–7500-kc. range. There are, of course, two possibilities, second harmonics and incorrect tuning of the transmitter as just described. If you have another ham who lives nearby, about one mile or so distant, you can have him listen at the harmonic frequencies to see if you are putting out spurious signals. Don't pick a ham too close by, as you would probably overload his receiver and such checks would be useless. *However*, the best defense is to assume you have a harmonic problem and take steps to prevent harmonic radiation. As an aside, we can point out that under the ARRL Official Observer program, the League observers send out approximately 1000 harmonic or spurious notices per month — all to Novices! In fact, some observers have stated that during peak operating periods on week ends, the QRM is so bad around 7500 kc. that it is difficult to copy the calls! So better be safe than sorry.

There are a couple of methods for preventing harmonics from reaching the antenna and being radiated. One way to do the job is to insert a filter at the output of the transmitter. For this purpose the filter usually consists of a couple of tuned circuits using fixed capacitors, and does not require any adjustments. The filter will pass the desired signal to the antenna but will help prevent harmonics from leaving the rig.

Another system, and the one preferred by this writer, is the use of a transmatch. A properly designed and adjusted transmatch will provide adequate harmonic attenuation. The transmatch adds another tuned circuit between the transmitter and antenna, thus increasing the over-all selectivity of the system. Another point in favor of using a transmatch is the fact that your transmitter will always be working into the load it was designed for. If you have had problems loading the amplifier in your rig, the transmatch is the answer. Also, the use of an antenna changeover relay or switch in conjunction with a transmatch will improve your reception. Your receiver will work better and you'll hear more.

The 20-Meter Novice Band

Of course we are joking, there is no 20-meter Novice band! However, if you do a little listening on 20, you'd *think* there was. If you look at Table I you can see there are several possible ways for Novices to have signals on 20. In one case you would have second-harmonic radiation from Novice 40-meter operation. Most of the harmonics from Novices fall in the upper end of 20, in among the single-sideband stations, from 14,300 to 14,350 kc. Of course, some of the Novice harmonics will fall outside the 20-meter band, up to 14,400 kc. A transmatch or filter will cure the trouble.

The other possibility arises from 15-meter operation. Here a Novice usually starts out with a 40-meter crystal in the 7035- to 7083-kc. range. There are two ways he can get spurious radiation. One is through mistuning of the transmitter — actually tuning up on 20 instead of 15. A wavemeter will set you right in this case. Another possibility is the radiation of submultiple frequencies, and the cure is the use of a transmatch.

Antennas, Multiband and Otherwise

Many Novices mistakenly believe that a single-band antenna will not radiate on any band but the one it was cut for. It is true that an 80-meter coax-fed dipole would present a considerable mismatch to the second harmonic, but it is not enough to insure that no second harmonic will be radiated. Regardless of the antenna, you are always safer by assuming you have a spurious radiation problem and taking steps to cure it.

In the event you use a multiband antenna, such as a coax-fed trap-type dipole or the multiple dipole arrangement — or, for that matter, any multiband antenna that *does not* make use of a transmatch — then by all means take precautions to prevent spurious radiation. A multiband

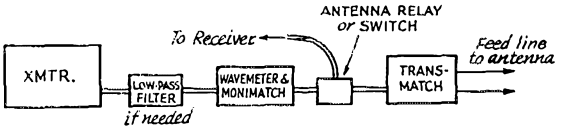


Fig. 1—The above diagram shows a typical setup that will provide good attenuation of spurious signals. The low-pass filter may not be needed, depending on the TV signal strength and channel allocation in your area.

antenna of the types mentioned will accept harmonics as easily as it does the fundamental signal. For attenuation of harmonics in such a system you could use the 50-Ohmer Transmatch that was designed for coax lines.

TVI

A Novice operating on 80 and 40 meters usually doesn't need to be much concerned with television interference, at least as far as harmonics are concerned. The harmonics from these bands are of such a high order that they are usually too weak to cause trouble. However, if you operate on 15 meters and have Channels 3 or 6 in your area, you should be on your guard. The third harmonic from 15 meters falls in Channel 3 and the fourth harmonic in Channel 4. The simplest cure for this problem is the use of a low-pass filter along with a shielded transmitter. The filter will attenuate the harmonics to a point where they won't cause interference.

Shown in Fig. 1 is a typical transmitting arrangement that will help prevent spurious signals from being radiated. The setup has the transmitter first, then a low-pass filter, if required, next a Monimatch and wavemeter, followed by the antenna changeover relay and transmatch. The feed line or antenna is attached to the transmatch. A Monimatch is essentially a matching indicator and will show you when the transmatch is correctly adjusted. QST

Bibliography

Transmatch:

"50-Ohmer Transmatch," *QST*, July, 1961.
"Wide-Range Transmatch," *QST*, November, 1961.
Also, pages 356, 357, 358 and 359 of the 1962 *Radio Amateur's Handbook*.

Wavemeter and Monimatch:

"Combination Band Checker, Field-Strength Meter and Monimatch," *QST*, Dec. 1961.
Also, pages 518 and 519 (wavemeter), and pages 537, 538 and 539 (Monimatch) of the 1962 *Radio Amateur's Handbook*.

Filters for low-frequency harmonics:

"How To Attenuate Your Harmonics," *QST*, May, 1961.
Also, page 355 of the 1962 *Radio Amateur's Handbook*.

Filters for TVI:

"Solving Your TVI Problem," *QST*, Feb., 1959.
Also, pages 564 and 565 of the 1962 *Radio Amateur's Handbook*.

Antennas:

"Choosing An Antenna," *QST*, Jan., 1961.

Strays

A recent speculation on the derivation of the abbreviation "73" suggested that it had something to do with the Winchester 73 rifle. Louise Moreau, W3WRE, an avid student of telegraph and radiotelegraph history, sets us straight. " . . . There is no possible connection between our '73' and the rifle brought on the market in 1873 by Winchester . . . '73' appeared on the [telegraph] wires long before that rifle was even a gleam in the inventor's eye. Too bad, really, it would have made such a nice colorful legend. But it was a part of the numerical code used in the 1840's." W3WRE goes on to point out that the earliest reference to "73" that she can find is in the F.O.J. Smith numerical code, in which it was used only to indicate that the signature was coming up.

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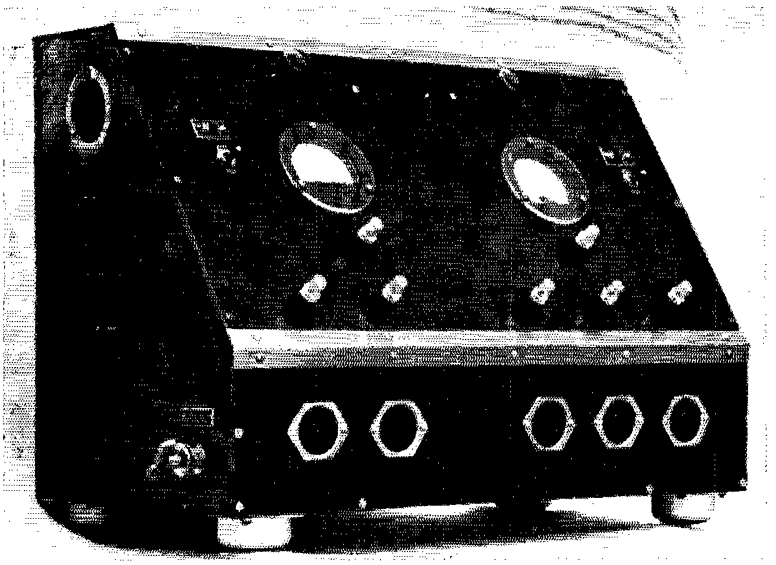
Researchers at the Advanced Electronics Center of GE in Ithaca, N.Y., are investigating auditory system response to modulated radio frequency. They have discovered that some people can pick up r.f. signals through some as-yet-unexplained physiological function.



Chester County's Field Day power-distribution panel. Power from a 1½-kv.a. generator fed in at the connector at upper left is distributed to equipment cables plugged into the two connectors at lower left. Above, on the left-hand side of the sloping panel, are a red indicator lamp, line switch, line voltmeter, and indicating-type fuse holders. A similar arrangement with three outlets on the right-hand side, distributes the power from a 2½-kv.a. generator. Ground connection is made at the wing-nut terminal, lower left.

Field Day Power Distribution

Simple Control Center for Multiple Installations

This well-thought-out Field Day power-distribution center not only speeds up installation, but also concentrates fusing and line-voltage monitoring at one spot, making it unnecessary to search far in case of a power failure. The principle applied here to distribute power from two generators may be extended as required.

BY THEODORE J. JONES,* W3CHU

As a result of previous experience in supplying power to each of several rigs during Field Day activities, the need for a safe, convenient and reliable power-distribution system became apparent to the members of the Chester County (Penna.) Amateur Radio Club (ARRL affiliate). The gear illustrated in the accompanying photograph and sketches, which was subsequently designed and built as a club project, well proved its worth in our last Field Day expedition.

The objectives sought in the design and layout of the unit were reduction of generator hash, a common electrical ground system for all equipment, and the elimination of power interruptions caused by cable connections working loose. In addition, the need for cables of adequate length, common polarization, monitoring of line voltages, and proper fusing for overload protection was taken into account. The consideration of these factors led to a practical and easily built piece of equipment which has proved to be a welcome asset to our club's Field Day equipment.

* 404 Brook Hill Road, West Chester, Pa.

Distribution Circuit

Fig. 1 shows the wiring diagram of the distribution unit. Provision is made for the convenient distribution of the outputs of two portable gas-driven generators. A 2½-kilovolt-ampere (kv.a.) generator feeds into J_1 from where it is distributed through three outlets, J_3, J_4, and J_5. Similarly, a 1½-kv.a. unit feeds in at J_2 and is distributed from two outlets, J_6 and J_7.

Throughout the distribution system three-contact twist-lock plugs and receptacles are used

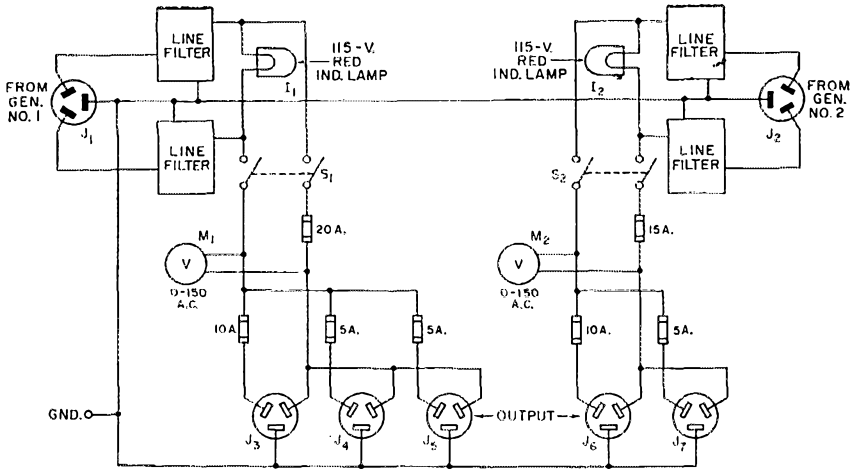


Fig. 1—Wiring diagram of the distribution unit.

I_1, I_2—115-volt panel lamp, red.

J_1, J_2—Recessed male three-terminal twist-lock cable connector (Hubbell 7327 or similar. Mating plug for generator cable is type 7313).

J_3–J_7, inc.—Flush-mounting female three-terminal twist-lock receptacle (Hubbell 7557 or similar).

M_1, M_2—0–150-volt 60-cycle a.c. voltmeter.

S_1, S_2—20-amp. d.p.s.t. toggle switch.

Line filters are pi-network type rated at 115/230 volts, 25 amperes (Mallory NF 25–230 or similar). Fuse holders are indicating type (Buss HKL or similar).

for making connections. These connectors not only provide the required mechanical security but the third contact makes it possible to maintain automatically a common ground connection.

Each generator output passes through a line filter to reduce generator commutator interference, and thence to a red lamp which provides a visual indication of whether or not generator output is being received at the unit. A d.p.d.t. switch connects the generator output to the distribution outlets which are individually fused in one side of the line, a common fuse being used in the other side of the line. Generator output voltage is monitored by a voltmeter. The common ground connection is brought out to a heavy terminal fitted with flat washers and a wing nut. In use, this terminal is connected to a metal rod driven into the ground, or other convenient ground connection.

Construction

The cabinet shown in the photograph is made of ¾-inch plywood. It is 24 inches wide, 12 inches deep and 16 inches high, and is fitted with a sloping upper panel and a vertical lower panel, both of which should be made of ¼-inch Formica or other insulating material. The recessed male input connectors, J_1 and J_2, are mounted one on each side of the cabinet, near the top. The five female output connectors are mounted in a row on the lower vertical panel, divided into groups corresponding to the two generator outputs. Meters, control switches, pilot lamps and fuses are similarly grouped above on the sloping panel. The fuse holders are of the "indicating" type which makes it easy to spot a blown fuse.

Mounting feet are provided to keep the cabinet off the ground if other means are not available, and handles on each side facilitate carrying. Flush-folding handles leave no projections when not in use.

Cables

Interconnecting cables are made of three-conductor underground-type plastic-covered electrical cable. This cable consists of two No. 10 wires for the electrical load, and one No. 14 wire used for the common ground connection. (This cable is often referred to as two-conductor No. 10 cable with ground wire.) The plastic covering of this cable is tough and durable. The two generator cables are identical and are each 10 feet long. If feasible, a three-contact female twist-lock receptacle should be mounted on the generator base or frame and the generator output termination (whatever type it may be) wired to the twist-lock receptacle. The ground terminal of the receptacle should be connected to the generator frame. In this case the input end of the cable will be fitted with a mating twist-lock plug. If there is some reason why this adapter arrangement cannot be installed, the input end of the generator cable should be fitted with a connector or other device matching the generator output termination. The output end of each generator cable should be fitted with a female twist-lock plug to fit the male input connectors of the distribution unit.

The five distribution cables are also identical. Each is 100 feet long, fitted with a male twist-lock connector at the input end, and a metal multiple outlet box at the output end, as shown in Fig. 2. Four-receptacle boxes are standard items in electrical-supply stores, and require only the addition of the wing nut. Any unused

holes should be plugged with caulking compound to exclude rain. The receptacles are of the two-contact type to match the standard a.c. plugs of equipment and appliances. The ground terminals of all equipment operating from any one distributing line should be connected together and then to the wing-nut ground terminal on the outlet box. The ground wire of the cable is secured internally to the box, and the box should be grounded by a No. 10 wire from the wing nut to a metal rod driven into the earth.

The common ground system, elimination of all exposed hot terminals, weatherproof cables and adequate fusing have proved their worth in reducing electrical hazard to a minimum. The twist-lock connectors help to make the system mechanically foolproof, and identical cables avoid the confusion that often reigns at a Field Day setup. It is not necessary to hunt for the right cable length with the right terminations, and the maximum permissible distance between control center and equipment is known in advance.

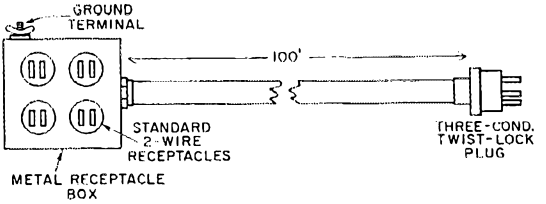


Fig. 2—Sketch showing makeup of distributing cables. Input end terminates in a three-contact twist-lock male plug (Hubbell 7572 or similar). Output end terminates in a metal box fitted with a wing-nut ground terminal and the desired grouping of standard two-contact a.c. outlets for equipment.

The Chester County Radio Club is proud of this small contribution to the fun and safety of Field Day exercises, and passes this along to others who may be interested in constructing similar gear for their own activities. QST

Strays

The S.S. *Hope* (see "The Voyage of the S.S. *Hope*," *QST*, April, 1961, p. 51) is leaving to operate in the Peru area for about nine months, arriving there in April. The X-ray technician on board, W8POZ, will also operate the ham station, using the call of Bill Halligan, W9AC. They will probably be operating on 20 and 40 meters, with c.w., sideband, and RTTY. A ham station will be set up in the Washington, D.C., headquarters of Project Hope, in order to handle traffic with friends and relatives.

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Re the Stray on page 15 of December, 1961, *QST*. Yes, several fellows apparently can top W2ZI's record for ham radio activity. One is W3RV, who has just celebrated his 54th year as an active ham. Then there is W2IL, who says that in 1903, at the age of 9, he was on the air in Jersey City using the call BC. And we hear from a friend of W2ZB's that that OM was in ham radio prior to 1909. Another 50-year ham is W9DA, active since 1912.

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CALLING ALL . . .

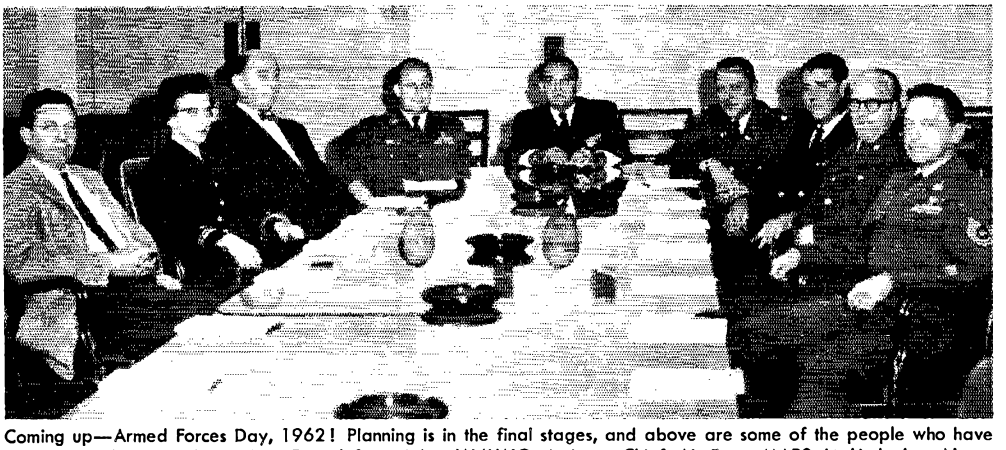
Chiropractors who are hams — contact William Emerson, K8IUI, 21701 Eleven Mile Rd., St. Claire Shores, Mich.

—···—

Maple syrup manufacturers — contact Don Moore, K1QPN, 74 West St., Bloomfield, Conn.

—···—

Sons of the American Revolution — contact Frank J. Ryder, W2DQ, 80 Hollywood Drive, Oakdale, L. I., N. Y.



Coming up—Armed Forces Day, 1962! Planning is in the final stages, and above are some of the people who have put in many hours on the project. From left to right—W4LWG, Assistant Chief, Air Force MARS, Lt. Linda Lee, Navy; K4KNV, Assistant Chief, Army MARS; W4IYR, Chief, Air Force MARS; CDR Kunz (K4NAA), Head, Navy Amateur Radio Branch; W2TBZ, Chief, Army MARS; W5OFH, Navy; K9PBR, Army; KL7DKZ, Air Force. Complete details next month.

Amateur Participation in Echo A-12

Satellite-Bounce DX for the V.H.F. Man

BY RAPHAEL SOIFER,* K2QBW

The second Echo balloon satellite, expected to be launched before mid-year, should be a better bet for bouncing ham signals than Echo I. It will take high power and the best of equipment to make the grade, but the possibility is there. Here's an analysis — and a method for assessing your chances of making contacts by way of Echo A-12

As PART of its passive communication satellite program, the National Aeronautics and Space Administration has formed Project Echo A-12, which will provide a satellite suited to independent propagation, tracking, pointing, and communication experimental purposes. The physical dimensions and positioning of the Echo A-12 spacecraft should be such as to offer the possibility of regular contact on the 144- and 220-Mc. bands between well-equipped amateur stations, at far beyond normal communication ranges.

If the planned orbit is achieved, the satellite should remain useful for communication purposes for up to four years from the date of launch. Amateur participation willing, a 144-Mc. WAS will be issued by 1966 — maybe even before 1962 is out!

Although NASA is launching the satellite, and will be furnishing tracking data to us, control of our work with the satellite rests completely in our hands. An amateur radio program has been set up, under the auspices of the Office for Satellite Scatter Coordination (OSSC) with the assistance and cooperation of the American Radio Relay League, to make optimum use of the services to be offered us by NASA in conjunction with the launching. Pre-launch advisories and bulletins for Echo A-12 vertical tests and the orbital launch itself will be carried over W1AW. Everything possible is being done to see to it that this venture into the field of v.h.f. space communication will come off smoothly. We're counting on you, though, to make use of it, and earn that two-meter WAS!

The Satellite

The Echo A-12 satellite will be spherical in shape, 135 feet in diameter, and constructed of laminated aluminum foil and Mylar. This is 35 per cent greater diameter than Echo I, which translates into 2.7 db. worth of additional reflecting area. The nominal altitude, in a circular orbit, will be 800 statute miles, compared with 1035 miles for its predecessor. The combined effects of lower altitude and larger size should provide enough of a boost to turn what was marginal with Echo I into solid A-12 contacts.

The Echo I satellite did not retain its spherical shape for too long a time, and after a month or two its radio reflectivity began to suffer. As of this writing, Echo I's reflectivity is but 40 per cent of its original value, and this degradation is expected to get worse with time. Owing to differences in construction, the new Echo A-12, it is hoped, will not lose its shape, and will retain its reflectivity for most of its orbital life as its mean altitude gradually decreases. In 1965, for example, we might be faced with a 135-foot sphere, riddled by micrometeorites but still spherical, at less than 200 miles altitude. What this will do to the signal-to-noise ratio will become evident in a short while.

The launch is scheduled to take place in the second quarter of 1962 from the Pacific Missile Range (Vandenberg to you). The orbit will be more or less polar, the objective being an inclination of 82 degrees to the equator, almost exactly that of Oscar I.

The OSSC is especially interested in any anomalous results which may turn up as a result of the satellite's electromagnetic interaction with its environment. We don't know for sure whether this kind of thing will occur at two meters very often. The one measurement we do have showed Shotput IV to have interacted with an auroral electron cloud to the tune of a 20-db. boost in received signal strength. Thus, it will pay you to be on the lookout for these interactions. In fact, it may pay you a European or Hawaiian QSO!

Communication Possibilities

Right now, fish out November 1961 *QST*, turn to page 36 and, if you have not already read K2LMG's article, sit down and read it. Beside the theoretical concepts explained in Dave's text, with which we will assume familiarity, pay particular attention to Figs. 1 and 5. Ask yourself: Without benefit of meteors, aurora, band openings, or even summer conditions, how far away is the most distant station I can work *regularly*? Fig. 5 will yield for this distance a corresponding figure in db. This is your maximum tolerable path loss. Perhaps you live where well-equipped stations are far apart. If this is so, your most-distant regular contact actually may come in fairly strong or he may run medium or low effective radiated power. You may feel you can tolerate additional path loss. Figure out how much, at 6 db. per S unit, and add this to correct your estimate.

*3 Ames St., M.I.T., Cambridge 39, Mass.

Our discussion of Echo A-12 path losses will assume that all propagation occurs by passive reflection. Thus, what we will obtain are minimum estimates, corresponding to K2LMG's 99th percentiles. We assume that Faraday rotation losses[1] have been engineered out of the system, and that the antennas are tiltable to follow the satellite.

You will recall from some of our earlier discussions that we selected frequencies above 1215 Mc. as optimum for amateur space communication. You may recall from the conclusion of our second article, though, that amateur tracking techniques simply have not progressed to the point at which the narrow-beam antennas characterizing these frequencies can be used. We must make a compromise in our s.n.r., then, between antenna gain as a function of beam width, and our tracking capability. This being done, it is plain that 144 and 220 Mc. are the best currently available bands for Echo A-12. Antenna gains at 50 Mc. are too low, and 432-Mc. beam widths are too narrow to be compatible with our tracking capability. For several reasons, the discussion here will center on 144 Mc. Anything we say about passive reflection may be adapted to 220 Mc. by simply adding 1.8 db. to each one-way path-loss figure to follow (remembering that higher antenna gains are possible on 220, so total results should be a bit better than on 144, but with a correspondingly more difficult tracking requirement).

Fig. 1 shows, subject to the above qualifications, the total *one-way* path loss for *each station* when using Echo A-12 at different ground ranges and satellite heights. This one-way path loss is a new concept, and may need further clarification. To get it, first determine the precise position of the satellite from tracking data. Plot this point on a map, neglecting altitude. This is called the subsatellite point, or the point on the ground at which the satellite would appear to be *exactly* overhead at that instant of time. Now measure the as-the-crow-flies ground range between your station and this point. Using the given figure for the satellite's altitude, find the appropriate curve on Fig. 1. Read along the horizontal scale until you come to the ground range (in statute miles) you have just measured. Making sure to use the proper curve, read off the figure in db. corresponding to this ground range. This is called your one-way path loss for the satellite at that particular place and altitude. Now, do the same thing for the station you're planning to schedule. Keep the subsatellite point where it is; just use the ground range from the other station to the subsatellite point instead of your own, and read off *his* one-way loss.

Now, the final touch: *Add* the two one-way losses. This will give the total two-way path loss from your station to the satellite and back to his station. Compare this figure with the maximum permissible path loss you previously computed from your station's tropo-scatter performance, remembering to make any necessary corrections. If the two figures are comparable, or if the Echo loss is a lower number than your maximum permissible loss, you win; contact is probably possible between the two stations on a regular basis. (If not, keep in mind the approximations we have made. You may still win.) To get a rough idea of the greatest distance you can regularly work using Echo A-12, divide your maximum permissible path loss by 2; find the mileage corresponding to it from Fig. 1 of *this* article (not K2LMG's). Double this mileage. The result will be the desired estimate.

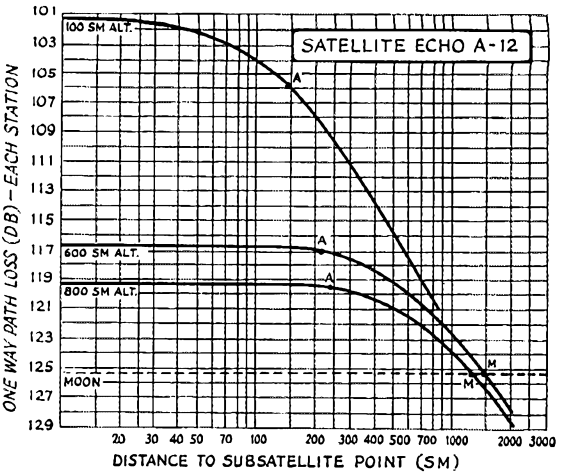


Fig. 1—Chart for estimating DX possibilities at 144 Mc. using Echo A-12 as a passive reflector. SM = Statute miles.

As an example, let's say that you find yourself able to keep a daily tropo-scatter schedule with a high-power friend 500 miles away. You look up 500 miles on K2LMG's Fig. 5, and read off 242 db. path loss. Divide this by 2 to get 121 db. Let's say you are interested in finding out what you can do with the satellite when it is first launched. Looking at Fig. 1, and noting that the third curve from the top says 800 statute miles, which is the nominal (planned) launch altitude, we find that 121 db. corresponds to 500 miles, which we double to get 1000 miles. This means that whatever results you got at 500 miles before can now be duplicated at 1000 miles, by using Echo A-12. Echo has doubled your working-out ability.

But this is not all. Remember, we said that Echo A-12 is expected to retain its spherical shape for quite a while, and that its mean altitude will decrease with time. The curve for 600 miles altitude represents what might confront us a year after launch. Those 1000-mile stations who were just even with your old schedule partners for strength are now 3.8 db. *stronger*. The point at which the Echo-bounce DX equals your old sked results has moved out to 1460 miles. If you didn't work those states the first time you tried, now's your chance, for signals will be stronger all around.

[1] Soifer, "Space Communication and the Amateur," *QST*, Nov., 1961; "The Mechanisms of Space Communication," *QST*, Dec. 1961; "The Feasibility of Amateur Space Communication," *QST*, Jan. 1962.

Let's now look at what might happen should the satellite retain its full reflectivity all the way down to 100 miles, near the end of its orbital life. The stations 1000 miles out are now a full 10 db. stronger than that old sked of yours. That lower-powered fellow you had such a hard time with in the early days of 800-mile orbits is now coming back on phone. The 121-db. point has moved steadily outward from its original 1000 miles and its 1963 value of 1460, and now in 1966 stands at 1740 miles.

But wait! The curve ends abruptly at 121.1 db. This means that 1750 miles is about as far as *anyone* can work with the satellite at this altitude. The reason for this is no mystery. A satellite at any given altitude can "see" only so much Earth, and the relay point must be able to see both stations for it to function. All that has happened is that points more than 875 miles from the subsatellite point are now beyond the satellite's horizon, and unreachable with amateur power and antenna capabilities. Lower satellite altitudes give greater signal returns for shorter ranges, but we must pay for this with limitations on the ultimate range. Get your longest-range work done early.

The Echo A-12 curves all represent thresholds. Lest members of the 2E26 or SCR-522 crowd get over-optimistic, it should be pointed out that the minimum power requirements are pretty high. For the satellite at 800-mile height and zero ground distance, the path-loss threshold stands at 238.4 db. This means that if your station is not capable of regular tropo-scatter work at 465 miles (K2LMG's Fig. 5), or close to it, your chances of Echo reflection are extremely slight. The threshold drops with satellite altitude, as signal returns get better. For the 600-mile curve, the corresponding threshold is about 425 miles. At 100 miles altitude, Echo gets a little more democratic, making itself available to anyone whose reliable tropo-scatter range is 240 miles or better. Bear in mind, however, that these figures are the result of certain idealizations and approximations, and may not hold in many specific cases. They represent the best guesses we can make at present, but that is all. The only way to find out how good or bad they are is to try.

It should be obvious that Echo is a high-power man's game. Rather than wear out your 829B calling, it will pay you to spend the time putting up a bigger array, or maybe building a new final. But don't give up completely. Although regular work, for the first few years at least, will probably not be possible with medium power, the sporadic interaction phenomena of which we will speak in a subsequent article may carry you into the money. Keep trying, but while you're doing it, better start building up that kilowatt. The one thing not to try with the satellite at higher altitudes is phone; this will only prove a complete waste of time.

The points marked *A* on each curve in Fig. 1 represent, to the best of our fortune-telling abilities, the distances at which Echo A-12 first starts showing advantages over tropo-scatter. They are expressed in distances to the subsatellite point, which should be doubled to find maximum ground ranges. For the 800-mile altitude, point *A* corresponds to 480 miles. This means that at less than 480 miles you will probably do better with tropo-scatter, and should pick out stations farther away to make your best use of Echo A-12. For the 100-mile case, the corresponding point *A* is only 290 miles. The same qualifications which we placed on our thresholds hold for these *A* points, only more so.

For general interest, a dotted line has been drawn in to show the one-way path losses associated with 144-Mc. moonbounce. It may be seen that Echo A-12 will demonstrate s.n.r. advantage at all subsatellite-point distances up to those points marked *M*. These *M* points are qualified to the extent that interaction phenomena may affect the Echo path losses.

Over the entire life of the satellite, then, Echo A-12 should provide regular work *with stronger signals than any other medium of propagation*, at one time or another during its life, at distances from 300 to 1750 miles, and sporadically as far out as 4500 miles.

Signal Characteristics

Being a moving target, Echo A-12 will impart Doppler shift to all relayed signals. A formula for Doppler shift is given on page 25 of December 1961 *QST*. In practice, Doppler shifts resulting from passive reflection will not be too much different from those encountered with Oscar. The reference to Garner and Wells, in May 1961 *QST*, given in the December article is valid here for 144-Mc. work, and should be read.

Radiotelephone work will encounter severe selective fading. In commercial practice f.m. has been shown to be by far the best mode for satellite phone work, but unfortunately requires a high carrier-to-noise ratio. Unless he is equipped with far better than average antennas, the amateur should not attempt phone work until the satellite has decayed into quite a low orbit.

Equipment Modifications

To the basic requirements for Echo A-12 work — a good, all-around high-performance station, with low-noise converter, high-power c.w. transmitter, and high-gain antenna — we add three more — a tiltable array, polarization diversity, and Echo tracking capability. We will discuss the last in a subsequent article, concentrating for now on the first two.

While a tiltable array might have been a luxury for Oscar work, it is a virtual necessity for Echo. Antennas used in amateur work have notoriously low vertical beam widths. This is exactly what is desired for tropospheric scatter, since the idea there is to get as much as possible of the energy into low radiation angles. In the case of a satellite relay, the objective is to beam the radiation directly at the satellite, wherever it happens to be at the time. To point up the inadequacy of conventional low-angle antennas, let us say the

antenna in use has its maximum radiation at a vertical angle of five degrees, quite a reasonable value for modern v.h.f. arrays. To take advantage of the antenna's rated gain, the subsatellite point would have to be more than 2000 miles away from the station (for 800 miles altitude), giving a total path loss, assuming passive reflection, of 257.2 db. The *tropo-scatter* range corresponding to this figure is well over 600 miles, which exceeds the present amateur state of the art. In fact, with such antennas, moonbounce will beat Echo A-12 by more than an S unit.

In order to make use of the satellite at the A points, the antenna need not be tiltable fully overhead, but should be able to go up to about 70 degrees elevation. The tilt angle should be controllable from the shack, as is the azimuth.

Many amateurs already have tiltable arrays, for a variety of purposes. In light of what we have seen of Echo A-12's DX capabilities, no well-equipped amateur can today afford to be without one!

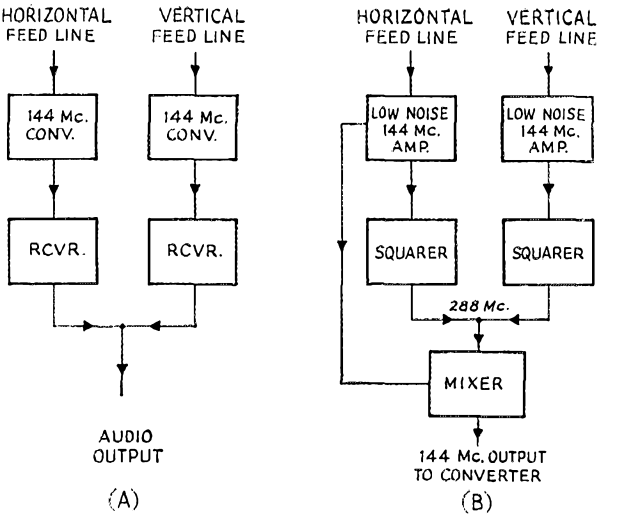


Fig. 2—Block diagrams of (A) full diversity receiving system, (B) alternate system using diversity combiner.

Eliminating Faraday Rotation Loss

The path loss and distance figures which we said were possible using Echo A-12 all assumed that Faraday rotation losses had been engineered out of the system. These losses are very serious, and failure to eliminate them might put you out of the Echo picture entirely.

At 144 Mc., we can calculate that the transmitted signal will undergo eight Faraday rotations, more or less, between the time it leaves the transmitting station and reaches the receiving station. It's the "more or less" that poses the problem, for it means that the signal can reach the receiving antenna polarized at literally *any* angle at all, and we must be prepared to receive all angles without degradation.

As a substitute for the helix, which has a sense problem, the methods we will consider for eliminating Faraday losses are based on what we will call the "plus-sign" array, which is a Yagi antenna system having an equal number of horizontal and vertical elements. To get the most gain for any given antenna size, the vertical elements should be mounted on the same boom as their horizontal counterparts. Take down each bay of your stacked-Yagi array, and right alongside each horizontal element mount a similar element in a vertical position, securing it to the boom with clamps, screws, brackets, or any suitable method. Keep the driven elements for the horizontal and vertical components electrically apart, for it is in feeding this array that Faraday rotation will be defeated. When you're done modifying each bay, put it back in its old place on the stacking frame, but don't reconnect the feed lines.

The key to this method is having equal antenna gain values for the horizontal and vertical components. If you'd rather not modify the original bays, you'll have to put up a duplicate antenna system using vertical polarization and keep the two mechanically and electrically synchronized, if you are going to match the gain obtainable with the plus-sign system. Of course, you can always split your present system by turning half your bays vertical, but you obviously lose 3 db. by this technique.

Feeding the Array

In cutting feed line for the harnesses there are several different roads we can take, all eliminating Faraday loss but with varying efficiencies in terms of s.n.r. Let's take the simplest first; although not the best from an antenna gain standpoint, it may well prove the most popular because it combines reasonably good efficiency with low cost.

This method, used for 2-meter moonbounce by K1HMU[2] involves feeding the combined array with one line. But instead of feeding the horizontal and vertical components in phase, Ned's system inserts a 90-degree phase-delay line between the horizontal and vertical elements so the vertical elements will lag the horizontal by 90 degrees, thus giving rise to circular polarization. Here's where equality of gain between the two components comes in, because any inequality will cause the resulting polarization to be no longer circular, but elliptical; we would again experience Faraday loss.

Here's how to do it: Connect up your old feedline harness to the horizontal bays, the same way you had it before. Now, from each horizontal driven element run a quarter-wave line to its corresponding vertical driven element. The length

[2] See page 89, *QST*, November, 1961.

of this line is given by

$$L \text{ (inches)} = \frac{2953}{f} V, \qquad \text{where}$$

L = Length of quarter-wave line in inches
f = Frequency in megacycles
V = Velocity factor of the line material used (get from ARRL *Handbook*)

If you're running duplicate antennas, you'll have to make up your own feed system. Just remember to feed the vertical bays 90 degrees out of phase with the horizontal ones. In all cases, make sure that the corresponding sides of each component are fed with the same side of the line. For example, if you use coax and connect the center conductor between the nine-o'clock side of a horizontal bay and the twelve-o'clock side of a vertical bay, make sure that you do exactly the same thing on all your other bays. On all bays, the braid would then go between the three-o'clock and six-o'clock sides. Whatever you do, don't cross them by connecting the nine-o'clock side to a twelve on one bay and a six on another. That will really foul up the works! Equally as bad would be failure to standardize the feed harnesses to the horizontal bays from the transmitter. If your center conductor goes to a nine-o'clock side on one bay, it should go to nine-o'clock sides on all the others. Fiddling with the gamma matches (they will need it) for an optimum s.w.r. will complete the installation.

Standardization

One feature of this array is that dire consequences will follow if the fellow on the other end doesn't have his hooked up in the same way as yours. In the interests of national standardization, then, let's all adopt the following convention, which will put us in step with those already using this type of array: Viewing each plus-sign bay from the *rear*, connect (using one conductor of the quarter-wave line) the nine-o'clock and twelve-o'clock sides together. This means that the braid (or second conductor) of the line will go between the three-o'clock and six-o'clock sides. This will give everyone in the country clockwise polarization in transmitting, and counterclockwise in receiving.

A Super De Luxe System

If you are willing to use two feed lines, it will pay you several decibels to use, instead of standardized circular polarization described above, one of the linear polarization-diversity systems described below. In these systems, the plus-sign array (or duplicate arrays) is constructed as before, but instead of feeding the vertical component from the horizontal driven element through a delay line, a completely separate feed system would be run into the shack. The two feed lines should be pruned so that they radiate *exactly in phase*, instead of in quadrature as in the K1HMU antenna. This system gives us linearly polarized output at a 45° polarization angle.

For optimum results in reception, the two lines are fed into separate receiver-converter combinations, each adjusted to provide equivalent gain, and the *audio outputs* of the two receivers are combined. This is illustrated in Fig. 2A.

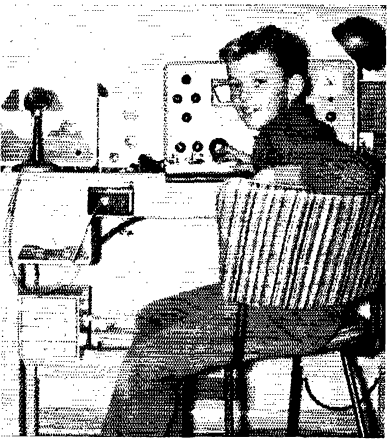
If a second receiver-converter combination is not available, the approach followed in Fig. 2B may be employed at some slight s.n.r. loss. Depending on the plane of polarization of the incoming signal — which, as we saw, was a random variable — the voltages measured under receiving conditions across the horizontal- and vertical-component feed lines will be either exactly in phase or exactly out of phase. Fig. 2B shows the diversity combiner suggested by K9VSK to make use of this property. Each line goes to a separate Nuvistor or parametric amplifier, adjusted for equivalent gain and phase distortion. Each channel then goes to a squaring circuit, which might use a properly-biased square-law diode. The squared channels are added, and their sum is heterodyned with *one* of the Nuvistor amplifier outputs, to bring it back down to 144 Mc. The output of the mixer goes to the regular converter input, and treated as any other 2-meter signal.

These two diversity approaches, when implemented on both ends of the circuit, will yield six and three decibels of increased s.n.r., respectively, over a fully implemented K1HMU system with an equivalent number of plus-sign elements. They are therefore recommended whenever maximum s.n.r. is required at all costs. They have one drawback, however, and that is their incompatibility with the standardized circular array we have just discussed. A signal emitted by a circular polarized antenna will be received by one of these linear-diversity systems without Faraday losses. *but not vice versa*. Because of its simplicity, the standardized circular array is going to be used by many stations, in spite of the less-than-optimum performance it provides. It does eliminate Faraday losses, and its gain is equal to that of the antenna before modification.

For general all-around DXing with Echo A-12, we recommend the standardized circular array. It's simple to build, and you'll have more stations to work. If, on the other hand, you are not out for increasing your states total but are inclined toward concentrating your work to one schedule with one or two specific stations, as for research purposes or for a sustained, KH6UK-type assault on the mileage record, then we suggest you get together with your prospective schedule partner and agree on using linear polarization diversity, in order to squeeze out the maximum possible gain. Bear in mind, of course, that going all-out for gain in this manner will very much hinder any future work you may wish to attempt with circularly polarized stations, and you would then have to modify your setup back to the standardized circular approach.

Don't just stand there! Put in one or the other. Stations without either standardized circular polarization or linear polarization diversity will be out in the cold when Echo A-12 flies. That may be sooner than you think, so let's get busy!

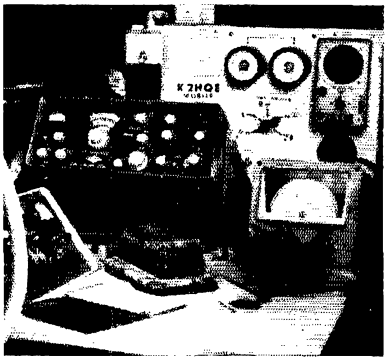
(Propagation anomalies and methods of antenna tracking will be treated in a subsequent article in an early issue. — EDITOR.) QST

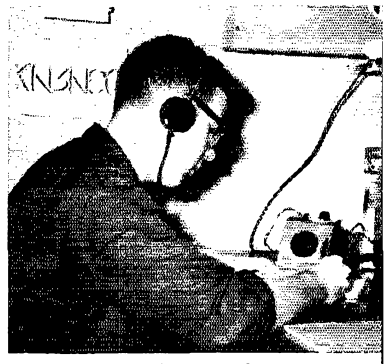


Above, are a couple of young hams who look as though they enjoy the hobby. At the left is KNØGXD, of St. Paul, Minn., while in the center is WNØAHZ, 12 years old and the youngest member of the Minneapolis RC. . . . At the right W5BAB recuperates at Sparks Hospital, Fort Smith, Ark., where one of the doctors is K5FZK, a believer in the proper therapy for ham patients.

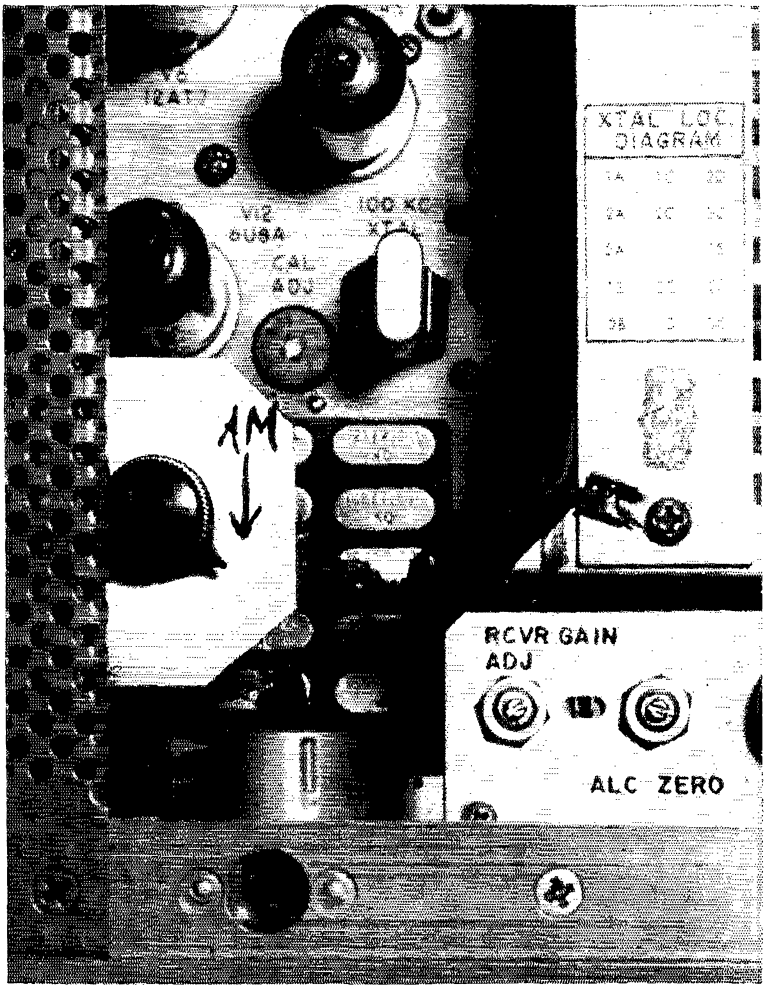


At the left is Chief Radioman A. F. Lalak, USN, operator at 9Q5US, who was recently awarded the Navy's Commendation Medal for meritorious communications services rendered while on duty in Leopoldville. We don't have a photo of him at his ham gear, but the picture above shows him relaxing over the traditional Navy cup of coffee after the award ceremonies. . . . In the center above is WA6OON at the controls of K6NCT, a SeaBee station that enables Pacific personnel to contact their families in the States (*photo by K8YUW*). . . . At the right is KH6CJJ who (a year ago) attended the National 4-H Conference in Chicago as a reward for his outstanding 4-H work (*photo via KH6ARL*).





Above left is an amazing installation, in K2HQE's Cadillac. Gear includes G-76, KWM-2, two bugs, a 6-meter v.f.o., s.w.r. bridge, a 110-amp alternator, six antennas, and miscellaneous smaller items. No room for passengers! . . . In the center is W4NMK, who has been much heard on the bands of late. He is skipper of the submarine USS *Cutlass*, and has been working the gang while submerged. Incidentally, some 60 Navy ships now have ham stations on board. . . . At the right is KN3NCQ, who recently won a Savings Bond for building the winning piece of gear (a transistorized keying monitor) in the 1961 "build-it-yourself" contest sponsored by the Rock Creek (Maryland) ARA.



W6BNK's a.m. adapter installed in the KWM-2. The adjustable control is located on a small aluminum shelf above the crystal bank, just inside at left front. A hole to facilitate this mounting already exists in the side bracket.

Clean A.M. with S-Line Units

Simple Adapter for S.S.B. Exciters

BY R. H. McCOLLISTER,* W6BNK

VERY little has been published about working a.m. with the KWM-2 or Collins S-Line, yet most owners of these fine units have heard that it is possible. I have labored over the subject and been on the air with a KWM-2 using a.m. for about a year, so perhaps I'll be permitted to comment.

Yes, the little circuit in Fig. 1A will do the trick when placed across the balanced-modulator-filter components. This is the basic idea where the b.f.o. output is picked up at point A and reinjected at point B so as to nullify the balance and, if possible, also eliminate the filter. This system was described by W2LNP in an article in *QST* for September, 1961,[1] and a simple method of installation was suggested. However, the simple arrangement of Fig. 1A has its drawbacks, since the amount of capacitance needed will vary, and the elementary system must be manually switched.

Improvements

The improvements shown in Fig. 1B are more becoming to the Collins equipment. For an a.m.

* 4091 South Land Park Drive, Sacramento 22, Calif.

[1] Popkin-Clurman, "A.M. With Collins S.S.B. Units," *QST*, September, 1961.

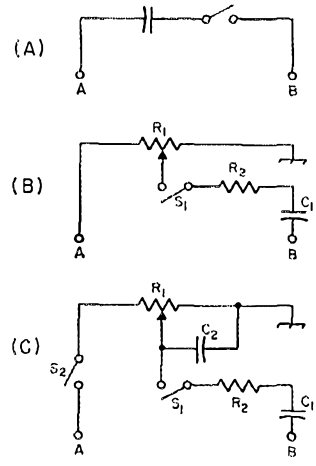


Fig. 1—Three methods of reinserting the carrier in s.s.b. units. See text for values and discussion.

QSO with this system, it is only necessary to rotate the potentiometer, R_1, for some appropriate carrier and return it all the way back for s.s.b. or c.w. Without any further ado, 32S-1 owners may use Fig. 1B. KWM-2 owners may also use Fig. 1B, but the transceiver will suffer slightly and, unless something gets switched, the point-B lead must stop short of the dual-purpose filter. This is satisfactory within reason, but the situation may be remedied by using Fig. 1C. (You fellows who are engineers may argue that this is not true a.m., but it works.)

Connections

Point A is soldered to the center arm of the carrier-balance potentiometer, resulting in an efficient take-off. Point B is soldered to the grid of the transmitting first mixer, or either equivalent lead from the filter. However, if the KWM-2 owner does not use Fig. 1C, this lead should be attached to Pin 6 of V_{4A}.

S_1 is a snap-on part of the control, R_1. When turned to the off position, it provides assurance that the s.s.b. transmissions will be clean, without carrier leakage.

S_2 represents points 9 and 10 on the main relay, K_4, in the KWM-2. These contacts afford an automatic break for the a.m. circuit while the unit is resting on receive. As the unit comes from the factory, these relay points carry an extra return to the power-supply, so that they may be used to close an external relay on transmit. To keep the KWM-2 a.m. arrangement clean, self-contained and completely automatic, you will find that these contacts may be easily cleaned off and rewired. They are located on top of the relay blade stack (closest to the viewer when looking into the inverted chassis).

C_1 is a 0.01-μf. disk installed at the B connection, and C_2 is a 0.005-μf. disk added in the KWM-2 to insure a clean receiver.

R_1 is the all-important potentiometer, 5000 ohms. R_2 is 3300 ohms. However, if the KWM-2 owner does not use Fig. 1C, the latter should be 20,000 ohms.

Rubber-covered shielded wire is used but, to avoid any possible loss in drive on s.s.b. transmit, the shield of the A lead is left ungrounded.

Operation

Whatever your circuit choice, the operating procedures will be the same. Tune up your equipment in the normal manner on either sideband. Close off the microphone gain and bring in the carrier with the new control, R_1. A setting of 100 to 125 plate ma. will be about right, and this limit should not be exceeded for prolonged periods. Now the microphone gain is reopened, but carefully, so that when voice is applied, a slight upward kick occurs in the plate current. If the kick is heavily upward, you will be overmodulating into s.s.b. with an annoying carrier. If the kick is downward, or if there is no movement at all, you will need to turn R_1 back a bit. When this balance is reached you are there, and your a.m. quality should be fine business.

The output with these arrangements is quite the same as with other similar exciters; i.e., 15 to 25 watts. Feeding a big linear like the 30S-1 is no problem, except that the amplifier's key-down ratings must be observed, and little R_1 becomes chairman of the board. Why not have some fun? This a.m. thing is the darndest — it makes old receivers copy s.s.b.! QST

Strays

The Totah ARC of Farmington, New Mexico, will set up a station at Four Corners on May 12 and 13. This is the point where four states (Arizona, New Mexico, Utah, and Colorado) and three call areas (5, Ø, and 7) have a common meeting point. Work any station at the Four Corners monument and receive a certificate. Send QSL of station worked *and* $1.00 to Totah ARC, P.O. Box 24, Farmington, New Mexico.

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This is Ernie Savage, our long-time British Columbia SCM, wearing a sweater knit for him by a grateful XYL whose OM was taught the code by Ernie. VE7SH is Ernie's wife.

Clear Channel Operation

BY W. M. QUITTER,* W8YLU (ex-K5EMY)

To most hams, the overcrowding of the bands through the years has been perhaps the one major detraction in the joys of the pursuit of the greatest hobby yet devised. Let's face it, there are either too many hams or not enough channels in the r.f. spectrum. This thought has apparently struck far and wide, judging from the various techniques developed through the years to circumvent the problem. One of the first was the use of rock-crushers — to outshout the other fellow. Later came the more subtle techniques of sideband — which improved things, to be sure, but also encouraged the expansion of hamdom at the same time to compound further the original problem.

Having also given a lot of thought to this problem, I have concluded that clear channel operation is the best solution — but this seemed beyond practical application. The thought persevered — how to clear the channel that *you* want to use without the expense and reputation established by the use of the 10-gallon rock-crusher (not to mention the FCC view of such operation). The problem after some consideration resolved itself into a simple consideration — all other operators are noise in relation to my signal, so let's improve the signal-to-noise ratio! Now of course, it would be difficult, if not impossible, to entreat the other hams on my frequency to leave — either by subtle or forceful means — but there had to be a way — and with a bit of further thought it came to me.

Consider that an antenna picks up the signals radiated by others (noise, from our present point of view) and in so doing actually reduces the signal energy of that radiation in space by virtue of the resistive losses in the antenna system. Now it occurred to me that since the currents and voltages induced into a receiving antenna are direct functions of the radiated field of the transmitter, the amount of power absorbed by the antenna could be increased by simply lowering the antenna resistance! Remember $P = E^2/R$. . . . With E constant (for any given transmitter) and R increasingly reduced, the power absorbed would increase constantly until P would become virtually infinite — and all the transmitted power would be absorbed! Think of the possibilities — an antenna which could absorb the energy in the ether at a given frequency, if the antenna resistance could be sufficiently lowered. Such an antenna would automatically clear whatever frequency it might be tuned to, by simply "sucking up" the energies at that frequency. Of course, the problem remains to operate on the frequency yourself without being caught in this power-sucker. This need was quickly resolved by deciding to reduce the antenna resistance to near zero at a superaudible rate, but in the opposite phase from the operation of the local transmitter at the same superaudible rate, so that the antenna power-sucking action would not affect the local transmitter.

The next problem was one of practical application. First we had to devise a practical means of reducing the antenna resistance to zero, and had to be able to vary it at a superaudible rate. A zero resistance sounds pretty difficult to achieve, but I recalled that negative resistance devices could be coupled to actual (positive) resistances to some media point such as zero. Voila! The technique is practical. Since power sources display negative resistance characteristics, it was necessary only to build a superaudible oscillator, load it with an adjustable resistor and suitably connect it into the antenna system, adjusting it to zero resistance. This last posed a few problems . . . such as driving the negative resistance into the antenna without feeding it back into the transmitter power amplifier. And then too, it occurred to me that the energy absorbed from the radiation in space at this frequency would have to be dissipated somewhere if the unit was to continue to suck up power. Putting these requirements together, a bridge circuit not too different from a magic-T waveguide suggested itself.

Here's how it works. With the antenna at one end of the bridge, the transmitter power amplifier at the other, the superaudible oscillator feeds in at one of the remaining corners with a dummy load at the last corner. With this lashup, the antenna would in effect be fed by both the transmitter and the superaudible oscillator. In turn, the antenna would in effect feed back its sucked-up energy (the zero-resistance component) to the dummy load. One little wrinkle remained — the bridge connections between the transmitter and the superaudible oscillator should be crossed over, to insure that the antenna is fed by both sources in the opposite phase. Otherwise, the local transmitter would find its power sucked-up along with all the other transmitters on the frequency. Although not fully realized at the outset, it was suddenly apparent that by having the super-

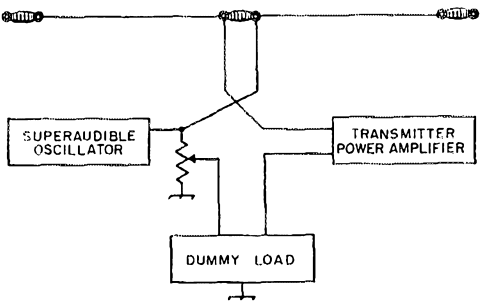


Fig. 1 — Self-explanatory.

*Carrera 21, 86-A 20, Bogota 2, Columbia

audible oscillator in the circuit, a bandwidth considerably larger than the audio spectrum of my transmitter would be effectively involved in the zero-resistance action of the circuit — which of course means the clear channels would actually be wider than required by my transmitter.

Finally came the actual test . . . how did it work? The connections were made, the rig tuned up, and the resistance adjusted to zero. I looked over the band 'til I got a weak signal barely discernible through the noisy pack. After he signed I gave him a short blast (not to be too hoggish of the frequency). The guy came right back to me with the best report I had ever received — and with the curious question about how did I ever find the hole in the band, I was wide open and in the clear. These words delighted my soul, and from there I went from one 100% QSO to another. In actual practice, I found that while I cleared the channel with the power-sucker at first, the natural disruption of all QSOs on the frequency led everyone to QSY and in a very short time I had a clear channel for myself and my opposite numbers too — who marveled at our luck in finding the hole in the band. Of course, the guys who QSYd shrugged and thought simply that they had found a "dead spot" in the band, and moved along. It was great. Armchair copy all the way!

As it does to all of us, though, conscience has come to bear. I realize that to keep my good fortune to myself would be the height of selfishness. So after a short time of enjoying privately the fruits of my labors, the fruits have become bitter and I have decided to share my knowledge with the rest of the ham fraternity, although not without some misgivings. For now that I have bared my secret, certain basic consequences must result. As the use of Clear-Channel (power-sucker) operation spreads, those hams who must QSY will become more and more crowded. The natural result will be that the use of Clear Channel (power-sucker) operation will spread even further, until virtually all the bands will be cleared of all but this type of operation. The ultimate result is obvious. The bands will appear to be completely clear! Clear because of the power-suckers tuned across the bands, sucking up all the energy in the band spectrums.

In spite of these dire consequences, I believe that I must reveal this technique. As in the past, I believe hams will rise to the needs of the future. I am sure that some ham, now unknown and unsung, will develop a still newer technique in the near future, when all the bands are cleared by power-suckers, which will revolutionize communications as we now know it. It is really with the hopes for this bright prospect that I freely offer the techniques of Clear Channel (power-sucker) operation. QST

Strays

During August there took place between WØSSM and WØDPM/Ø a QSO during which power was, for the first time in ham history, derived from fuel cells. The transmitter at WØDPM/Ø was a transistorized crystal-controlled job feeding a 3-element 10-meter yagi. The photo above shows the battery of fuel cells and the transmitter that was in use. Fuel cells are a relatively new means of producing electrical power. They can be regarded as batteries in which the electrodes are continuously being replaced as discharge proceeds. The fuel cell employed for this contact used porous carbon electrodes on the air side of the cell, and nickel screens served as the fuel electrodes. The alcohol fuel was dissolved in the electrolyte, which in this case was caustic potash solution. Each cell gave an open circuit voltage of approximately one volt. The method of construction was very like that of the ordinary storage battery except that there were air chambers behind each carbon plate to supply the oxygen used to "burn" the fuel. This project was a team effort by hams at the Onan Division of the Studebaker-Packard Corp. in Minneapolis. The transmitter and antenna were constructed by Russ Hughes, WØIFS; the operator was George Thole, WØDPM: while Henry Perry, ex-G3/GM3KXS, poured in the fuel. Armand Poirier, who constructed the fuel-cell battery, is studying for his ticket. The ham at the other end of the contact, Les Ford, WØSSM, was also an Onan man. In these days of "do-it-yourself," it is interesting to note that this contact was performed with home-made electricity! — *GM3KXS*

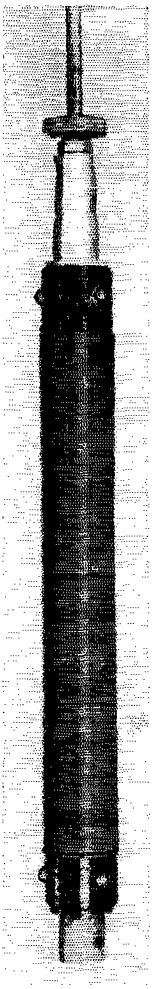
Multiband Mobile Antenna Loading Coil

BY E. ZIEMENDORF,* W2IGI,
AND J. LAMPUS,* W2KJV

To most mobile hams the antenna system presents certain limitations and problems. Multiband operation multiplies the difficulties in nearly direct proportion to the number of bands used. Some of the problems have been overcome over the years by experimentation and "home-brewing," and it is the purpose of this paper to describe the results of a recent effort to improve on multiband mobile antennas. Specifically, the article describes the details of construction of a tunable mobile loading coil for the bands from 75 to 10 meters.

The construction of the coil will present no problem to the ham having access to a small machine shop. Because each ham may have other sizes and dimensions of material available than those shown in the cutaway view, Fig. 1, drawings and dimensions of the individual pieces will not be shown.

* c/o The Carborundum Co., Research & Development Div., P.O. Box 337, Niagara Falls, New York.



External view of the coil, whip bearing and locking system.

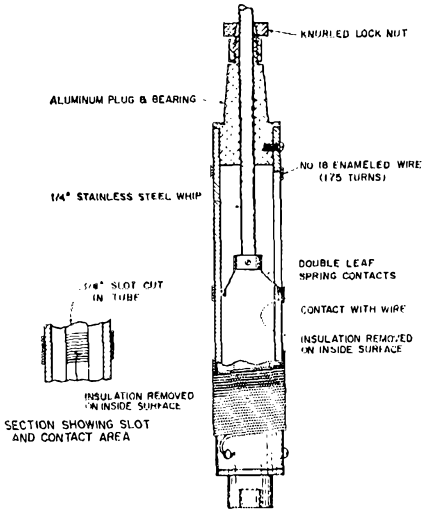


Fig. 1—Cutaway drawing showing the constructional features of the loading coil. Dimensions can be varied to suit materials available.

The body of the loading coil is a paper-laminate phenolic tube (Spaulding Fiber) 1⅛ inches o.d. by ⅞ inch i.d. by 10 inches long. A longitudinal slot ⅜ inch wide by 8 inches long is cut in the tube. The ends of the slot are equidistant from the ends of the tube. Contact between the slider and the inside of the wire is made through this slot to provide tuning adjustment.

The slider contacts were made from heavy-duty spring contacts obtained from a defunct Centralab JV-9002 switch. Two of these are soldered 180 degrees apart to a collar which is then fastened to the main whip with set screws. One spring contact rides on the inside of the fiber tube and provides electrical and mechanical stability. The other contact rides on the inside surface of the wires, which have been cleaned of insulation.

Because of the danger of shorting turns, a chemical cleaner could not be used to remove the insulation from the inside of the wire. Several slow and unsuccessful methods were tried before

it was found that coarse sandpaper placed on a flat, narrow piece of material with a long handle could be used to abrade the inside surface of the wire. This method quickly removed the insulation along the length of the slot. It is essential that good contact be made between the wire and the sliding contact, to prevent noise and detuning.

Additional support for the whip, to help prevent the contact on the wire from moving, is provided by a fairly long bearing at the top of the coil. The aluminum plug and bearing is about 2½ inches long. The hole to pass the whip rod is a snug fit to help hold the contact secure. A Millen No. 10062 shaft lock holds the whip firmly in position after tuning to the desired frequency. The loading coil is secured to the base section by another aluminum plug tapped for ⅜-24 thread. Both of these end pieces are fastened to the inside of the fiber tube by three 8-32 machine screws spaced 120 degrees apart. The ends of the wire are fastened under one of the screws at each end of the coil. The electrical circuit of the antenna is shown in Fig. 2.

Construction and Assembly Summary

The coil is wound with 175 turns of No. 18 enameled wire. The winding just covers the slot. The inductance with the slider all the way to the top (approximately 2.8 Mc.) is 120 microhenrys, with a Q of 150. About 80 μh. is used at 4 Mc. Before the coil is wound, the form is sprayed with Krylon to reduce the effects of moisture. Several coats are later sprayed on the completed coil to help hold the wire in place and for atmospheric protection.

The inside of the coil wires must be well cleaned. This will prevent detuning during transmissions and eliminate "intermittents" during reception. A good snug fit in the bearing plug will aid in maintaining good contact between the slider and wire.

The whip is marked for the various bands and

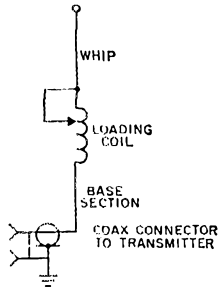


Fig. 2—Electrical circuit of the whip antenna with loading coil.

frequencies, which are then permanently stamped in the proper places. It was found that the 75-meter phone band could be covered with two settings, by tolerating a slight power loss at each side of a center frequency. The other bands were calibrated at only one setting. This permitted optimum adjustment for any frequency within a given band. When operating on the 75-meter band the slider is set near the top, while on 10 meters the slider is at or near the bottom of the coil.

The antenna loading coil system shown in the photograph has been used for about six months under all conditions with good results. No detuning or noise has been experienced. Power as high as 60 watts into an Elmac AF-67 has been used without any difficulty.

This antenna tuning system has solved most of the problems encountered with tapped coils, outside sliding contacts, cumbersome LC tuners and others. It is small, neat, stable and, after calibration, easy to adjust to resonance on any band.

No measurements of any sort other than those mentioned above have been made on the coil. Successful QSOs are being made and it is felt that this provides a good indication of its operating characteristics. QST

Strays

Editor, *QST:*

"As the Director, Naval Communications, it is one of my responsibilities to continue the long-standing Navy policy of working cooperatively with amateur radio. The Navy has found that Naval Communications has no more capable nor devoted proponents than radio amateurs.

Amateur radio in itself is an environment that encourages creditable invention and improvization. From that environment invaluable techniques have emerged to benefit the technology of mankind. From amateur radio have come some of the Nation's most gifted and talented communications-electronics engineers. From amateur radio the Nation and the Navy may draw upon a vast reserve of needed personnel in times of emergency.

My best wishes go to America's radio amateurs and to them goes the assurance that the

Navy's support of amateur radio will continue under Naval Communications' new Director."

Rear Admiral BERNARD F. ROEDER, *USN*
Director, Naval Communications

Project Oscar

Eyeball and Eardrum Doppler Tracking

BY DONALD E. NORGAARD,* W6VMH (ex-W2KUJ)

A CONSTANT-FREQUENCY signal transmitted from a source that has a radial component of motion relative to an observer will be seen by the observer as a signal whose frequency is different from that which is transmitted. This effect was first explained by Christian Johann Doppler in 1842 and is commonly known as the *Doppler effect*. In the case of a signal transmitted from an artificial space satellite such as Oscar, measurements of the apparent frequency shift (Doppler shift) of the radiated signal as the satellite passes within radio range of an observer can yield enough data to permit determination of many of the characteristics of its orbit.[1,2] It is the purpose of this article to describe simple apparatus and methods which permit Doppler-shift measurements to be made within an error of ±20 cycles per second.

The setups to be described permit measurement of the Doppler shift as a function of time. Measurement of the exact frequency of the satellite at any time is not necessary in the application of the Doppler method; knowledge of the transmitted frequency within 1 per cent or so is sufficient.

The Doppler Apparatus

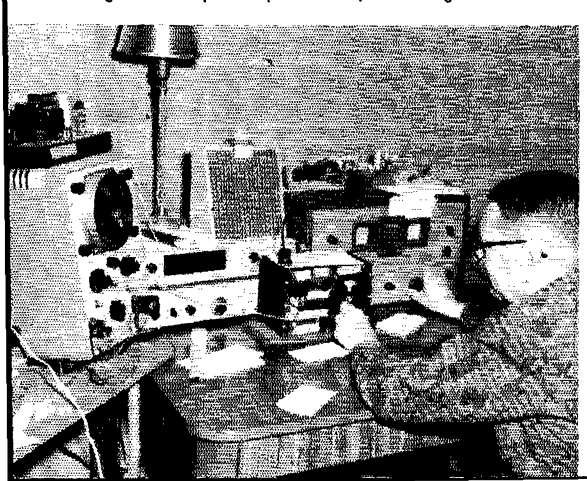
Fig. 1 illustrates in functional form the setup evolved by Ed Hilton, W6VKP, and me for Doppler tracking. Oscar's 145-Mc. keyed "HI" signal is received, converted to approximately 15 megacycles and fed through a tee connector to a conventional receiver tuned to the converted frequency. The low-impedance speaker output terminals of the receiver are connected to an oscilloscope through a 1000-c.p.s. phase-splitting network and to a "bridging" audio amplifier driving a loudspeaker. A switch is provided to permit monitoring either an unfiltered audio signal (position 1) or a filtered one appearing at the output of the phase splitter (position 2). The output of a 15-Mc. variable-frequency oscillator is coupled lightly into the receiver through one leg of the tee connector. This oscillator is provided with a frequency-set control and a slow tuning control (incremental tuning) having a total calibrated tuning range of about 10 kc., enough to encompass the expected Doppler shift of Oscar's signal during a single pass.

* Project Oscar Association, Box 183, Sunnyvale, Calif.

[1] Oliver, "How Doppler Shift Records Provide Satellite Range and Height Data," *Hewlett-Packard Journal*, Vol. 9, No. 3-4, Nov.-Dec., 1957.

[2] Hilton, "Making Your Own Orbital Predictions from Doppler Measurements," *QST*, March, 1962.

Tracking Oscar I with the setup shown in Fig. 1. That little gimmick pinned on top of the speaker is the rig's last gremlin—captured just in time, according to the author!



Recording Doppler Data

It didn't take very long to evolve a practical sequence for use of the setup of Fig. 1. Prior to an expected pass of Oscar the equipment is warmed up and the 2-meter antenna aimed for acquisition of Oscar's signal at the earliest possible time. The beat-frequency oscillator of the receiver is turned on and the 15-Mc. tracking v.f.o. tuned in to produce a beat note of 1000 c.p.s. as evidenced by a somewhat circular display on the scope. This display can be made quite circular when the beat note is at the resonant frequency of the phase splitter and the vertical and horizontal deflections are made equal by gain adjustment of the deflecting amplifiers of the oscilloscope. It should be pointed out here that the circular display turns into an ellipse leaning to the left for a shift of the beat note in one direction from that which produces a circular display, and to the right for the opposite direction of shift in the beat note. Thus, a 1000-c.p.s. *offset* of the tracking oscillator (accomplished by adjustment of the incremental-tuning control) from a signal being tracked can be monitored both visually and aurally.

Surprisingly enough, the resolution of this method is about ±5 c.p.s. if the observer happens to be the least bit sober. There are, of course, two such points of 1000-c.p.s. beat notes; the sense of the leaning ellipse reverses when changing from one of these beats to the other. It makes no difference which side of zero beat is selected for tracking. Once tracking is begun, however, it is necessary to stay on the same side of zero beat for the duration of the tracking run. The incremental-tuning dial is set near the high-frequency end of its range before the acquisition phase of the operation is begun.

Oscar's signal is acquired by operating the receiver with its b.f.o. set near the center of the receiver passband and with the 15-Mc. tracking oscillator disconnected from the tee. As soon as

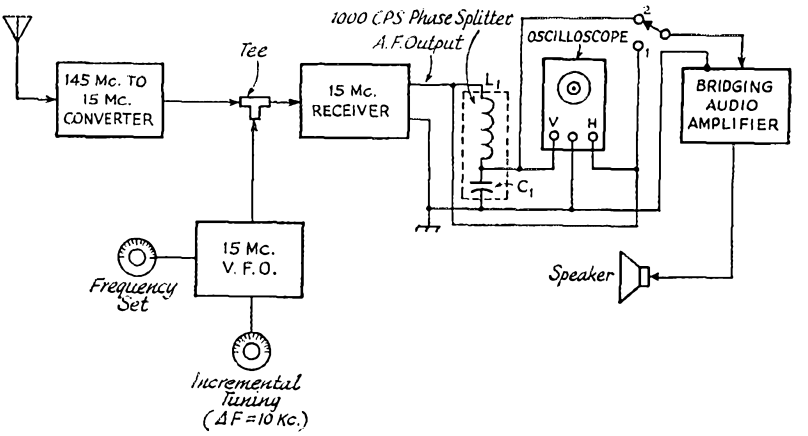


Fig. 1—Setup for determining Doppler shift, using scope indicator for checking frequency change. The phase-splitting circuit gives a circular pattern at the resonant frequency of L_1C_1, approximately 1000 cycles. L_1 is 118 millihenrys and C_1 is 0.022 μf. paper.

acquisition is definite, the receiver b.f.o. is switched off (manual gain is used, *not* a.g.c.), the tracking v.f.o. is reconnected into the tee, and the frequency-set control on the tracking v.f.o. is adjusted to give a nearly circular trace on the oscilloscope. This time it's Oscar's keyed signal that is seen and heard. All this can be done in a period of less than ten seconds, with a little experience or rehearsal.

Now all is ready for the tracking run. The incremental-tuning dial is turned first to obtain and then to maintain as nearly a circular display as possible on the oscilloscope.[3] Smooth manual tuning will produce a smooth record, which is the objective of the whole thing. Here again, a little practice helps. Several times during the tracking run it may be necessary to tune the receiver lower in frequency to follow the Doppler shift. Receiver tuning does not affect the frequency of the beat, but if the whole show is not followed by receiver tuning, parts of it will be missed. This is especially true if the receiver band width is narrow.

This Doppler tracking method requires two operators. It is a full-time job for one operator to accomplish smooth tuning centered (on the average) about the 1000-c.p.s. beat indicated by the circularity of the keyed trace on the oscilloscope. The other operator will be kept busy recording a sequence of readings of frequency, as observed from the calibration of the incremental-tuning dial, on a strict time schedule for the duration of the run. A time interval of five or ten seconds between readings is suggested. This time scale must be referenced to GMT within about one second in order to utilize the data to maximum advantage later.[4] Between the two operators the other jobs are counting the "HI" rate and aiming the antenna, if its directivity pattern warrants that additional operation.

Things move pretty fast near the time of closest approach (t.c.a.) and it is easy to lose the signal if the antenna pattern is sharp. A nearly overhead pass is the wildest of all. A highly directional antenna is a definite handicap; the only directivity needed is that which can tell you whether the pass you are observing is east or west of your location. Sometimes, in spite of reasonable preparation, the signal may be lost temporarily. The rule then is that the tracking operator *continue* tuning at the rate he had established at the time the signal was lost. When the signal is subsequently reacquired, readjustment to the correct point will be small — and, most important of all, the signal will most probably not have gone through zero beat. The ability to hear the signal whether it is perfectly tracked or not sometimes saves the day when severe disturbances such as automobile ignition noise make the scope display a bit "sticky." The tuning operator must then not become absorbed in listening to the tone change pitch — his job is to keep it constant! One can expect a duration of the tracking run totalling about 8 minutes or so, depending on satellite height and local conditions such as distance to the radio horizon.

After the run, the readings obtained may be plotted on graph paper, and the points may then be joined with straight lines. Following this, a smooth curve can be drawn over the segmented one and should represent the most probable actual Doppler curve. Remember, the real frequency is of no interest here — just the Doppler shift as a function of time (actual GMT time, though) is all that is sought.

An alternative method would be to advance the incremental-tuning dial *ahead* of its absolutely correct position in increments of, say, 100 c.p.s., during the run and record the *time* when the beat note passes through 1000 c.p.s. as seen on the circular display.[5] This leap-frog game is continued for the duration of the track. You might be caught short on this one if the signal drops out

[3] This display collapses to a fuzzy noise blob at the center of the circle during the "space" portion of the keyed signal and serves as a reference level of noise for estimation or measurement of signal-to-noise ratio. The s.n.r. is the ratio of the average diameter of the trace during "mark" to the average diameter of the noise blob during "space."

[4] See Hilton (Footnote 2), for calculations based on the Doppler shift information. Reduction of Doppler shift to graphical form simplifies much of this work.

[5] Fig. 2 is a Doppler shift record made by this method. The frequency increments are different from those suggested above, but quite creditable results can be obtained from records of this quality. A check against our record of this same pass indicates an agreement of better than five seconds in t.c.a. The author is indebted to W6CQI for permission to reproduce this chart here.

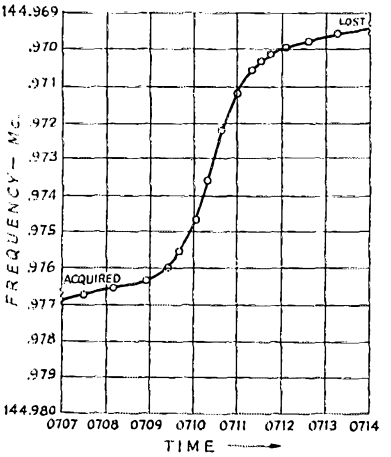


Fig. 2—Doppler curve obtained by W6CQI using the "leap-frog" method. This was an observation of the 243rd orbit of Oscar I, on December 28.

temporarily just about when a time reading is due. If this happens, advance the dial to the next increment and hope that the signal returns before this point is missed, too. Near the center of the Doppler track it may be necessary to use increments of frequency greater than 100 c.p.s. — slopes of 60 to 70 c.p.s. per second are normal for nearby passes.

One-Man Operation

Still another method will appeal to many hams because one operator can handle this technique all by himself. A suggested setup is given in Fig. 3. For acquisition, the receiver is used in the normal manner, b.f.o. operating, and the 15-Mc. oscillator disconnected from the tee joining the converter and receiver. In this case the b.f.o. should be set near the edge of the receiver passband that corresponds to frequencies *lower* than the passband center. When acquisition is definite, tune the *receiver* so that the beat note is somewhere between 3.5 and 4 kc., start the tape recorder, and connect the 15-Mc. oscillator to the tee. Quickly set the 15-Mc. oscillator to about zero beat with the *b.f.o.*, then turn off the b.f.o., and *do not* readjust the frequency of the 15-Mc. oscillator during the run. The keyed satellite signal will start out at this high pitch and will slowly drop in frequency, heading for zero beat. Shortly after the beginning of the run, momentarily open the normally-closed switch feeding the audio input to the recorder exactly on some time mark and write down this time (GMT) for future reference. Do this several times during the run so that you will be able to establish a time base referenced to GMT as noted by each momentary drop-out of noise. A nimble-fingered operator can hit this between "HI's" so that nary a one is missed.

When the beat note reaches about 500 c.p.s. tune the receiver *lower* about 2 kc. or so. This will not affect the pitch of the note at all, but does set the receiver so that the next portion of the Doppler shift will remain within the passband. The signal beat will go through zero and thereafter its frequency will rise. When this audio frequency reaches about 1000 c.p.s. deftly tune the receiver downward again by 2 kc. or so to complete the run. The reason for splitting the entire Doppler shift into two roughly equal parts is twofold; first, to keep the beat so that it can be heard readily (it need never be greater than 4 kc. for 2-meter signals) and, second, to put no great strain on the passband of either the receiver or tape recorder. Most receivers and tape recorders will handle audio frequencies up to 4 kc. with no difficulty whatever.

Now what do you have? You have a tape that has recorded on it the entire Doppler range of the pass, along with a few time markers that are referenced to London's Big Ben. A little work remains to be done before useful Doppler data can be extracted from it, but at least you have a good start. The total Doppler shift is there all right, but it has been folded. This must be unfolded and analyzed to complete the job.

Set up the tape recorder to play the tape just finished as indicated in Fig. 4. Don't worry about it if only one ear works well; listen to both speakers with the good ear. Start the tape and adjust the audio oscillator so that the keyed signal, starting at about 3.5 to 4 kc., is kept at zero beat with the oscillator all the time. A practice run about now wouldn't hurt a bit.

OK, ready now? GO!

Every five or ten seconds (preferably on a strict time schedule) jot down the frequency of the audio oscillator as you track the recorded signal at zero beat. For an 8-minute Doppler run you

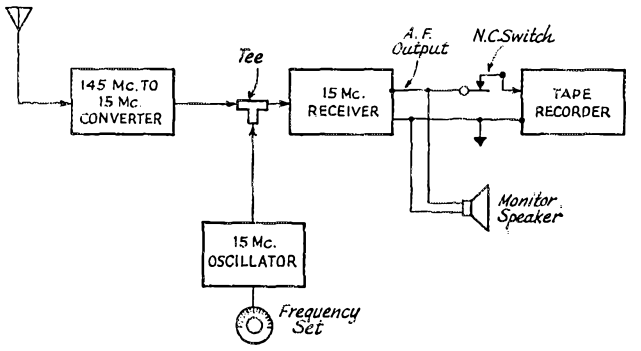


Fig. 3—One-operator setup, using tape recorder for subsequent data take-off.

will perhaps have a hundred readings. Don't *give up — you can always stop to rest*, backtracking the tape recorder as necessary to pick up at least a few five-second intervals before writer's cramp sets in. If the audio oscillator has several ranges you will have to stop anyway to change ranges. With a little preparation and practice, this whole operation can be done smoothly.

For most accurate results a precisely calibrated audio oscillator is necessary. If yours isn't, calibrate it and write down the *true* frequency opposite each dial reading recorded. Then plot each point of *true* frequency versus time on graph paper until you reach the last reading available before the keyed signal reached zero beat *on the tape*. This graph paper is your "paper clock." Let's suppose this happens to be 113 c.p.s. The next one *may* have been inaudible and so had to be missed because its frequency was too low to hear distinctly. Perhaps this is also true of the very next one, too, but somewhere *on the other side of zero beat on the tape* you will be able to make a reading. Plot this frequency as a *negative* quantity [6] on the paper at the proper time spot, remembering that the clock kept going whether or not a reading was obtained. Suppose the frequency happened to be 124 c.p.s. This point should be 113 plus 124 = 237 c.p.s. away from the 113-c.p.s. reading mentioned earlier. If it is only 11 c.p.s. away from that point — well, you goofed! Finally, you should end up with a nice string of points on the paper. Draw a smooth curve through these points and here is your Doppler shift curve.

Now for some dirty work. What time *was* it in London (GMT) corresponding to your 113-c.p.s. point, or any other point for that matter? You know that your "paper clock" was running at the same *speed* as the real thing, so now you have to set it. Play the tape again and find the first drop-out where you interrupted the recording for a fraction of a second. You wrote down that time (GMT) so if you have used 5-second intervals between points it must be within at least 2½ seconds of one of the points just plotted. Back up the recorder and find the two frequencies on your plot that bracket this *known* time, using the setup of Fig. 4. You should be able to spot both points within better than one second. The same is true for every other point on the plot. It is doubly reassuring if the other time-check "drops-outs" you put in the tape check this first one plus one other. If your recording (primary data) is legible you should be able to get very good Doppler shift curves after you organize yourself to reduce these primary data to this form. The nice thing about it is that you can go over it as many times as necessary to refine the results to a gratifying degree. When the initial plot is made do not be overly concerned about a few isolated points which fail to fall on the curve defined by the vast majority of the points — simply ignore them.

[6] Yes, I know there is no such thing as a negative frequency, but remember that the Doppler shift was folded as it was recorded on the tape.

On the other hand, beware of too much rationalizing: Doppler curves *are inherently smooth* curves, and if your points line up poorly, the inevitable result is loss of accuracy in the data which can be extracted from such curves.

Doubtless the descriptions of the foregoing methods will suggest many variations of one sort or another. Generally, here is what any method should do:

1) Permit Doppler shift accuracies of ±50 c.p.s. or better.

2) Reference this Doppler shift to GMT, within ±1 second or better. This is important if you cooperate with another observer a few hundred miles away to obtain altitude and ground track information about your satellite.

Whose satellite? — Yours!

Frequency Stability

It will be apparent that the incremental methods described place rather stringent requirements on frequency stability of several of the elements of the system for the duration of the Doppler track — about 8 minutes. This is true for the

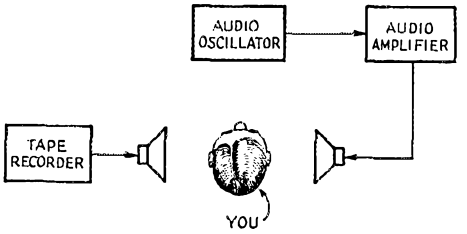


Fig. 4—Data reduction using tape-recorded signal and audio oscillator.

satellite itself, the converter, and the 15-Mc. v.f.o. of Figs. 1 and 3.

It is recommended that the converter be crystal controlled and thoroughly warmed up before attempting a Doppler shift run. At least one hour is recommended unless you *know* that it takes less time than that to settle down to a drift rate of less than 0.1 c.p.s. per second, referenced to the input frequency (145 Mc.).

Obviously, there isn't much you can do about the frequency stability of the satellite itself. Let's hope that Oscar's early training in this regard is good enough so that when he's out there alone he doesn't become capricious. But there is something you can do for the earth-bound oscillators you build for Doppler tracking. They must be stable, frequency-wise. While Fig. 1 indicates a 15-Mc. oscillator, this frequency is used because the output of our converter is in this frequency range. If your converter has a different output frequency when tuning to a signal at 145 Mc., you would be ill-advised to try using a 15-Mc. oscillator.

So you build your own *stable* tracking oscillator operating at a frequency that is appropriate for your setup. The 15-Mc. oscillators used in obtaining our Doppler shift data were transistorized jobs rather hastily built, but they were stable.

Many hams have their own pet ultra-stable

oscillator schemes. Most of these have several important features in common, one of which is *solid* construction. Toward that end, flimsy panels, shields, and the like are out. Coils are generally tension-wound on ceramic forms solidly mounted to the remainder of the structure. Tuning capacitors must be of good quality, double-spaced for reasons of frequency stability rather than voltage breakdown. Another feature is thermal isolation of the frequency determining elements from ambient conditions (rapid changes in temperature, for example) and internally-generated heat which causes temperature gradients to exist within the device. Here is where the transistor can do some good. There is no heater power, and the operating power input is small — hardly ever more than 1 or 2 milliwatts, total. Still another feature is stabilization of d.c. input voltages. Fortunately, the oscillators are not required to have really good long-term stability (such as WWV, for example) nor is a little very-short-term instability such as microphonics, noise f.m., or even hum f.m. a great tragedy so long as the frequency averaged over a second or so is constant.

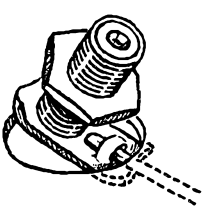
The incremental-tuning dial should be calibrated at the 15-Mc. nominal operating frequency, if its calibration is intended to be used to determine Doppler shift. Slight variations in nominal operating frequency obtained by adjustment of the frequency-set control away from the point used when the calibration was made will introduce a correspondingly slight error in the incremental frequency calibration. Any such error will not affect the value of the derived Doppler shift curve in its use to determine t.c.a., but does serve to introduce error in calculated slant range. If your 2-meter converter delivers its output at a frequency other than 15 Mc. when tuning in a 145-Mc. signal, use that frequency setting when calibrating the incremental-tuning dial.

Acknowledgment

The author wishes to express his gratitude to Edgar A. Hilton, W6VKP, for his help in all phases of the effort reported in this article; to Dr. Bernard M. Oliver of the Hewlett-Packard Company for his counsel, and to William I. Orr, W6SAI, of the Project Oscar Association for his help in the preparation of this article. Appreciation is also expressed to Project Oscar Association for providing the satellite, Oscar. QST

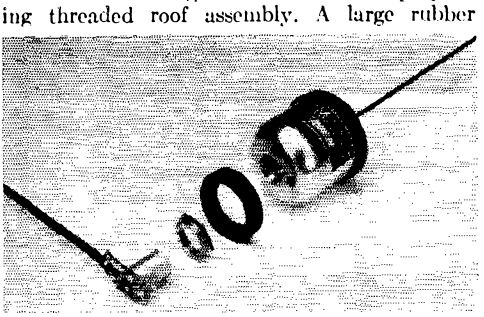
• *New Apparatus*

Mobile Roof-Mount Antenna



PROBABLY one of the biggest objections to car-top antennas is the necessity for removing car upholstery and cutting large holes in the metal roof in order to install the antenna. The GAM TG-2-R antenna eliminates this problem with the unique mounting arrangement shown in the sketch. To mount the antenna, it is only necessary to drill a single ⅞-inch hole in the car roof and then snake the coaxial cable, which is attached to the assembly at the factory, down to the transmitter between the car body and the upholstery. The assembly is then slid through the hole and centered. The large nut is tightened until the mount is firm.

The antenna consists of a matching coil and half-wave radiator (see photograph) which is designed for operation in the amateur 2-meter band. The matching coil screws over the projecting threaded roof assembly. A large rubber washer is furnished and is placed between the car roof and the loading coil for weather protection. The half-wave vertical element attaches to the top of the coil and is held in place by two Allen head set screws (the wrench is furnished).



The TG-2-R is manufactured by G.A.M. Electronics, Inc., Manchester, New Hampshire. They plan to make the mounting assembly available as a separate item in the near future, and also to bring out a quarter-wave model of the antenna.

— *E. L. C.*

Strays

W9QGR, recuperating at home from a heart attack, required the services of a medical technologist — who turned out to be W9HZO.

—•••—

W8LZV had a pleasant rag-chew on 20 sideband one evening with W8SZS. Later in the evening severe internal pains necessitated his removal to a hospital and medical consultation. So who shows up to work on the case? W8SZS.

—•••—

Every member get a member. See page 64A.

Have You Tried 160 Lately?

Simple Phone-C.W. Rig for 1.8 Mc.

BY EDWARD HAYWARD,* W1PH

IF YOU'RE tired of bucking the QRM on 40 and 75, or of waiting for openings on the higher frequencies, you'll probably be as surprised as I have been to rediscover what can be done on 160 with simple equipment.

Unfortunately, only a few of the current manufactured transmitters have provision for 160 meters, making it necessary for most of those interested to build their own. Fig. 1 shows the circuit that I have been using with good results. Most of the components for this low-power rig came from the junk box. A triode Clapp-type v.f.o. and an untuned buffer stage drive an 807 final. The modulator is W6LNN's "Simplest" – a grid-bias type described in *QST* several years ago.[1] Just switch it into the key jack J_2 when you want to go on phone.

* 15 Woodbine Terrace, Auburndale, Mass.

[1] Gardner, "The Simplest Modulator," *QST*, September, 1953.

Construction

The v.f.o. is shielded by building it in a one-pound coffee can — a simple arrangement that the author has used in the past with good success.[2] Shielding is usually found to be necessary when working straight through at the v.f.o. frequency to avoid frequency instability. The layout of the remainder of the circuit is not critical. I simply fastened the components down with wood screws to a piece of plywood that forms the bottom side of a plywood cabinet.

The antenna tuner is external. I wound the coil on an empty cylindrical salt box. To facilitate tapping, a slot was cut lengthwise over the central portion of the box.

Operation

Two power supplies are needed — a small one

(Continued on page 140)

[2] Hayward, "The Coffee-Can VFO, Sr.," *QST*, September, 1951.

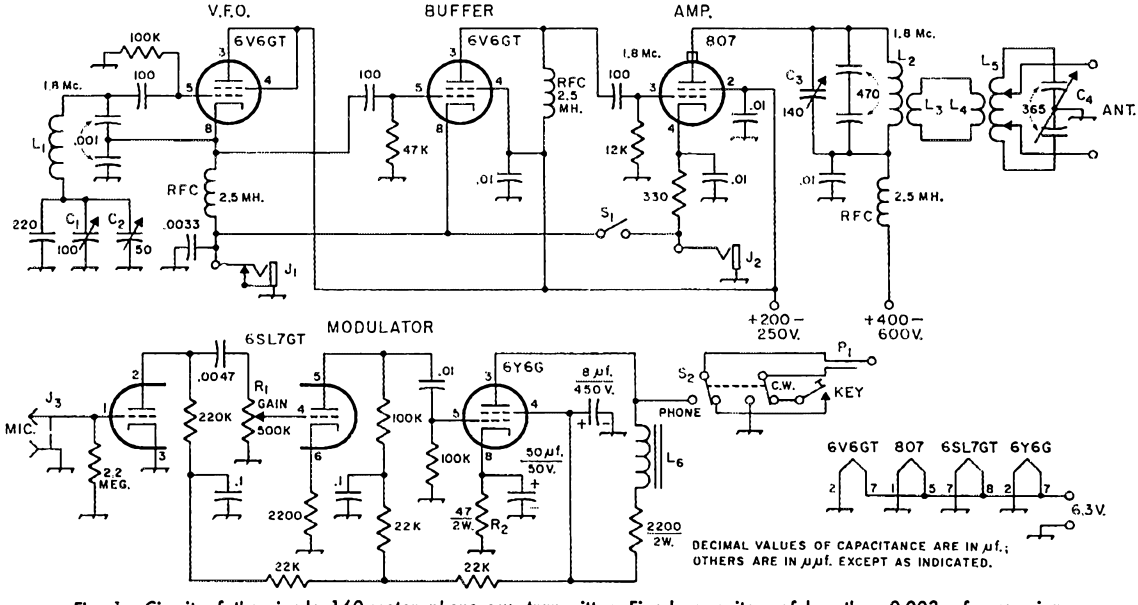
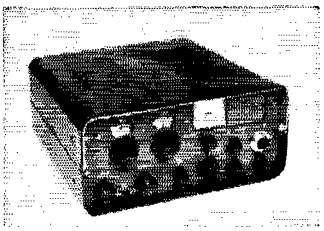


Fig. 1—Circuit of the simple 160-meter phone-c.w. transmitter. Fixed capacitors of less than 0.003 μf. are mica; others are paper or ceramic, except for those marked with polarity, which are electrolytic. Resistances are in ohms and resistors are ½ watt unless indicated otherwise.

C_1, C_3—Midget air variable.
C_2—8–50-μμf. ceramic trimmer (Erie 557–8 or equiv.)
C_4—Dual air variable (broadcast-replacement type).
J_1—Closed-circuit jack.
J_2—Open-circuit jack.
J_3—Microphone connector.
L_1—46 turns No. 20 enam., 1½-inch diam., close-wound.
L_2—37 turns No. 20 enam., 1½-inch. diam., close-wound.
L_3—8 turns No. 20 plastic-covered, wound over low-potential end of L_2.
L_4—Same as L_3, wound over center of L_5.
L_5—44 turns No. 20 bare, 3¼-inch diam., turns spaced 1/16 inch (see text).
L_6—Small filter choke, approx. 15 henrys at 50–60 ma.
P_1—Plug to fit J_1, J_2.
R_1—Audio-taper control.
R_2—Nominal value (see text).
S_1—S.p.s.t. toggle switch.
S_2—D.p.d.t. toggle switch.

• Recent Equipment —

The Poly-Comm 62B



WEIGHT: 15 pounds. Size: 10 by 11 by 5 inches. Contents: 15-watt plate-modulated transmitter for 50 and 144 Mc., multiple-conversion receiver for both bands, dual-purpose power supply for 12-volt d.c. or 117-volt a.c. input.

Statistics like these are also included at the end of equipment writeups, but we're putting them up front because they serve better than wordy paragraphs to point up the unusual aspects of this v.h.f. man's package. Details may be of more than ordinary interest to the ingenious do-it-yourselfer, as well as to the prospective purchaser of a v.h.f. station, so let's have a look at the block diagram, Fig. 1.

The transmitter (upper portion of the diagram) follows fairly standard practice in obtaining output on 50 and 144 Mc., with three exciter stages and a final amplifier. The 6AH6 oscillator, V_{13}, may be run with crystal or self control, operating in the 8- to 9-Mc. range either way, and tripling to 24 to 27 Mc. A 12BY7, V_{14}, doubles to 48 to 54 Mc. A second 12BY7, V_{15}, is in the circuit only for tripling to 144 Mc. Band-switching connects the first multiplier into the amplifier grid circuit in 50-Mc. service. The final amplifier is a 7551, V_{16}, working straight-through on both bands. Paralleled 6BQ5s, V_8 and V_9, serve for both modulator and receiver audio.

The receiver is perhaps the more interesting of the two main parts of the 62B. The first r.f. amplifier, a 6ES8 dual triode, V_1, is band-switched. A 6CW4 mixer, V_2, serves the combined functions of mixer on 144 Mc. and low-gain second r. f. amplifier on 50 Mc. Output from the crystal oscillator, V_{12} (Butler circuit with 94-Mc. crystal), beats with 144-Mc. signals in the 6CW4 to give a first intermediate frequency of 50 to 54 Mc. The oscillator is disabled by the band switch in 50-Mc. reception, by connecting a high resistance in its cathode lead. This resistance is common to the 6CW4 cathode circuit in the 50-Mc. position, also, so the latter stage merely passes on 50-Mc. signals from the first amplifier stage.

From the 6CW4 on, operation is identical for both bands. The front end of the 62B is essentially a 50-Mc. receiver with a crystal-controlled 144-Mc. converter ahead of it. Tuning is done with the 6AH6 oscillator, V_{11}, which covers 44.595 to 48.595 Mc. This stage provides injection for the second mixer, the triode portion of a 6AW8, V_3, beating with 50-Mc. signals (and converted 144-Mc. signals) to produce a second i.f. of 5.405 Mc. This is amplified in the pentode portion of V_3, and fed to one half of a 12AT7, V_4, which is a combined third mixer and 4950-kc. crystal

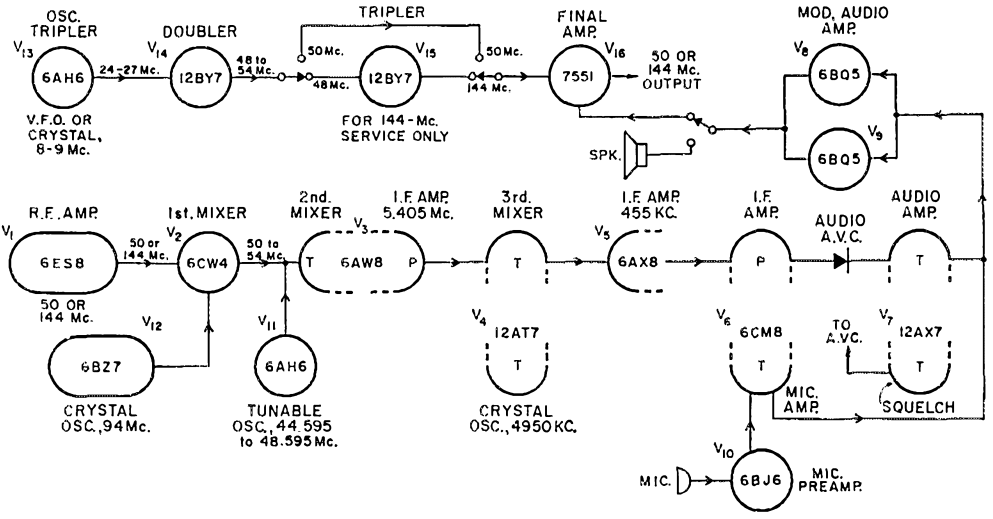
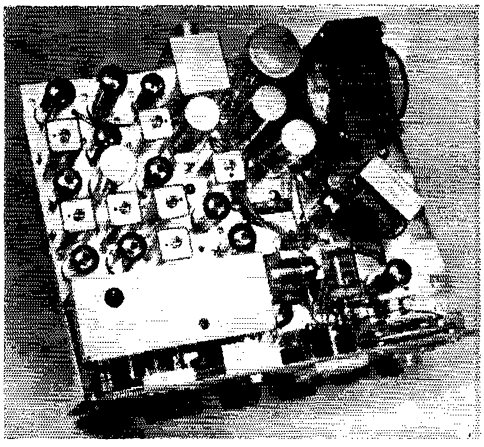


Fig. 1—Block diagram of the Poly-Comm 62B v.h.f. transceiver. Note that, as indicated at the lower left, the receiver is essentially a 50-Mc. tuner with a 144-Mc. converter ahead of it.



Interior of the Poly-Comm. Construction is on a single chassis, rather than in subassemblies.

oscillator. Conversion here is to 455 kc.

Then come two i.f. stages at 455 kc., the pentode portions of a 6AX8, V_5, and a 6CM8, V_6. Don't waste time looking for the other half of V_5. It is not doing anything, having been "orphaned" by a design change. If you can think of anything you'd like to add to the Poly-Comm that can be done with a triode, here's a spare one for you, it having been easier for the manufacturer to continue with the 6AX8 than to substitute another tube type.

Detection, a.v.c. and noise-limiter functions are handled with diodes. A 12AX7, V_7, is a receiver audio amplifier and squelch stage. A 6BJ6, V_{10}, and the triode portion of V_6 comprise the speech amplifier for the modulator.

The power supply has a full-wave doubler circuit, eliminating the need for diodes having high p.i.v. ratings. Separate power cables are provided for battery and a.c. operation. Either positive or negative car battery ground may be used.

Versatility

Designers of the Poly-Comm have made provision for many options or modifications. Here are some examples:

Control is normally by means of the microphone push-to-talk switch, but the microphone is detachable, so any control device that suits the operator's convenience can be installed. As contest operators can testify, long periods of continuous duty can be very tiring when a hand-held push-to-talk microphone is used. Contest men and CD operators will appreciate facilities for other methods of control.

The audio system may be used for p.a. service.

The two antenna terminals may be connected together, for use with two antennas (or a two-band antenna) having a single feed line.

Universal mounting bracket, for easy installation in any of six different positions.

Crystal-oscillator circuit permitting 8-, 12- or 24-Mc. crystals.

Harmonic filter housing at the antenna terminals. TVI and spurious-signal problems vary so greatly from one location to another that no one type of filter or trap will serve for all. Many locations will encounter no trouble of either kind, but when either does occur, a suitable trap or filter can be tailored to the local situation and installed readily.

Hang-up bracket for the microphone, usable on either side of the case, or at various angles.

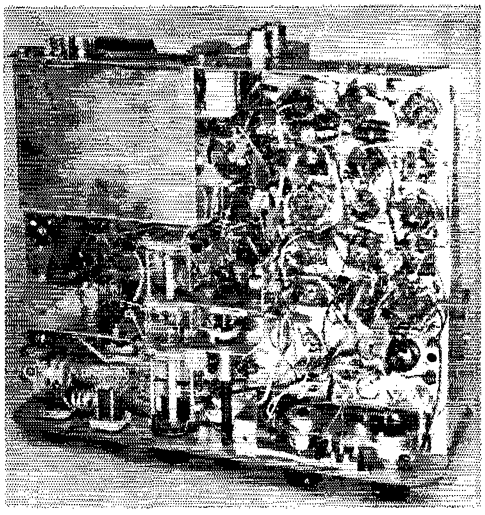
Illuminated S meter, as an option.

Provision for external speaker. The instruction book calls to the owner's attention that this will give better audio quality, and it is recommended in permanent installations, where room is available. Use of the built-in 3-inch speaker, while far from giving hi-fi reception, does not introduce a trouble common in this kind of gear: microphonic howl in the receiver. This is prevented by shock-mounting the tuning capacitors (both receiver-tuning and v.f.o.) in rubber.

Operation

Some compromise with the ideal is inevitable in any compact package of this kind regardless of cost, and here are some aspects of the Poly-Comm which could bother the uninformed user. No attempt is made by the manufacturer to hide these problems. In fact, some are emphasized in the instruction book, so that the owner will know what to expect of the equipment.

A multiple-conversion receiver for 2-band v.h.f. service is certain to be open to interference from nonamateur services. The Poly-Comm is no exception. Using it at the home location of W1HDQ, a high elevation with a line-of-sight shot to many f.m., TV, and mobile-relay stations, we hear a lot of signals from other services, the most troublesome being f.m. broadcasting. When you know the frequency of the interfering station, the installation of a trap (in the housing provided for this purpose) becomes a simple matter. Per-



Bottom view of the v.h.f. transceiver is a well-arranged maze of small components. All wiring is Teflon-insulated for high heat resistance and durability.

haps a better solution is the insertion of a coaxial filter in the antenna lead, as this will help to reject all signals not in the amateur band, and work on both transmitting and receiving to prevent interference.

Use of three oscillators, one tunable and two crystal, is bound to produce some beats here and there. The 62B has several, and they are mentioned in the instruction book, which says that they appear at 145.2 and 147.7 Mc. Two units checked here had these, plus weaker ones at 144.2, 144.6, 145.7, and two above 147 Mc. All appear to result from harmonics of the tunable oscillator.

The receiver performance seems more than adequate in other respects. Sensitivity, selectivity and stability are all good for a unit of this type. Selectivity is stated as 8 kc. at 6 db. down and 25 kc. at 60 db. down, which is about all one can handle in equipment intended for mobile and portable use. It is, in fact, something of a problem to tune in signals with the Poly-Comm, unless the operator is tending strictly to this business alone.

Incorporation of v.f.o. control in a compact hot-running piece of equipment like the 62B seems to be going out on a considerable design limb, but performance of the v.f.o. is acceptable on both 50 and 144 Mc. — although the critical listener will not have to be told that v.f.o. is in use. Particularly on 144 Mc., the frequency goes through a short drift cycle each transmission; but in justification it should be said that many crystal-controlled transmitters drift as much, or more. The note, with b.f.o. reception at the other end of the circuit, is only slightly less than T9, and the signal is relatively free of f.m. under modulation. V.h.f. men who appreciate real stability and T9 signals will, however, be happier if Poly-Comm users make a practice of running crystal control whenever possible.

As with too many other v.h.f. packaged stations, the Poly-Comm has no b.f.o., and no means of keying the transmitter. Here's a way to use that extra triode section — if you can find the space for a few extra parts for a b.f.o. somewhere.

There is not much extra space. This box is *full*, as might be expected. And it runs very hot. Here, again, no attempt is made to dodge the issue. Instead, it is emphasized that Teflon-insulated wiring and feedthrough bushings are used throughout, which should go a long way in preventing common hot-box troubles. — *E. P. T.*

Poly-Comm 62B Transceiver

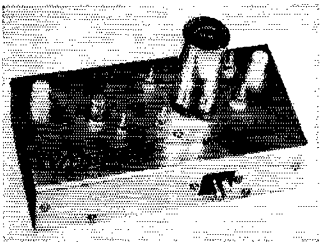
Height: 5 inches.
Width: 11 inches.
Depth: 10 inches.
Weight: 15 pounds.

Power requirements:	**12.6 v.d.c.**	**117 v.a.c.**
Transmit	**16 amp.**	**140 watts**
Receive	**10 amp.**	**90 watts**

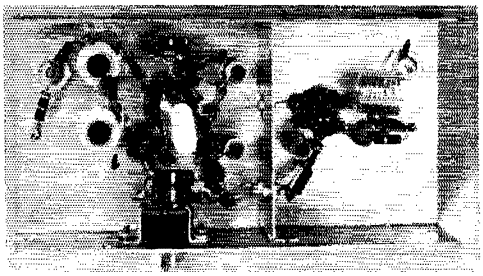
Price class: $350.

Manufacturer: Polytronics Lab., Inc., 388 Getty Ave., Clifton, New Jersey.

The TELco Model 201 50-Mc. Converter



WHEN a manufacturer whose products are already well established brings out a new model that is both considerably improved and reduced in price, that's news. But this has happened in the case of Tapetone's latest effort in v.h.f. converter design, the TELco Model 201 converter for 50 Mc. With only two tubes and simple circuits it provides all the sensitivity you'll ever be able to use, plus a high degree of protection against overloading and interference from out-of-band and in-band signals.



Interior view of the TELco 50-Mc. converter. The r.f. portion is at the right.

These desirable objectives are achieved through the use of a 6CW4 Nuvistor in a single grounded-grid r.f. stage and a 6U8 combined crystal oscillator and mixer. Nothing unusual here. In fact, there is no one outstanding feature of the design. The results come from careful attention to several small details.

First, the gain is held down to only that needed for good noise figure. Overloading in v.h.f. converters is most likely to occur in the mixer stage, and the problem there is aggravated if the gain ahead of the mixer is higher than necessary. Second, the mixer (pentode portion of the 6U8) is

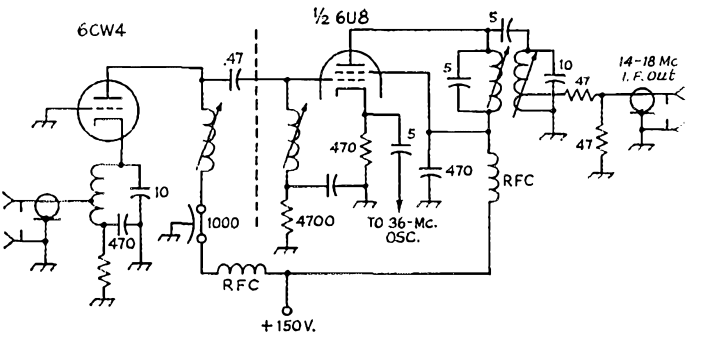


Fig. 1—Principal circuit features of the TELco 50-Mc. converter. Resistances are in ohms, capacitances are in $\mu\mu$f.

operated in the condition that makes it least susceptible to overloading. This is with low bias and high screen voltage, so that it draws a reasonable amount of plate current. Third, interstage and output coupling circuits having a minimum of capacitive coupling are set up to provide the desired bandpass characteristics, and at the same time provide considerable reduction in interference from out-of-band signals. Finally, all power leads are well filtered and decoupled, to prevent pickup or radiation of spurious frequencies, and to provide good stage isolation.

The principal circuits of interest are shown in Fig. 1. The 50-Mc. signal is fed into the cathode of the 6CW4, using a tuned circuit here for some selectivity, and for impedance-matching purposes. Note that the plate circuit of the Nuvistor and the grid circuit of the mixer are shielded from each other, the only coupling being through the very small capacitor connecting them. (Note to constructors looking for ideas to lift: a 0.47-$\mu\mu$f. capacitor is easily made by twisting insulated leads together. About one twist should be enough.)

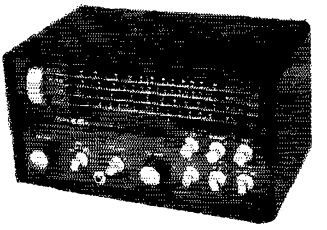
Two tuned circuits are used in the mixer output, but here there is a combination of inductive and capacitive coupling. Adjustment of the interstage and output-coupling circuits is done with a sweep generator, the aim being to develop a flat-topped steep-sided response curve for the 50-Mc. band.

The instruction book accompanying the converter goes into some detail on additional means to be taken to combat overloading and spurious responses. A coaxial filter for insertion in the antenna lead is described, and information is given on making an i.f. attenuator to be inserted in the line between the converter and receiver, in case the gain of the over-all system turns out to be higher than optimum. A balun for use with antenna systems employing balanced lines is also described. — *E. P. T.*

TELco Model 201 Converter

Height: 1½ inches.
Width: 6 inches.
Depth: 3 inches.
Power requirements: 150 volts d.c., 40 ma., 6.3 volts, 1 amp.
Price class: $35.
Manufacturer: Tapetone Electronics Laboratories, Inc., 99 Elm St., West Newton, Mass.

National NC-105 Receiver



The National NC-105 receiver is designed primarily for the short-wave listener and beginner radio amateur. Although this receiver is in the $120 class, it contains many features usually reserved for the higher priced models. It has a separate detector for c.w./s.s.b. reception, variable selectivity, a built-in speaker, and an S meter. Although it does *not* improve the performance of the receiver, a hand-rubbed oiled walnut cabinet is available for an extra twenty bucks!

Housed in a wrap-around cabinet finished in what is becoming a traditional National color, blue-gray, the NC-105 has a large illuminated slide-rule dial calibrated in four bands, from 550 kc. to 30 Mc. There is also a bandspread dial, marked from 0 to 100, just below the main dial. An illuminated edge-reading S meter sits at one end of the panel and chrome knobs for the various controls are grouped along the bottom and on one edge.

Six tubes are used in the NC-105, several of them performing more than one job. A look at the block diagram in Fig. 1 shows the tube lineup and functions. The NC-105 does not have an r.f.

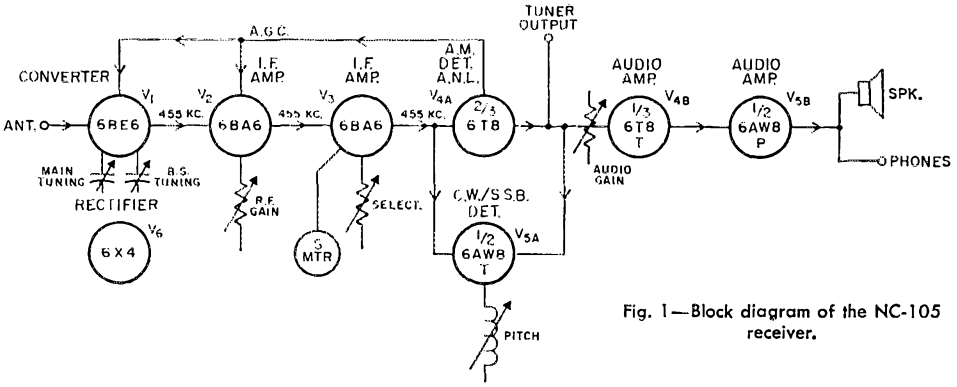
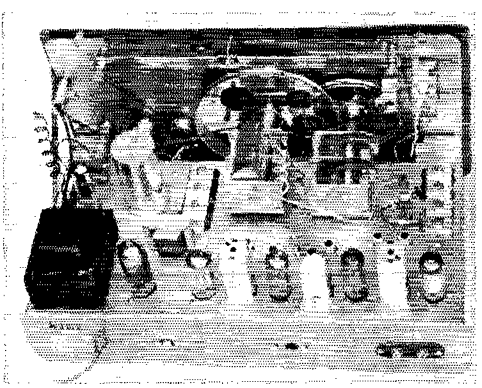


Fig. 1—Block diagram of the NC-105 receiver.

stage, and its front end uses only one tube, a converter. Signals coming from the antenna are coupled into a single tuned circuit and then converted directly to the i.f., 455 kc., in the 6BE6 converter tube, V_1. The converter is a five-grid tube operating as combination mixer and oscillator. The proper oscillator and antenna input coils are switched in the front-end circuits by the panel BAND SWITCH. The 550 kc. to 30 Mc. range is covered in four bands: 550 kc. to 1600 kc., 1.6 to 4.5 Mc., 4 to 12 Mc., and 11 to 30 Mc.

The oscillator portion of V_1 operates 455 kc. above the signal frequency on the three lower bands and 455 kc. below the signal on the high-frequency band. The resulting 455-kc. i.f. signal is then amplified in the first i.f. amplifier, V_2. This stage has its cathode returned to ground through a potentiometer, the RF GAIN control, so that the gain of this stage can be adjusted.

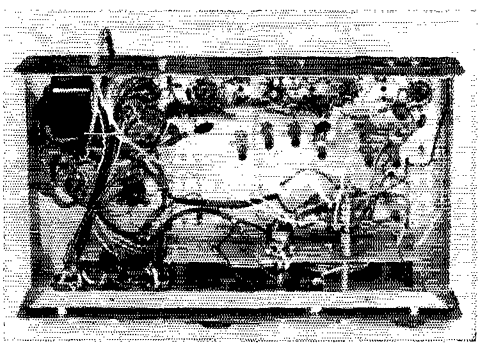
A second i.f. amplifier, V_3, can be made regenerative by a panel control labeled SELECTIVITY, which permits adjustment of the i.f. selectivity from a broad position, for hi-fi broadcast reception, to sharp selectivity for c.w. and s.s.b. reception. Also located in the i.f. amplifier circuits is the S meter which, with the r.f. gain control set at maximum, indicates relative signal strength of the received signal.



View of the NC-105 with its cabinet removed. The coiled lead at the left of the photograph connects to the speaker attached to the cabinet top. Rear apron connections and leads are, from left to right: Line cord, tuner output, S-meter zero adjust, and antenna and ground-terminal strip.

A.g.c. voltage is applied to the first i.f. amplifier and, in the case of the 550-kc. to 1600-kc. band, to the converter stage, too.

Two detectors are available in the NC-105. A diode detector, V_{4A}, is used for a.m. reception, and an oscillating triode detector, V_{5A}, for c.w. and s.s.b. reception. A panel BFO switch selects the desired detector. The panel PITCH control determines the frequency of oscillation of the oscillating triode, V_{5A}.



Bottom view of the NC-105 receiver.

An automatic noise limiter, consisting of a diode section of V_{4A}, can be used when in the a.m. mode of reception. It is turned on and off by the panel NOISE LIMITER switch.

Output from either the a.m. or s.s.b./c.w. detector is available at a plug at the rear of the receiver. This TUNER OUTPUT can be used to drive a high-fidelity amplifier. Output from the detectors can also drive the built-in audio amplifiers, V_{4B} and V_{5B}. V_{5B} feeds a loudspeaker

National NC-105 Receiver

Height: 7⅝ inches.
Width: 13½ inches.
Depth: 8⅝ inches.
Weight: 30 pounds.

Power requirements: 105–125 volts a.c., 50–60 cycles.

Price class: $120.

Manufacturer: National Radio Company, Inc., Melrose 76, Mass.

which is mounted inside the NC-105's cabinet. The audio output signal is also available at a front-panel phone jack. Inserting a standard phone plug automatically disconnects the loudspeaker.

Other panel controls not previously mentioned are an AUDIO GAIN control for adjusting the speaker or headphone level and a FUNCTION switch that has three positions: STBY, REC, and TUNER. In the STBY position, the receiver high voltage is disconnected to mute the receiver. In the REC position, the receiver audio circuits are connected and output goes to the built-in audio amplifiers and speaker. In the TUNER position, the audio circuits are disconnected and the detector output is fed to the rear apron TUNER OUTPUT jack.

The NC-105 has its own transformer power supply which delivers about 130 volts d.c. A 6X4 rectifier tube is connected in the full-wave center-tap circuit.

The instruction manual for the receiver contains the usual operating information, specifications and parts list but, in addition, has a dial-scale calibration chart for use with the bandspread dial. The calibration chart includes all the amateur bands plus several of the popular short-wave bands, and is used to convert the bandspread 0-100 scale directly to frequency.

— *E. L. C.*

Strays

Better check your v.f.o. calibration, gang. Effective January 1 WWV increased each of its standard frequencies by 2 parts in one billion. This was necessitated by irregular variations in the speed of rotation of the earth. Astronomical observations made at the U.S. Naval Observatory show that the earth was rotating at a successively slower speed each year from 1955 to 1958, and that since then the earth has been rotating at a faster speed each year.

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W6ISQ reminds us of a new service offered by Western Union, called a *Personal Opinion Message*. For 75¢ you may express your opinion on political affairs in a telegram to your Senator or Congressman, provided you can do it in 15 words or less. These *POM*'s can be filed anytime, from anywhere. If you haven't written yet concerning Senate Bill 2361 — reciprocal licensing — maybe this would be a good bet. What! You don't have the details on what this bill is all about? See pages 9 and 73 of *QST* for October, 1961.

Every member get a member. See page 64A.

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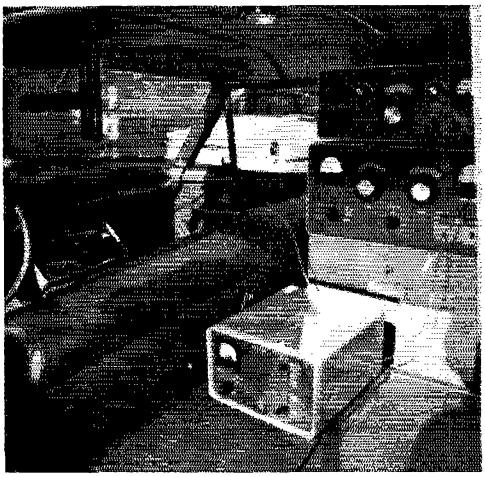
You don't have to be, but it helps. K4YYR with his mobile station.



W4EYI runs a full kw. mobile with the outfit shown above. The radio gear consists of Collins S-Line, and is used only on 40 meters. A.c. power for the station is supplied by the 1500-watt Onan generator mounted on the back. Special overload springs are installed on the station wagon to take care of the weight of the generator. W4EYI operates very nicely underway—we just hope that no one ever rams him from the rear!

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Who:

"I wonder if conditions were this bad when Morse invented the telegraph," mused Sunspot Sam McSquegg, sitting around with the rest of us after a recent Key & Glee Club conclave.

"OM Morse probably wasn't worrying about the solar cycle when he went after *his* DX," opined Grommethead Schultz, our club historian. "And, say, did you know that Mr. Morse was not *the* inventor of the electromagnetic telegraph?"

Sunspot Sam grabbed the bait. "What's the gimmick, Mr. Wiseguy? My kid's brand new supermarket encyclopedia states that Samuel F. B. Morse *is* the inventor of the electric telegraph. And I know it's so, so there."

"Your new brainbooks are not to be considered strictly in error on the subject, Sunspot," said Grommethead Schultz, calmly draining his toddy glass "Nevertheless, while it is entirely reasonable that Mr. Morse should be credited with the feat, your reference volumes would be more precise to state that he was *an* inventor."

"Well, I never heard of any co-inventor," declared Sunspot Sam. "Some guy named Schultz?"

"Restrain your facetiousness, OM. I magnanimously yield the glory to the immortal Morse — and to his contemporary, a Professor Joseph Henry."

"Joseph Henry who?"

"Joseph Henry period. Surely you are familiar with the henry, our unit of electrical inductance. Joe ranks with Gauss, Joule, Faraday, Ampere and others who fired the dawn of this electronic age."

"But the 'What Hath God Wrought' deal is the triumph of Mr. Morse," insisted friend McSquegg.

"True, very true, and quite good DX in 1844. And the date associated with Sam Morse's invention is actually twelve years earlier, 1832."

"You mean to sit there and say somebody beat him to it?" scoffed Sunspot.

"You put it crudely," continued Grommethead, toying with his tumbler. "But the validity of an affirmative answer to your question is rather firmly maintained by competent authorities. Mr. Morse, you see, was most concerned with his rightful claim to invention of the *recording* electromagnetic telegraph, there being quite a shortage of capable telegraphers in those days. Professor Joseph Henry of Albany, N. Y., devised and demonstrated what apparently was the first practical electromagnetic telegraph in 1830–'31, publishing details in *Silliman's Journal* of the latter year. Mr. Morse, as you know, subsequently pursued his own project to such a glorious end that we radio amateurs now use Morse code instead of Henry code."

After the boys went home Jeeves & Co. looked up this Henry chap. Grommethead wasn't kidding — the prof was quite a guy. Among his many scientific triumphs was the magnetization of a needle by lightning at a distance of eight miles, probably the first recorded action of "wireless" transmission as we hams use it. A phone call from Sunspot Sam McSquegg interrupted our research. He offered to part with his kid's gaudy new supermarket-type encyclopedia set dirt cheap. It doesn't even list Joseph Henry.

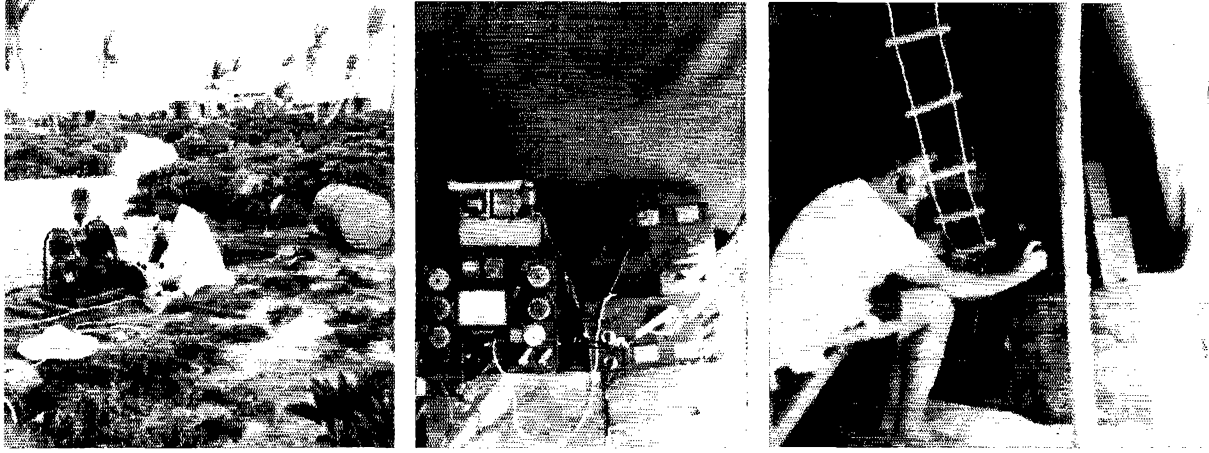
What:

Professor Henry also helped found the U. S. Weather Bureau, the outfit that tips us off to the imminence of QRN or good antenna-hoisting conditions. And it's good to say bye-bye to the roughest winter in years. . . . Spring traditionally peps up the propagational scene no matter what the state of the solar cycle. This year is no exception, judging from dispatches arriving from the world-wide "How's" postal network. . . .

160 c.w. fireworks commenced in earnest back in January when, according to W1BB's 160-*Meter DX Bulletin* No. 3, 1961–'62 season, **KH6IJ** hooked up with **HC1AGI**, **VP7NY** and a flock of W/Ks; HC1AGI clicked with **VP8GQ** and **ZL3RB**; VP8GQ knocked off Ws 1BB 9IFH and VE1ZZ; and ZL3RB two-wayed with Ws 5SOT 6KIP and K5VLH. Yes, we're talking 1.8 Mc., not 20 meters! Transatlantic QSOs were plentiful at the same time. W1PPN made the grade with Gs 3CHN 3ERN 3IGW 3OIT 3OQT 3PU 5JU 6BQ, **GI6TK** and **W9VEH**/**VP9**. Other goodies reported available are **EI5B**, **EP2BK** (1801 kc.), **GD3UB**, **HR3HH**, **UO5AA**, **VP5FP**, XE2OK and **ZL3BC**.

80 c.w. should be worth a peek if 160 is hot, so W1CTW, K1HTV, WA2s JMT KWB, WA6IVM, KØJPL, VE7BBB, EP2BK and KP4AOO lit out after such 3.5-Mc. DXcellence as DM3s PDA ZKK, **EI9J** (3501 *kc.*) 0700 *GMT*, **EP2s** BB BH (5) 23, BK 4–5, F8TM 6, FA9WD, GDs 3UB 7–8, 6IA, GIs 3IVJ 7, 5DX (3) 0, **GM3IWU** 8 **GW5TW** (5) 6, **HB9UD** 7, HK1QQ 5, **HZ1AB** (10) 20, IIIM, JAs 1ASF 1BRK 1CGM 1CRT 1CSL 1CVD 1ON 3BEA 3CAF 4GD 6AK ØAHF all on the low edge around

*7862-B West Lawrence Ave., Chicago 31, Ill.



VQ8APB (VQ8AP) fired up a T-1154, HRO and G5RV-type antenna on St. Brandon island in this fashion for a few DXciting days last December. Twenty-meter c.w. fishin' was fine—seven U. S. call areas and considerable DX were worked. Cyclone Beryl's approach terminated Louis's rare appearance. The background at left reveals remains of havoc wreaked by the great monster cyclone of 1960, a blast that devastated much of VQ8-land. (Photos via K2UYG)

12-15 GMT, **KG**s 1FD 4CW 3-4, 6DG, **KH6IJ**, **KL7IR** (5) 7, **KP4**AOO (3) 8, **KR6**AR (2) 11, **KV4CI** (1) 22, **KZ5**TD (10), LAs 6BQ (5) 4, 7Y 7, LU1HBS (3) 3, **OX3**DL, **OY7**ML, plenty of OK-OZs, **PA0**s PN 6, WDW, **SL5ZL** 7, **SV0W**Z, lots of 8Ms, **TF5**TP, **TG9**BG, **UA**s 9CI 9CM (2) 18, **UB5**UW (10) 5, **UO5**IT, **UP2**KBC, VK3DQ (2) 13-14, **VP**s 2VL (7) 6, 5MJ 7, 8GQ 1, 9CB 3, **VQ2**W (6) 4, **VR2**AP (24) 5, XE2RCC, YN1AA (4) 3, **YU**s 1FC 3FS 3LT, **ZB**s 1AD 2AD (3) 4-6, **ZP9**AY, **ZS1**A (3) 4, many ZLs, **5A**s 1TW 3TQ (5) 22 and **9Q5**AAA.

75 phone DX, *concentrating just below 3800 kc.* for the most part, looks like this to K1HTV, W1HKK, VE3PV and club informants: **CN8**s 1K 2, MU 22, **CT1**s EY KD*, **DJ**s 2VU 4WN 4ZC 5ID, **DL**s 1SD 1VX 3DM 6DS, EAs 1GH* 9AZ 21-22, **EI4Q**, **EP2**AT 20, F7DB 8, a dozen Gs, GB2MT, **GD3**GMH, **GI**s 3CDF 4RY 9, **GM3BQ**A, **GW5**TJ, **HA9**OZ, **HB9**s AAM* ABV* UD, **HC1**AGI, **HH9**DL, **HR3**HH, **HV1CN**, **HZ1**AB 22, IIAIM, K3NSI/VO2, **KG1**s FD GC 9, **KH6**GF 8, **KP4**s AWH 23-0, AXU*, **KZ5**s LC WH, LA6U, LX1DE, **OE5**DS, **OH5**NQ, **OK**s 1FF 6, 3KAB*, **ON4ZA**, **OX3**AI, **OY7**ML, **OZ**s 5KG 7KG, **PA0**s FM 8SB, **PJ2**AA, **PY7**VBR, **PZ1**AX, **SM5**s BPJ CL, **SV0W**T 19, **TG9**AD* 4, **UC2**AA 22, **UB5**s KAB 21, UW 21-22, WF, **UR2**AO, VEs 3BQL SU 22, VE8CA 22, **VK3**s AHO BM HG JA all 19-20, VO1s DF DN EC, **VP**s 2VI 5, 5CH 9DL 8, **VS9**AAC 22, **XE1**CV, **YU1FC***, YVs 1EE 5ANS 10, **ZC4**PC, **ZL**s galore, 3A2DE, 3V8CA, **4X**4s AS CW 19-20, DK and IX 21 — the asterisks representing outnumbered non-s.s.b.ers.

40 c.w. takes up the 14-Mc. slack in fine DX style and we find W1OPB, K1s JFF HTV, QYJ (25/15 countries worked/confirmed), WA2s HLH (23/9), KWB, K3KHK, K1s ADU SQS, K5s ETA YPS, K6MQG, WA6IVM, W7s DJU LZF, K9VER, K0s JPL YRQ ZEI, EP2BK, I1ER, KP4AOO and VE7BBB living it up with **BV1US** (25) 15, **CE**s 1AD 2AGH 3RY, **CN**s 2BK (5) 7, 8M1B 8MZ, **CO**s 2CT (7) 6, 2QR 2WI (13) 23, 3AGD 3NR 6XZ (8) 2, 8RM, **CP5EZ** 8, **CR**s 6CA (7) 1, **7CI** (15) 3, **CT3AB**, **CX2**s AM BT CO (2) 2, **DU**s 1AQ 9, 7SV (10) 15, **EA**s 8CP 9AP 14, 9AZ 9EA, **EL4A** (7) 6, **EP2**s AT (11) 16, BB 16, BH (5) 17-23, **ET3AZ** (13) 22, **FA**s 2VV (5) 5, 2ZJ 8RJ 9VN, **FB8XX** (5) 14, **FG7XI** 23, **FK8AM** (4) 8, **FO8AN** (2) 4, **HA**s 1KSA (7) 0, 3KGC (3) 1, 3KMF (8) 23, 7PZ (19) 2, 8CC (9) 23, **HC1**s DC LE, **HI8MAF** (15) 5, oodles of HKs, **HL1AE**, **HM9A**/p (19) 13, **HP1**s IE LM, **HS1X** (10) 15, **HV1CN**, **HZ1AK** (15) 21, IT1AGA (8) 23, thirty JA1s, **JA2**s ANX DN GU UJ, a dozen JA3s, JA4s AKR JY, JA5s ADR BZI MU PQ YAP, ample JA6-7-8s, JA9XC, JA0s AHF AHI RR SU, **KC6BD** 7-8, **KG1FD** (11) 12, **KM6CG** (14) 12, **KR6**s AR LF (35) 12, MD 16, QW, **KR8**s AI (2) 16, AS (9) 16, **KV4**s AA (8, 26) 6, CI, **KW6DG**, **KX6**s AJ BU (3) 5, many LZs, **MP4**s BBE (12) 21, QAO, **OA4BW** (28) 12, **OD5CT**, **OE6KZ**, **PJ**s 2AE 2ME (23) 12, 3AD, **SL8AY**, SM5ZS/**ZC6** (4) 21, loads of SPs, **SV**s 1AV 0WC 0WG 0WZ (9) 4, **TF5TP** (6) 0, **TI2**s CMF 6, LA (9) 3, WR (18) 4, **UA9**s BX (5) 13, CM DH 12-13, KEC KJA (20) 13, OC XG XV YE, **UA0**s AG BL CE CK 9, GF 9, KAG (12) 11, LH (21) 16, LJ MK (1) 12, scads of UB5s, **UD6**s BK KAB, **UF6**s AF AU 19, FB, **UG6KAA**, **UI8**s AH KAA (25) 20, KAD (10) 22, LB, **UJ8**s AL AM KAA (30) 1, **UL7**s NB NII (40) 19, **UM8KAB** (6) 12, **UO5**s KAA WN, UPOL-8 (7) 2 in the arctic, **UP2MO** (7, 12) 23-2, **UQ2DQ**, **UW**s 9CE 0FB (19) 15, VEs 3BQL/SU 8DU 0NR (20) 3 on Atlantic shipboard, **VK0**s RC YK, **VP**s 2DA (30) 0, 2DQ (5) 2, 2LD (36) 2, 2SH (8) 1, 2VH 2VI 3VN (18) 23, 4TK 4TR 5MJ 6KL (8) 21, 7BZ 7NQ (13) 4, 8EG (9) 12, 8GQ (171, 1) 0-2, 9EU, **VQ**s 2AB 2W 4HY, **VR**s 2DK (30) 11, 4CV (40) 8, **VS**s 1DJ 1FZ, 4RS (17) 14, 9AAC, **VU2JA**, sundry XEs, **XZ2TH**, **YN**s 1AH (5) 4, 1RH (5) 5, 3KM (24) 4, YOs and YVs in quantity, **ZB**s 1JF 22-23, 1MNC 2AD, **ZC**s 4AK 4CT 4PC 4SG 4TX (19) 0, 6BB 23, **ZD6RM** 20, **ZE**s 1AS 5JF 5QR **ZK1BS** a logful of ZL-ZSs, **4X**4s HC (10) 17, JU JW 22, KF NX, **5A**s 1 TW 3BC 3CAD 3TQ (8) 16, 4TC, **5H3GC** (3) 16, **5N2**s CPH JKO 22, LKZ 6, **6W8DD** 22, **9G1DT** and **9Q5AAA** (1) 5 . . . . . KN5s KWG and LLQ give us the **Novice** 7-Mc. slant with XEs 1CCG 2MD (173), **WH6EJV** and **WP4BBL**.

40 phone obstacles fail to daunt K1HTV, WA2KWB, K3s CBW KHK, ISWL NCDXC and PBRC bedlam specialists in their pursuit of **CN**s 2BK 8FU*, **DJ1BZ*** (96) 1, **FS7RT*** (293) 2, **HC1AGI*** (298) 3, **HH2**s AID* P* V (223) 12, **HK**s 1AQ 3JF (283) 11, **HZ1AB*** (95) 1, K4PGL/**VP9**, **KG1AA***, **KM6CG*** (208) 10, **KP4ASK** (260) 11, **KX6BU*** (103) 5, OA1W 11, **PY8SB** 9, **TG9BM** 9, **TU2AA** 7, **UB5WF***, VE3BQL SU*, **VK3AHO*** (70) 19, **VP**s 2AB 10, 2DA (245) 11, 2DX (245) 12, 2GE 10, 3HAG 10, 6KT (17) 22, **VQ**s 2AB* (42) 20, 4FO* (29) 19-20, XE1CV (293) 3, YV5s AYY HU (260) 10, **ZS1**s BK (29) 19, JA* 20, **4X4DH** and **9G1BF*** (30) 19, the asterisks in this paragraph going for known sideband specimens.

20 phone comes through consistently for K1s HTV IMD JFF, WA2FIT, K3KHK, W4NJF, K5s ALU YPS, K6s ENX MQG, K8s GJD RDE, K0s BHM JPL YRQ, EP2BK and VE3PV. We'll let the starred items be the lonely non-s.s.b. protagonists: **CE3**s HX QB (320) 2, RY, **CO8JK***, **CP5EA**, **CR7**s CF* IZ*, **CT1EY** (309) 12, **EL**s 2Q* 6D (339) 21-1, **FS7RT** (311) 12, **FY7YI** (160) 11, GD6IA (336) 20, a dozen Haiti workables, **HC1**s AGI BS (287) 14, **HK1QQ** (302) 23, **HZ1AB** (327) 13, **KB6BR** (270) 3, **KC4AAE** (335) 3, **KG**s 4AE 6IJ (310) 8, **KV4AA**, **OA4EY**, **OE1RZ**, **OX3GK** (303) 13, **PJ2AA** (333) 21, **PY8MA*** (180) 22, **PZ1**s AX CH, **SU1AS**, **TG9**s GZ TA, **TI2**s EA GRO (321) 0, HP (305) 12, PT*, **UB5KAB** (347) 13, VK6MK (304) 23, **VP**s 2SY* (180) 21, 2VI 2CAC 3HAG* 4TI (312) 1-2, 5BL (301) 23, 5BP (VE3CJ), 5CH (334), 5CW* 5LR* (180) 12, 7NA* (175) 13, 7NP 9WB*, VQ2AT (271) 20, **VU2RX** (313) 14, YN1WW* (220) 13, adequate YVs, **ZL**s 2BE* 3GJ (302) 12, **ZS3DP** (297) 21, **5N2**s EBL (321) 14, JKO*, **9G1CN** (115) 22, **9K2AM** (315) **9Q5**s AF (335) 1 and US (343) 20. With the skip 'way out there seems to be plenty of room on 20 these days.

20 c.w.'s daily hours of usefulness increase now as our days grow longer. This is jake with W1s APU OPB, K1s HTV (159/129), IMD (110/100), JFF (99/91), QYJ, K2JUA, WA2s FIT QMJ, K3KHK, W4NJF, K4ADU, K5s ALU (119/86), YPS, K6s ENX MQG (138/102), TZX, WA6s IVM ORS, W7s DJU LZF, K8s GJD RDE, W0CDL, K0s BHM JPL YRQ, VEs 3PV 7BBB, EP2BK, I1ER and KP4AOO because they'll have more time to lower the beam boom on **CE9**s AF (50) 2-3, AS (47) 0, **CO8JK**, **CP6FJ** (60) 1, **CR7**s CI IZ 21, **CT**s 2AI 3AV (20) 20-23, **DM3PBM**, **DU7SV** (5) 3, **EA9AP**, **EL4A** (40) 16, **EP2**s AT (47), BK (60) 16, **ET2US** (24) 18, FAs 2QY (76), 3CT, **FG7**s XI XJ (71) 0, **FB8XX** (40) 16, **FM7WP**, **FO8AN** (72) 0, **FP8AP** 13, **FY7YI**, **HA**s 1VA (30) 18, 7AC (41), **HC**s 2CS 5TD, **HH2**s CB OT, **HK**s 1AAF 1QQ 0AI, **HM1AP** (50) 1, **HP1IE**, **HR2FG**, JAs in all call areas but the ninth, **KA2**s AB JM KS (55) 10, MA (20), **KC4AAD** (80) 1, **KG**s 4AN 4CW 6AIG (50) 1, **KM6BI** (60) 4, **KV4AA** (81) 23, **KW6DG**

(30) 2, **LU3ZO**, **LX**2XG (3) 9, **LZ**1s KPZ KSZ (60) 15-16, **OA**8D, **OE**8SH, **OX**3s J1 UD, **PJ**2ME, **SL**3ZB, **SV**0s WC WI (70) 18, WT, **TI**2LA, **TN**8AG (60) 20, **TT**8s AA 20, AG (50) 20, AL (20) 21, **UA2**KAW (60) 15-16, **UA0**s EQ (25) 2, GF (48) 1, JU (40) 2, LL, **UB**5s JE KCC (10) 16, KNF (50) 15-16, VE (64), **UC2**s KAA 16, KAR (50), **UD6**BK, **UG6**GG, **UI8**KIA (60), **UM8**CB, **UO5**GN (40) 18, UPOL-8 14, **UP2**s NV 11-12, NR (93), **UR2**s BV KAN, VE3MC, VO1AW, **VP**s 2VI (20) 20, 4CC (18) 22, 4TR 5BF 5BL 5MJ (75), 6AP 6PJ 9EP 9WB, **VQ**5s IB IG (60) 19-20, **VS9**MB, W6MUB/TF (30) 16, WA6KMT **KM6**, XE2FT, **YO**s 2BB 9IA (50) 16, YV3BD, one ZA2BAK, **ZD1**s CM (30) 33, S, **ZE**s 4JS (34), 7JV 8JJ (10) 23, 8JO, **ZP**5AY, **ZS**s 3EW (48), 7R, **4X4**DK (50) 16, **5A4**TC 19, **5N2**s JKO 22, LKZ, **5T5**AD (81) 22-23, **6O1**MT, **6W8**s BQ DE 19-20, **9G1**s DE DT (1) 22, **9K2**AM (100), **9Q5**AAA 22 and **9U5**DS (30) 20.

15 phone can be played cagily, catching good openings while others battle pile-ups on 20. K1s HTV 1MD, K2YFE, WA2s FIT FQG QMJ, K3KHK, W4NJF, K4LRX (102, 84), K5s ALU YPS, K6MQG, WA6IVM, K0s JPL YRQ and EP2BK have good luck with **CE**s IAGI 3DD, **CO**s 2JL 2XA 8JK 8RA, **CR**s 6AL (220) 20, 6CR (240) 22, 6JL (220) 20, 7IT, **CT**s 1JG 1YE 2AI (240) 17, EL2Q, **FG7XL** (210) 17, **GD3**NJK (240) 15, **HG**s 1AAI 2RM, **HI8**s DGC DGH, **HH2**s CL (215) 21, V (240) 21-22, **HK2**GO, **HR**s 1MM* 3AC (240) 21, **JA**s 1FAF 2KX 3APL 7LK 8BY 9UU 0AET, **KG4**AH, **OA**4s J* (442) 14, JD (252) 21, **OX3**KM, **PJ**s 2CR 2MC (90) 20, 3AH 3AI, **PZ1**BW (260) 21, **SP9**KJ, **TI2**s ES PT, **VE8**YG (240) 19, **VP**s 2AF (250) 21, 2GW (210) 21, 2LA (260) 20, 2SP (220) 20, 2SY (220) 20, 2VA 3FM 4LG 5AH (280) 21, **5CH***, 5CW 5LG 6WR 9AK, **VQ4**s HX RF, **VS**s 4RS 9MB, XE2BC, **YN**s 3KM 4SH, **YV**s 2CJ 3BD 4EH 5AGA 5AGD 5AKP, **ZB2U**, **ZD**s 1B (245) 20, 1JWC 6HK (220) 18, 6RM, **ZL**s 1CA 1CE 1HA 2UD, **ZS**s 3AH 3LW 7L, **5H3**PBD, **5N2AMS*** (240) 17, **5T5**AB, **6W8**s BQ (235) 20, and CY (190) 21, the rare asterisks denoting single-sidehanders this time.

15 c.w. cases off, naturally, when there's less competition in the 21-Mc. phone bailiwick, but W1OPB, K1s HTV JFF, K2YFE, WA2s FQB QMJ, K3s KHK NWD, K5s ALU YPS, K6MQG, WA6s IVM ORS, K8s GJD PSV RDE, W9KQB, K0s BHM YRQ and VE3PV enjoy the lack of QRM around **CE**3s RC RY ZK, **CN8**ED, **CT1**s ID (37) 16, **CX2**s BT FD, EA9AP, FA3OA (60), GD3UB (170) 17, HA1KSW, **HC1**DC (42) 16, **HK7**s BE XI, **HP1**AP, **HR1**MM, **HV1**CN (44), **JA**s 1DRB 3ADN 5FQ 7LK 8AAC, **KR6**LD, **KW6**DG (50) 21, **LU1**ZL, LZ1KSA, **OE3**AT, **VP2**LD, **VQ**s 2JC (50) 21, 4DW, **VS4**RS, W7UXP/KH6, **XE**1s PJ RY, **YN3**KM, **YO6**XI, **YV5**AKU (90) 19, **ZB1**HC (61), **ZS3**AJ, 3V8CA (45), 5As 1TW (45), 3BC, **5N2**JKO (39) 17, **6W8**BQ (93) 15, **9G1**DT and **9Q5**AAA (DL7AH).

Novicewise on 15, KN5KWG and, WV2RTS keep the ball rolling with CE1AD, G5IV, HK1AAK, K9MVN/VO1, **KG1**FD, **KH6**ACC, **KL7**DQS, **KP4**s AJH ARZ ATY AXN, **KZ5**TD, **WP4**s BAD BBN, XE1HHT and **YN3**KM.

10 phone may be down but it's not yet out by any means, according to mail from K1s HTV 1MD, K2YFE, K3KHK, K5s ALU YPS, K6MQG, K8s GDJ PSV RDE, K0s BHM and JPL. Nothing wrong with a logful of **CO8**JK (400) 19, **FS7**RT* (600), **HH2**OP, **HI8**DGC (400) 18, **HP2**MD, **HR2**IB (400) 17, K4PDI **VP9** (600) 22, a dozen KP4-KZ5s, **LU**s 1DAB* 7DDC, **OA**4s BR* HK, PJ2AF*, SV1AB*, **UA**s 3KND 6KP, **UB5**s ABK DDV KNH, TG9BJ, TI2PT, VE3BQL/SU, VO2WW (600) 21, **VP**s 2LA (500) 20, 5BP*, **VQ2**s AT* WR, **XE**s IRY ISS (400) 21, 2RCC, YV3AY (500) 19, **ZD7**SE, **ZE**s 6JS 8JJ, a fistful of ZLs and ZSs, **4X4**BT, 5A2JK, **5N2**s JKO and LKZ, is there? . . . . . On the other hand, only K3KHK seems to have something good to say about **10 c.w.**: **KZ5**MQ and XE1AX.

Where:

Hereabouts — Our "QSLers of the Month" are KV4AA, OA4JH, TI2CAH/TI9, VS4RS, XE1CV/XF4, ZL3GJ and 9Q5US, all nominated for their prompt QSL response by WA2HLH, W4NJF, WA6s IVM and ORS. Who's your candidate? . . . . . WA2QMJ says your QSL returns from the Curtain countries will be negligible if you use commemorative postage in the Champions of Liberty series. The Sun Yat-Sen stamp, for an example, should not be expected to carry a QSL to BY1PK, Peiping . . . . . W4QVJ designates W4DQS as QSL target for the upcoming HK0AA Bajo Nuevo onslaught, s.a.s.e.c. (self-addressed stamped envelope) required . . . . . WA2HLH says that Box 429, Butte, Nebr., is a route toward VP7NQ pasteboards . . . . . K7KBN finds his QSOs and QSLs still in great demand among Nevada-needers. Many an incoming QSL proclaims that Pat's reply will mean WAS. K7KBN, active on 15, 20 and 40 c.w., responds on receipt without delay . . . . . W3AYD writes, "For the recent VP5BL/5 and VP5BH Caymans DXpedition, we request the gang not to ask for duplicate cards for those which may have gone astray until about the middle of June. Quite a number are en route via bureaus because of lack of s.a.s.e. We have plenty of blanks and will entertain requests to confirm all bands and modes via which the boys worked us." Gobs of VP5BL/5 and VP5BH QSLs began hitting the mails in late January . . . . . WA2ODA disclaims connection with FP8 QSL affairs . . . . . KP4AXU, rolling up quite a DX record on lower-frequency bands, feels that some incorrectly addressed QSLs may not have reached him. Ed answers all cards as received at the address in the list to follow . . . . . W4NJF wonders why such QSL reticence among the KG4 gang. Buck-passing of QSL-answering responsibilities on multioperator station staffs? . . . . . "I operated VE8PQ this past year at Cambridge Bay, Perry Point, Victoria island, and previously signed VEs 4LK and 5PU," informs VE3CEL. "I have all logs for these activities and will gladly answer inquiries." . . . . . W8s IV and KX find that a few dozen handwritten words of felicitation on the back of one's QSL often makes the difference between an immediate or delayed response . . . . . According to WGDXC, W4OPM's VP2GAC QSL responsibility dates from February 1, 1962. The Gulfers also indicate that recent VP1JH s.a.b. action is confirmable through KØRDP . . . . . WA2s FIT ODA, W4NJF, K4ADU and K9UIY offer to serve as QSL assistants to deserving overseas stations. K4ADU, by the way, is ex-DL4BL-DL4TOM-F7FG . . . . . VE7BBB hints that KG1GD QSLs may emanate from 537 NW 26th Av., Birmingham 15, Ala. . . . . OX3UD is a stamp enthusiast, according to VE3PV . . . . . K3KUK finds that K1MMB's FP8BR work may be confirmable through K1MEM.

Asia — KR6ML ships us a lively edition of Okinawa Amateur Radio Club's *Keystone Karrier*, pointing out that OARC has 77 paid-up members and a QSL bureau that accepts and forwards QSLs for all KR stations. Resident KR8s AF AH AK and AP also are OARC boosters . . . . . DJ2PJ obtained logs for 1961 TA2BK (ex-TA5EE) operation, quickly followed by writer's cramp . . . . . VERON's *DXpress* hints that ex-MP4TAC may be accessible at 10 Avenue Rd., Gosport, Hants., England; also that K4KTR may be of assistance toward confirmations of XW8AL QSOs dating after October 19, 1961 . . . . . Sixteen-year-old JA3CUK scored a quick 2000 DX QSOs and guarantees reliable QSL response from the address in the roster to follow.

Africa — "I am the acting QSL manager for VQ1DR," confirms W2TSD. "The usual QSL procedure for direct reply — self-addressed stamped envelopes from W, K applicants, self-addressed envelopes with International Reply Coupons from non-W, Ks. All others will be answered via bureaus." . . . . . K9QIZ apprises, "I am 5N2NFS's QSL manager. Norman is having cards printed in this country, and as soon as they arrive our mailing will begin — s.a.s.e., or s.a.e. plus IRCs." . . . . . West Gulf DX Club's *DX Bulletin* observes that K4TWF continues QSL chores for 9G1DP-XT2Z; also that 6W8DE responds to fill-out-and-return QSLs inasmuch as his own cards have run out.

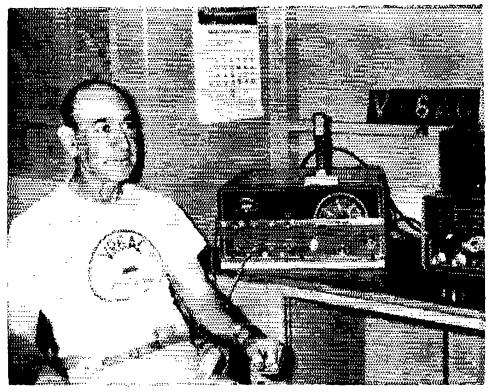
Europe — OY7ML warns of self-styled Faeroes pirates on the prowl, especially an OY1 on c.w. and an OY2 sidewinder. Martin offers to answer inquiries on unlisted OY calls, and also will represent OY8RJ who has left the islands . . . . . SV0WI tells WGDXC that Rhodes DX scholar SV0WQ is patronizing a local printer for some eagerly awaited wallpaper . . . . . W8KX finds that IT1AGA has received 11,000 answers to the 12,000 QSLs he has dispatched since 1952, not a bad return. "Gus has asked me to help him collect some of the Stateside cards he needs, particularly for QSOs with YLs. He's an avid certificate chaser."

Oceania — JZ0BM logs from October 22, 1961, through January 10, 1962, and JZ0MIL records for September 28 through November 26, last year, now are filed by QSL connoisseur W2CTN. Naturally, s.a.s.e., or s.a.e. plus

UA3BW has been prominent in DX activity for many years. Alex now augments his half-kw. c.w. activity with single-sideband sport on the high edge of 20.
(Photo via K2IEG)

IRCs . . . . . VERON of the Netherlands finds former VR3L operator David Kahn available at Tregurthen, Cambonne, Cornwall, England . . . . . W4NJF received ZL3GJ's QSL only four days after QSO, and WA6IVM had VS4RS's affidavit just 16 days after airmailing s.a.s.e. with IRCs . . . . . Following through as promised back in September, VR2DS reports tentative conclusion of his QSL-every-W K-worked experiment with a paltry 47-percent response. *Shame* on us. And now a few specific recommendations:

CE3HX, S. Gajardo, P.O. Box 5050, Santiago, Chile
CE9s AF AS (via W9VZL)
CO8RM, R. Morcate, Box 662, Santiago, Cuba
CP5EZ, P.O. Box 930, Cochabamba, Bolivia
CR4AH (via W2CTN)
EI4AK (to W2PCI)
EL2AG, E. Jansen, Box 34, Monrovia, Liberia
EL6D, Raymond Intl. Liberia Ltd., Roberts Field, Liberia
EL0J/mm (to G3JTL)
F7DC, Hq. Sq., 317th ABG, Box 681, APO 253, New York, N. Y.
FG7XI, V. Lima, Maison Arcoute, Capesterre, Guadeloupe
FG7XJ, Box 377, Pointe-a-Pitre, Guadeloupe
FG7XN, D. Miath, P.O. Box 387, Pointe-a-Pitre, Guadeloupe
FP8BX (to W1RAN)
HK0AA (see text preceding)
HS1X (via WA2WCB)
JA3CUK, K. Fujiyama, 21-2 Kikawa Higashinocho, Higashiyodogawaku, Osaka, Japan
JT1KAA, Box 639, Ulan Bator, M.P.R.
JZ0s BM ML (via W2CTN; see text preceding)
K4PDI/VP9 (via RSB)
K4ZPD/mm, L. Stanley, USS *John Willis*, DE-1027, FPO, New York, N. Y.
KC4AAD (via WØBAT)
KC4AAE (via KØYKG)
KC4USS (via KØGVB)
KC6GJ, R. Rivard, U. S. Weather Bureau, Ponape, E. Carolines
KJ6CA, Det. 1, 1957th Comm. Gp., APO 105, San Francisco, Calif.
KL7ECO, c/o RCA Svc., Nekolski, Alaska
KM6CG, MCB-11, FPO, San Francisco, Calif.
KP4AXU, E. Wilson, Box 41, HSS, 72nd BW, APO 845, New York, N. Y.
ex-KZ5MM (to K2VUY)
LU1CP, Buenos Aires FAA, c/o State Dept., Washington 25, D. C.
OK1ZL, Z. Mensik, Chotebor 810, Czechoslovakia
ex-OY8RJ (via OY7ML)
PJ5CE, Coral Cliffs Hotel, Ft. Nassau, Curacao, N.W.I.
PY7VGN, P. de Silveira, Box 64, Ceara, Brazil
PZ1BW, c/o GPO, Paramaribo, Surinam
SL4ZH (via SM4CO)
TAs 2BK 5EE (via DJ2PJ)
TF2WFV, W. Haynes, Faxabraut 25, Keflavik, Iceland
TG5WH, D. McLeod, Santa Cruz Barillas, Huehuetenango, Guatemala
TI2CAH/TI9 (to TI2CAH)
TL8AE, D. Etienne, B.P. 616, Bangui, C.A.R.
TN8AD, C. Duvaut, B.P. 1095, Pointe-Noire, R.C.
TT8AA, H. Gondouin, P.O. Box 235, Ft. Lamy, Tchad
UA1SO, Miss Tanya Fedyshina, ul. Mayakovskogo 9, Apt. 6, Vologda, U.S.S.R.
UA2AB, A. Lakir, P.O. Box 78, Kaliningradsk Obl., U.S.S.R.
UC2AR, G. Radion, Mogilevskoe Shosse 7, Apt. 13, Minsk 33, B.S.S.R., U.S.S.R.
UC2CS, E. Khomenko, R. Luxemburg 128, Apt. 26, Minsk 36, B.S.S.R., U.S.S.R.
ex-VE8PO, L. Kayser, VE3CEL, 187 Flora St., Ottawa, Ont., Canada
VP2AF, W. Martin, Martin Radio Svc., Market St., St. Johns, Antigua, W.I.
VP2DG/VP2, L. Green, Cable & Wireless, Montserrat, W.I.
VP2GAC (via W4OPM)
VP2s SP SY, A. Boyd, P.O. Box 142, St. Vincent, W.I.
VP2SO, R. Providence, Box 142, St. Vincent, W.I.
VP2VI (via W2YTH)
VP4BY (to VE6BY)
VP4CC (via VP4TE)
VP5TA (to G3TA)
VP7NP, G. Meckenberg, Governors Harbour, Eleuthera, Bahamas
ex-VP8AD (to LU2DAW)
VP8BW, J. Hill, c/o Secy., BAS, Port Stanley, Falklands
VP8FX, E. Grimshaw, Base F, Argentine Islands, Graham-land, via Falklands
VP9EP (via W3INH)
VQ1DR (via W2TSD)
VR2BZ, B. Hogg, Suva Airport, Fiji Islands
VR6AC (via W6RCD)
VS9AAA, J. Hern (G3NAC), c/o Officers Mess, RAF Steamer Point (114 m.u.), Aden
VS9KAC (to VS9AAC)
VS9KPH (to VS9APH)
VS9OC (via W6BSY)



Floyd McCoy keeps in touch with friends around the world from historic Pitcairn island with this Hallicrafters single-sideband setup.

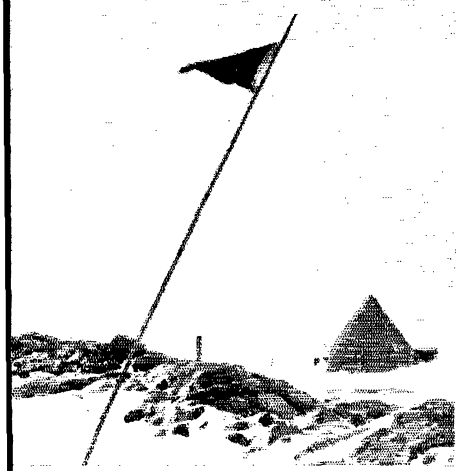
WV6UPY/KM6, L. Bickelhaupt, jr., MCB-11, FPO, San Francisco, Calif.
XE2FO, F. Gonzalez, Box 26, Santa Rosalita, B.C., Mexico
YN3KM, J. Murphy, Box 14, Leon, Leon, Nicaragua
YV3s AY CL, R. Rondon, Box 348, Barquisemeto, Venezuela
YV3HB, Box 348, Barquisimeto, Venezuela
YV5ANT, J. Lara, Box 2737, Caracas, Venezuela
YV5ASP (via RCV)
YV6CF (via W5BVI)
ZA2BAK, Box 28, Tirana, Albania
ZD6PR, P. Rackham, Box 16, Mzuzu, Nyasaland
ZS6BDU, Box 1, Ermelo, So. Africa
ZS6PC/8, P.O. Box 9321, Johannesburg, So. Afr.
3V8AU, P. Sallas, ERMIT 811, Kasbah Tunis, Tunisia
4S7NE (via 4S7WP)
5A3BC, P. Crosbie, Box 6, Barce, Libya
5A3CAD, I. Trays, c/o Burnett, 56 Albany St., Edinburgh 1, Scotland
5A4TC (via W2CTN)
ex-5A5TA (to W5LAK)
5H3HH (via W2CTN)
5N2NFS (via K9QIZ)
5T5AD, A. Duffau (ex-6W8AD-FF8AD), Box 100, Nouakchott, Mauritania
6O1ND, c/o U. S. Embassy, Mogadiscio, Somalia
6W8CR, J. Fraysse, Box 971, Dakar, Senegal
6W8CY, R. Mercier, Box 971, Dakar, Senegal
6W8DE, Box 3033, Dakar, Senegal
9Q5IR (via DJ1HJ)

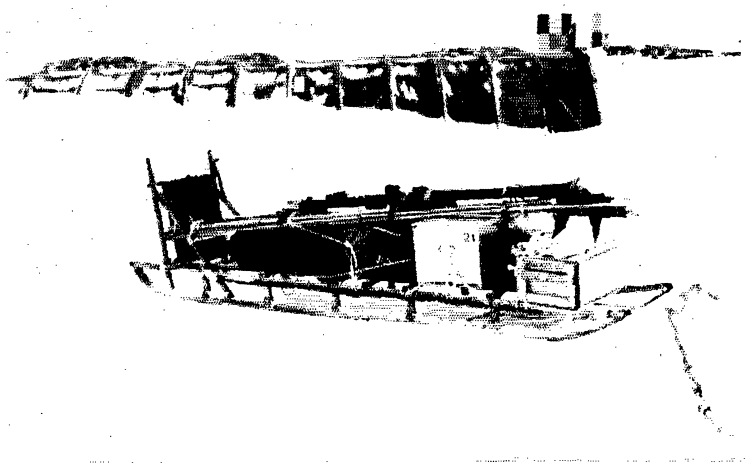
Direct your thanks for the preceding hints to W1s APU CTW GDY TS, K1JFF, K2YFE, WA2s FQG HLH, K3s CUI KHK, W4s QVJ NJF, K6MQG, WA6ORS, W7s IZF UVR, K8s GJD RDE, KØs BHM JPL YRQ, OY7ML, VE7BBB, the bountiful publications of the Award Hunters Club (OH2YV), Germany's DARC (DLs 3RK 9PF), Florida DX Club (W4CKB), International Short Wave League, Japan DX Radio Club (JA1DM), Kanawha Radio Club (W8PQQ), Newark News Radio Club, Northern California DX Club (K6CQM), Okinawa Amateur Radio Club, Polar Bears Radio Club (SL3ZO), Holland's VERON (PAØs FX LOU VDV), West Gulf DX Club (W5ABY & Co.) and Western Washington DX Association (W7JPC), the calls in parentheses representing editors or headquarters of the organizations indicated. Almost needless to say, none of the foregoing information is necessarily accurate, complete or official. Good huntin' — in the mailbox!

Whence:

Asia — DXciting sequence at EP2BK: "I've been working into the States every morning for the past few weeks on 80 c.w. On February 2nd conditions were especially good on that band. W2KQT was 599 here so we decided it might be possible to get through on 160. We made a sche fule for next day at 0330 GMT, John to transmit on 1801 kc., myself on 1999 kc. At the appointed time I heard W2KQT RST 339, also WA2KWH 229, for about a minute but did not manage a two-way with either station." EP2BK loads up a 75-ft.-high 15-meter Lazy-H on 160 and has realigned and peaked his AR-88D receiver for further 1.8-Mc. DXplorations . . . . . "I go to Aden in June for two years," notifies G3NAC (VS9AAA). "I'll be active on all DX bands by several modes and will give you plenty of advance notice of our next DXpedition." John alludes to last year's Kamarans triumph, of course . . . . . KA2CM gives FEARL (m) QSL Bureau, attn. Awards Mgr., Hq. 5th AF, Box C-5, APO 925, San Francisco, Calif., as the proper address to be

VKØVK documents a spectacular antarctic field day with these photos. Steve mushed out to Vanderbilt glacier on assignment with radio gear in the sledge at right, hitched a long-wire to the mast in the foreground, left, and managed several contacts with the U. S. A. despite poor propagation conditions. Now closing down, VKØVK scored more than 3000 W/K QSOs from Wilkes base. (Photo via W1AGS, ex-K2QXG)



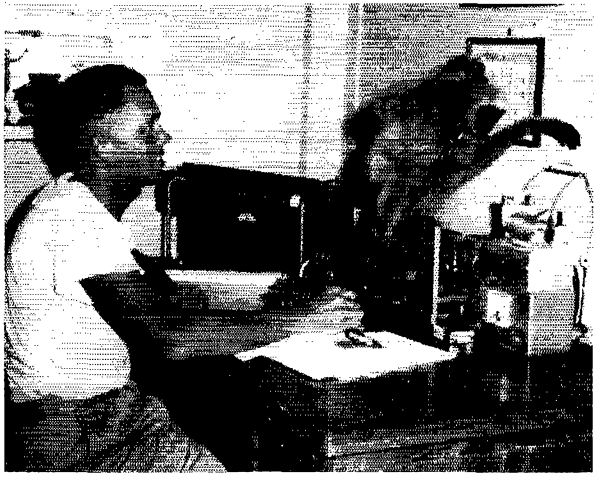


used for FEARL certifications correspondence. "We trust having all mail come to one central point will help eliminate 'lost' applications, etc." . . . . K6TZX tells of WA6OAQ's imminent Korean activation on 10 through 40 meters with a c.w. and single-sideband kilowatt . . . . If WA6IVM can click with JA1BRK on 28 Mc. it will complete the first five-band JA-W sweep for either . . . . Far East addenda via VERON and WGDXC: JT1KDA and UAØKYA join the global sideband set. . . . Ex-ZB1AQ (G3FGD) reports from Turkey that a concentrated effort is under way to liberalize the status of TA amateur radio. . . . AP5CP keeps East Pakistan possible around 14,055 kc. with a distinctive c.w. note. . . . HM1AP remains a Korean regular near 14,050 kc.

Africa — Libyan lore from ex-5A5TA (W5LAK) who now enjoys a four-month Stateside vacation: "Conditions are pretty grim in 5A-land on the h.f. bands. 5A1TW, however, worked a hundred countries in his first month on the air. 5A3TY holds down the s.s.b. fort there, but 5A4TA closed for home. 5A6TIF will be available with a big signal from the Tripoli International Fair." John left Libya after catching 239 countries and all United States except Idaho, a state that seems to elude most 5As. W5LAK will be off again for another DXy oil-hunting assignment, destination at present unknown . . . . "W2GLM's Zanzibar operation in early February as VQ1DR utilized a KWM-1 and 50-ft.-high dipole," records W2TSD . . . . 5N2NFS (G3PBM) formerly signed ZE5JI and now radiates 15- or 20-meter c.w. and a.m. from Lagos with a Victor sender, Geloso receiver and TA-33 jr. This from Norm's QSL charge, K9QIZ . . . . ZS3EW welcomes W/K/VE/VO QSOs daily on 20 c.w. between 1800 and 2330 GMT. Brian promises thorough QSL response . . . . SU1IM is back in action with 100 watts of c.w. and a.m. thanks to generous technical cooperation by Ws 8DUS 9DRS 9DSO and 9YFV . . . . ZS1HW announces that SARL (South Africa) will continue to issue WBCN certifications fur contacts achieved before the 31st of next month . . . . More on VQ8APB's December St. Brandon stopover: "We arrived December 15th with a party of nine college lads, another priest and myself. The weather was fine but the sun beat down mercilessly while we erected our tents, one of which served simultaneously as dining room, bedroom and radio shack. VQ8APB was installed on two wooden boxes beside my camp bed. Under canvas about 50 feet away was our power source, a little engine turning a 12-volt dynamo connected to a battery that gave light to the whole camp while also powering the radio gear through a vibrator and 240-volt line. I started DXing on December 17th and had quite good results for the next five days. On the 21st the weather began to deteriorate rapidly, so we boarded ship on the 26th and arrived safely back in Mauritius on the 27th." This from correspondent K2UYG . . . . Club African items thanks to ISWL, VERON and WGDXC: 9G1DP anticipates an FD8 sortie before summer's end. . . . TU2AL recovers in Germany from ulcer complications. . . . W5YOR sidebands from EA8BA at 1330 GMT near 14,285 kc., searching for old Texas sidekicks. . . . Idaho, Montana and the Dakotas could complete ZS7M's WAS project. . . . FB8WW's favorite phone hangout appears to be 14,180 kc., 0800 GMT. . . . 5A3BC is up to 850 QSOs with 93 countries on 15, 20 and 40 phone and c.w. Didn't know Bing Crosbie was a DX man, did you?

Oceania — Rare Novice-style DX on 40: "Pass the word along that I'll be signing WV6UPY/KM6 on 7175 and 7185 kc. almost nightly." It's done. OM . . . . "VR3L is temporarily QRT because all operators have transferred," notes YL VE7BBB. "RAF Cpl. Collins says several boys on the base are striving to become hams." QRQ, OCs . . . . NCDXC, VERON and WGDXC supply more Pacific patter: VR4CV seeks U. S. Twos on 7040 kc., 0700-1000 GMT. . . . ZL4JF's 14,275-kc. Campbells campaign is about to be supported by a sideband sender. . . . FO8AN (VP2VB/mm) managed a few kiloQSOs before heading onward to Papeete. Danny and *Yasme III* may try early propagation tests from nearby Flint and Vostok when not QRL with marine maintenance. . . . VS4RS likes 7- and 21-Mc. c.w. but neighbor VS4RM votes for 14,070 kc. around noon GMT. . . . KC6BD (W7FNK, ex-KP6AL) bumps the low edge of 7-Mc. c.w. at 0600-0700 GMT. . . . VK4RZ (VR5RZ) discloses that a group of young Tongans is determined to join the ham fraternity, cramming on code and theory. One of them works at BC station ZCO, a rare catch for s.w.l. tuners.

Europe — OY7ML comments, "I've been working W/K/VEs on 80 lately. 20 being almost dead here. OY8RJ, a fine fellow and FB operator, has left the Faeroes for three months of schooling in the U. S. A., then goes to Greenland." . . . . Reminder: As per last month's brieting on the subject, the Millennium SP Contest sponsored by PZK of Poland comes off (c.w.) April 7th-8th and (phone) the 14th-15th. Ready? . . . . EI4AK and W2PCI are one and the same OM . . . . DARC (Germany) calls attention to The Great International Ham Festival to be held at Lake Constance June 23rd-24th. The 1962 version is gala in concept and should substantially surpass the programs of past gatherings. Check with DARC for details if you contemplate a Continental June — Ortsverband Konstanz des DARC, Mittelweg 12, Konstanz/Bodensee 3, Germany . . . . Sicilian synopsis via W8KX: Retirement for IT1AGA means an accelerated DX career. The 60 watts and Windom of Gius have accounted for a 221/212 countries total despite heavy local ignition noises and QRN from an electrical motor shop down the street. He was able to come up with W8KX's first name after a two-year pause between QSOs . . . . OH2YV comes through with another neat



HS1R likes 15 c.w. with a modified DX-35, 51J-3 and Vee beam. For the latter, incidentally, he uses inexpensive plastic chopsticks as feeder spreaders. Pat writes, "My second operator, as shown, helps with logging chores, keeps the antenna tuner peaked up, and bums entirely too many cigarettes." HS1R expects to become W5OZI again shortly; he formerly signed K4ADL and DL4FL. (Photo via W8KX)

Award Hunters Club *Bulletin* and welcomes inquiries on the outfit at AHC, c/o Velamo, Isokaari 4-B-30, Lauttasaari, Finland . . . . . European commentary via PBRC and WGDXC sources: DL9PF drums up summertime Corsica and Turkey DX maneuvers. . . . SMOM HV1, stemming from sovereign Military Order of Malta territory in Rome, scheduled an intensive DX effort with 11s CL CNS. Ws 2BBV 2BIV 3AYD and 9IOP involved. . . . HB9GX conducts a ham-oriented DX program over Swiss SWBC on the second and fourth Fridays of each month on 6165, 9535, 11,865 and 21,520 kc., 1400 and 1645 GMT. . . . OK1ZL opines that most of the Albanian amateur activity reported since OK7HZ/ZA's operational visit has had no basis in fact. . . . UA2s AB AC AG AK and AW use phone or c.w. on several bands; AT sticks to c.w. on 20 through 80, while AO includes s.s.b. on his agenda. Club-type UA2Ks AA AE and AW also get around. . . . OH0s NF NH and NI bear the brunt of Alands DX pressure at present, the rest of the gang being inactive for one reason or another. OH0NF is chief DXponent with 90 watts of c.w., 65 phone, on 15 through 80 meters.

South America — Grahamlander VP8FX ordered ARRL's *Single Sideband* and hopes to have a homebrew s.s.b. outfit operative early this month. "Sideband signals received down here from the States are quite amazing — landline quality — and I'm looking forward to many fine contacts in that direction." . . . . . After a five-year hiatus VP8BW resumes his antarctic DX career at Halley Bay on the Weddell Sea. You may recall Jack's quavery signal from Deception island back in 1956, also his work on Signey island the following year. "Since 1957 when I left the antarctic I've been engaged as an automobile salesman in the U.K. and haven't touched a key in all that time. Also got married, but the XYL has given me leave to come south again — *hi*! I look forward to more excellent QSOs with the DX gang." VP8BW will find that DX conditions ain't what they uster be . . . . . K5ALU received a DX diploma *en Español* from or about YV4AA but can't figure out what he did to deserve it . . . . . PY2AJK writes W6SFM from Tokyo to report that dad PY2DV moved to Rio where he awaits a new PY1-type label. Rod comes home to Brazil shortly via VS6 9M2 VS1 VQ8 CR7 and ZS . . . . . Ex-PY7LJ of Fernando de Noronha is now widely worked as PY1BLT, and W4NJF finds ex-VP8AD busy as LU2DAW on 20 sideband.

Hereabouts — *Yikes* — what next? W4NJF awaits a QSL from W4NMK/*sm*, a submarine *mobile* worked 40 feet below the surface with Captain Dan at the mike [see page 37, this issue — Ed.] . . . . . KP4ACF also has an unusual QSL, a confirmation of QSO with nuclear-powered W8NPC three years ago, as the first non-W/K to hook up with that unique experimental installation . . . . . TG5WH of Huehuetenango operates 10 through 80 meters and finds amateur radio an invaluable adjunct to missionary work for Maryknoll . . . . . A 2-tube regen receiver and 75 watts is all K5ETA needs to work all continents on 40 c.w. . . . . W9JFT regretfully reports the passing of old friend HP2ON . . . . . KP4AXU supplements DXtensive 7290- and 3830-kc. a.m. activity with considerable 1.8-Mc. monitoring. Ed hopes it won't be long before KP4s can join the 160-meter two-way fun . . . . . There are those who advocate the anti-pile-up measure of a DX station's tuning far off his transmitting frequency when the group grows too boisterous. W4NJF registers an emphatic *nay*, pointing to the band-wide pandemonium caused by 5N2AMS/TR8's experimentation with this technique in 1962 ARRL DX Contest phone sessions . . . . . The HK0AA Bajo Nuevo plunge of HKs 1ABV 1QQ 3LX 0AI, TI2HP, Ws 4CKB 1DQS 4QVJ 6HAW 8FGX 9EVI and 0NWX is expected to take over (c.w.) 3501, 7001, 14,015, 21,015 kc., and (s.s.b.) 3795, 7195, 7295, 14,195, 14,348, 21,195 and 21,448 kc. from about April 28th through May 1st. If the ball bounces right a one-day Serrana Bank KS4 stand will follow . . . . . That roving s.s.b. loaner rig in the Caribbean softened some tubes, blew a bias transformer and suffered a busted neutralizing condenser but is once again under way via FM7WQ and other points after repairs at VP3YG . . . . . Preparations for that de luxe DXpedition of W4BPD & Co. proceed apace. W4ECI reports Gus thoroughly (ouch!) inoculated and that Collins gear is already deployed far and wide. Watch for W4BPD from the Aldabras later this month under the auspices of the World Radio Propagation Study Association, 3101 4th Av., S., Birmingham 5, Alabama.

Ten Years Ago in "How's DX?" — Jeeves plays a lugubrious second fiddle beginning in your April 1952 *QST* DX column but he manages to survive . . . . . What's being heard and worked? Well, 20 c.w. is loaded with AG2AG, AP4A, EK1AD, FD8AB, FKS8AG, HE9LAA, KM6AW/KS6, KT1OC, LB6XD, MC1CG, MI3s US VG, OE13SC, OQ5s CP PE VN, ST2s GL HL VL, SU1GO, VK1BS, ZC1AR, ZD9AA, 4UAJ and 9B3AA of Bulgaria . . . . . Phone 14-Mc. delicacies include FD3RC, KT1BB, MF2AA, MI3RR, OQ5RA, TAs 2EFA 3AA, UA0KKB, VK1s AF DP LE, YI3BZL, ZD4s AX BF and Marion island's ZS2MI . . . . . Forty offers rare CMs 1AR and 4HT, plus FF8AC, KH6QY/KW6, KS4AQ, ZD4AB and 9S4AX . . . . . Ten *hangs on with* CR4AE, *VQ1RF and a half dozen OQ5s on* phone . . . . . DX conditions on 160 fail to peak properly but KV4AA and some G-GW faithfuls keep things interesting notwithstanding . . . . . We see that: 5A2 is a new Libya prefix, also that KT1 Novices will be WT1s. . . . Some ZSs head for St. Helena, and Alands islands DX possibilities make juicy gossip. . . . Afghanistan and the Vatican reiterate their refusal to tolerate amateur radio . . . . . Pictures of phone DXCCers W1s JCX NWO FH, the full-sized 40-meter rotary of W4HQN, FB8ZZ and EA0AD complete the course. QST

Strays

STOLEN HAM GEAR

A Gonset G-76 Transceiver, serial no. B-1231, was recently stolen from the car of C. M. Miller, K5REV, 10235 Linkwood Drive, Dallas 18, Texas. A reward is offered for its return. Contact either K5REV direct, or the Dallas police department.

—•••—

A Gonset Communicator II-B, serial no. CD 117731D, was stolen from the West Branch Amateur Radio Association clubhouse. Any information on this unit should be forwarded to Howard J. Lamade, jr., K3MKW, 254 Lincoln Ave., Williamsport, Pa.

—•••—

W6WFR reports that some Boy Scouts out on a camping trip lost their microphone and for a time figured they wouldn't be able to keep ham skeds with the folks at home. But because Scouts are ever true to their motto — Be Prepared — they substituted the ear piece from a transistor radio and found that it worked satisfactorily.

—•••—

Dick Hay, W4LW, retired Navy communicator, is now with TMC as Manager, Systems Projects. W4LW has made many contributions to *QST*.

—•••—

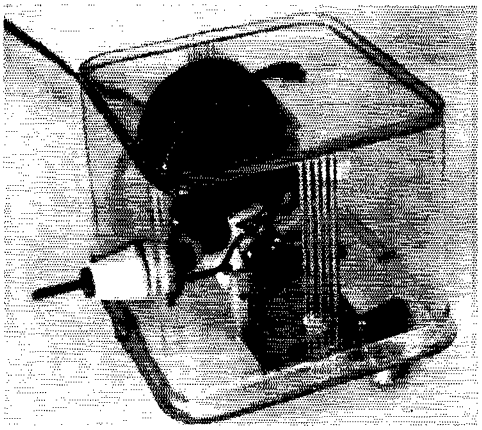
Every member get a member. See page 64A.

Hints and Kinks For the Experimenter

REMOTE TUNED GAMMA MATCH

The accompanying photograph shows a device I use to adjust the series variable capacitor on the gamma match of my 6-meter beam antenna, which is mounted atop a 45-foot mast. The unit permits me to adjust from the shack for minimum s.w.r. over the entire 6-meter band.

The device is easy to construct and consists of a 1-r.p.m. electric-clock motor mounted to the top of a plastic refrigerator food container which measures about 4 by 4 by 4 inches. It's important to use the kind of box that has a top that fits *inside* the container, so that when the box is inverted rain water cannot seep in. An



insulated flexible coupling connects the motor to a variable capacitor. Also mounted on the box is a coaxial fitting for connection to the feed line, and a feed-through insulator which connects to the gamma match rod. The entire assembly is mounted to the boom of the beam antenna by a couple of self-tapping screws. Power leads for the motor are taped to the coax feed line and brought back to the shack.

It would be convenient if the motor was reversible, but by observing the s.w.r. during a single revolution of the capacitor, the motor can be stopped during the next rotation at the appropriate spot.

— *W. T. Bradley, K4YPY*

HAND-POWERED BEAM ROTATOR

The sketch in Fig. 1 shows an inexpensive "Armstrong" rotator which can handle v.h.f. beams and lightweight high-frequency beams. The supporting frame mounts are made from 2 by 4 lumber and the mast is a 20-foot section of 1-inch galvanized water pipe. A bearing block in the lower frame mount is nothing more than two

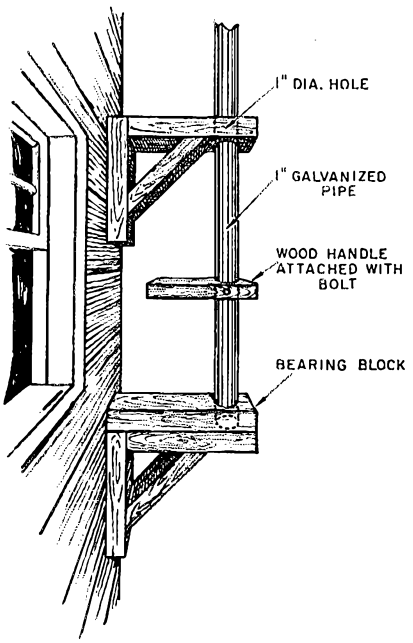


Fig. 1—W7MRX's Armstrong beam rotator.

blocks of wood. The top piece has a 1-inch hole so that the pipe rests directly on the bottom piece. A hole in the board of the top frame mount steadies the mast. The entire assembly is mounted along the side of the house and, if possible, near the shack window. A wood handle attached to the mast rotates the antenna.

The easiest way to mount the mast to the house is to slip the upper frame mount over the pipe and then lean the assembly against the house. The upper frame mount is fastened to the house with three or four lag screws. The lower frame is then fastened to the house about six feet above the ground. The pipe, which has been resting on the ground, is slid up through the hole in the upper mount and the pipe bottom is dropped into the socket in the bearing block. To mount the beam, or to make adjustments to it, remove the pipe from the socket and let it rest on the ground. The beam will be at about roof level.

— *Howard J. Hanson, W7MRX*

INEXPENSIVE TRANSFORMERS

Low voltage doorbell transformers make excellent transformers for transistor power supplies. They usually come in either 10 or 16 volt models and about three dollars each.

— *Chuck Ellermann, KØFBI*

UNIVERSAL RECTIFIER SOCKET

HAVE you ever blown a rectifier tube and then found that you didn't have an exact replacement? If the power supply has an octal socket for the rectifier, connect it as shown in Fig. 2. Now

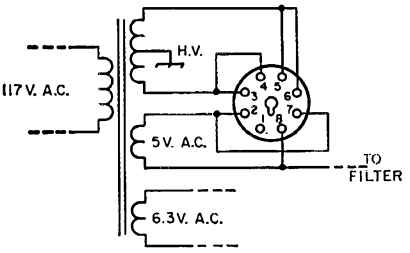


Fig. 2—Universal rectifier socket.

any of the following tubes can be used without any further changes: 5R4, 5T4, 5W4, 5Y3, 5Y4 and 5Z4. Of course, the voltage or current rating of the tube used should not be exceeded.

— *F. A. Saxon, W4AAY*

FOUR-WAY POWER SUPPLY

BY a simple wiring change and the addition of a few components, the "Two-Way Power Supply," *QST*, December 1961, page 37, can be made to have four different voltage outputs. The diagram in Fig. 3 shows the circuit for obtaining two additional outputs from the supply. Output at point A will have a value equal to the peak voltage and at B, 0.9 of the r.m.s. value of the secondary voltage of the transformer. The rectifier, CR_1, and the two electrolytic capacitors, C_1 and C_2, should have sufficient voltage ratings. The choke, L_1, has an inductance of 10 henrys or

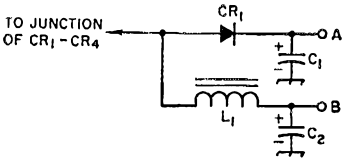


Fig. 3—Circuit for obtaining two additional outputs from the "Two-Way Power Supply." See the text for information on the component values.

so. One other change is necessary to get the fourth voltage output. Connect point 2 of the switch, S_1 (in the original *QST* article) to ground and bring out point 1 of the switch for the fourth voltage. Of course, an extra filter system is required at this output. — *Wolfgang Kruger*

IMPROVING THE PERFORMANCE OF A 75S-3 RECEIVER

WHEN substituting a completely new set of tubes for the original ones in my 75S-3 failed to restore the receiver to full sensitivity, I replaced the S meter with a 0–50 microammeter I had in the junk box and found that the sensitivity was greatly improved. The S meter is now pinned almost all of the time, even by the noise. No other changes were required.

Finding that the receiver was a little too close to the table for convenient operation and viewing of the dial and S meter, I raised the front by placing two beer-bottle caps under the legs. The decreased slope of the front panel is much nicer than before and the height of the receiver now matches my DX-60 transmitter. One must be careful, of course, to place the caps with the smooth sides against the table surface, as was pointed out to me by the XYL. (Hi!)

— *Larsen E. Rapp, W1OU*

MOBILE POWER SUPPLY FOR THE KWM-2

THE Collins KWM-2 and PM-2 a.c. power supply can be combined with a Heathkit MP-10 power converter (converts 6- or 12-volt battery power to 117 volts a.c.) for operating the KWM-2 portable or mobile. The MP-10 is an inexpensive unit when compared to the d.c. supply normally used with the KWM-2 and I have operated the above combination for many hours at full ratings even in hot summer weather. The most attractive feature is that absolutely no changes need be made in the KWM-2. All that's necessary is to add a 5-prong socket on the back of the PM-2 power supply. A hole is already provided for the socket. The 5-prong socket is wired to the PM-2 as shown in Fig. 4. The black wire, shown connected to Pin 4 of the socket, J_1, originally was connected to terminals 8 and 9 of the PM-2. Now wire up two 5-prong plugs, P_1 and P_2, as shown in Fig. 4.

For operating at home on 117 volts a.c., insert plug No. 2 and plug in the PM-2 in the 117-volt wall socket. For mobile or battery operation, insert plug No. 1, plug the PM-2 into the MP-10, connect 12 volts d.c. to Pins 1 and 5 of plug No. 1. That's all there is to it!

—*Glen H. Byars, WØBNF*

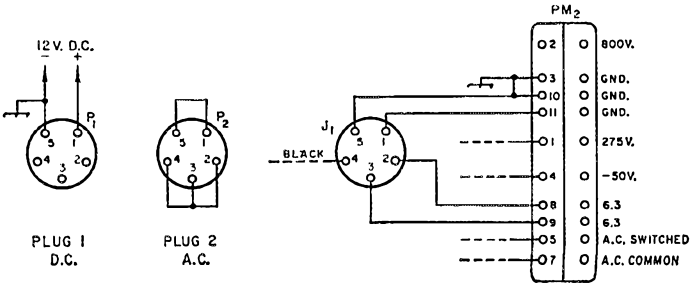


Fig. 4—Changes necessary to the PM-2 supply for d.c. operation of the KWM-2.

License Fees Proposed
Golden Anniversary of Licensing
RTTY Petition Denied

LICENSE FEES PROPOSED

From time to time proposals have originated within some branch of the Government that fees should be charged for licenses issued by Federal agencies. As a statement of general policy, this has been the "law of the land" since passage of the Independent Offices Appropriation Act of 1952, quoted below. In actual practice, implementation by independent agencies of the government has been somewhat limited. In January, 1954, FCC published a Notice of Proposed Rule Making, Docket 10869,[1] proposing to establish fees for the licensing of all classes of radio stations and operators. The League filed in opposition,[2] saying in part: ". . . The position of the League is that we oppose the imposition of license fees in the amateur service. Should the Commission be unable or unwilling to except amateurs from its fee schedules, the League's view is that the fee for amateur applications including both station and operator's licenses should not be greater than the nominal amount of $1. . . ." Later in 1954, the Senate Interstate and Foreign Commerce Committee raised some basic questions of jurisdictional aspects of Congress *vs.* agencies in the matter of fees, and as a result the Commission suspended action on its proposals.[3] Docket 10869 has been dormant since, until terminated by an Order of the Commission on February 14, 1962, to pave the way for a new proposal. In the meantime, there has been sporadic talk of license fees, notably last year when a staff study with a proposed schedule of fees was apparently "leaked" to trade papers.

On February 14 this year, the Commission by a four-to-three vote adopted a new Notice of Proposed Rule Making, Docket 14507, published in full at the end of this department. About the time you read this issue, the Executive Committee of the League will be meeting at headquarters to determine the League's official view in the current docket. Individual amateurs and radio clubs are, of course, free to file their own comments with the Commission on or before the deadline of April 16, the usual "original and fourteen copies" being requested.

[1] Page 44, *QST*, March, 1954.
[2] Page 54, *QST*, May, 1954.

50 YEARS OF LICENSING

A half-century ago, Congress enacted the Radio Act of 1912, bringing order to the then-new but rapidly expanding art and science of "wireless". As one of its features, the Act required for the first time that amateur radio operators obtain

[3] Page 45, *QST*, July, 1954.

"An Old Timer Sez:"

ALTHOUGH I have been a resident of the Saginaw Valley since 1908 and a ham for over 35 years, I don't have much claim to any honors as a first, or as a pioneer, in any branch of my hobby. There are hams in our group who have been licensed longer than I, and there are two or three calls that have been held longer than mine. But, in all those years I am proud of just one effort: I have consistently supported our national group, the ARRL, all the way. In all those years I have never missed a single copy of *QST*. True, during the deepest depression I couldn't afford annual membership, but I still bought the newsstand issues and I rejoined at the first possible moment.

As an old timer, I have seen the ebb and flow of amateur radio fortunes, and praise and condemnation of our national group, but the conviction firmly remains that, had it not been for ARRL, there would be no amateur radio today; not here, nor anywhere else in the world.

From the reportorial and technical standpoints, there are competitors for *QST*, but it — and it alone — stands as the lifeblood of amateur radio, as the sole guardian of its very existence, and as a firm bastion against encroachment upon or total obliteration of our hobby. The unusually astute management of ARRL, almost unique in the history of such groups, has seen to it that our prestige and our place in the sun has been protected through the years on a scale that is prodigious by comparison with the mere pittance that it costs the individual member.

—LEO F. STRASEL, W8QF

(Reprinted by permission from *SVARA News*.)

a license from the Department of Commerce and Labor after passing an examination.

Amateur radio operators who were first licensed in 1912 and who are active today will be honored at a Golden Anniversary Banquet to be held in New York City on October 13, 1962, in conjunction with the Hudson Division Convention. A search is now in progress to locate those who obtained their ham tickets during the initial months of licensing and who currently hold licenses issued by FCC. A commemorative award will be made to those qualifying, whether or not they are actually able to attend the banquet.

Old-timers meeting the requirements should send either their original 1912 licenses or attested photocopies thereof to League Headquarters. If the license has been lost or destroyed, the listing of the amateur's name and call in the July 1, 1913 edition of the government call book will be considered as satisfactory proof.

The banquet is being sponsored by ARRL, Armed Forces Communications and Electronics Association (AFCEA), Institute of Radio Engineers (IRE), Quarter Century Wireless Association, (QCWA), Radio Club of America, Hudson Amateur Radio Council, and the Single Sideband Amateur Radio Association (SSBARA). Chairman of the special committee is John DiBlasi, W2FX, president of QCWA. ARRL General Manager John Huntoon, W1LVQ, is vice chairman, and David Talley, W2PF, recording secretary of QCWA, is secretary of the committee.

RTTY PETITION DENIED

In August last year, the League filed a petition [4] with FCC asking that the rule requiring identification of radioteletype stations by c.w. as well as by printer be dropped. The FCC has now denied the League request, stating in part: ". . . Amateur stations are not assigned specific frequencies, and as a consequence, the interference resulting from the overlapping of signals makes identification difficult at best. Infraction notices are issued only upon positive identification. Without the dual identification requirement, positive identification would be very difficult for monitoring stations, and practically impossible for the Commission's mobile units which are not equipped to receive radioteletype transmissions. . . ." The text of the Memorandum Opinion and Order follows:

[4] Page 72, *QST*, October 1961.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D. C.

In the Matter of
Petition to amend Section 12.82 of the Commission's Rules governing the Amateur Radio Service to relax identification requirements in radio teletype operation.

MEMORANDUM OPINION AND ORDER

By the Commission: Commissioner Ford absent.

1. The Commission has before it for consideration a petition filed by the American Radio Relay League, West Hartford, Connecticut, which seeks amendment of Part 12 of the Commission's Rules so as to eliminate the requirement for dual identification when radioteletype emission is being employed.

2. Section 12.82 of the Commission's Rules now requires that, when an emission or mode of communication other than radiotelephone or radiotelegraph is being employed, identification be made in either radiotelephone (A3 emission) or radiotelegraph in the International Morse Code as well as in the emission or mode of communication being employed.

3. The petitioner states that the present dual identification requirement is inefficient and time consuming.

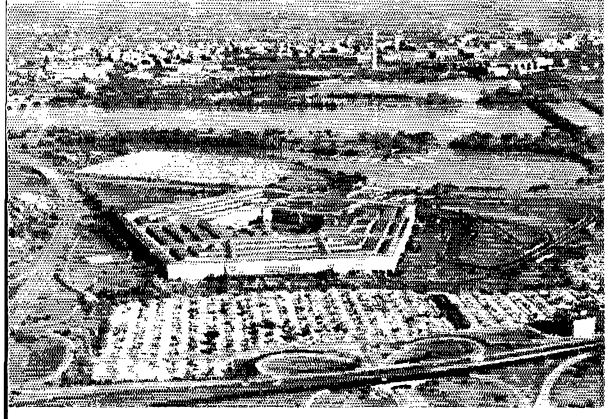
4. The dual identification requirement is necessary for the Commission properly to perform its duties. Amateur stations are not assigned specific frequencies, and as a consequence, the interference resulting from the overlapping of signals makes identification difficult at best. Infraction notices are issued only upon positive identification. Without the dual identification requirement, positive identification would be very difficult for the monitoring stations, and practicaly impossible for the Commission's mobile units which are not equipped to receive radioteletype transmissions. It appears to the Commission that the advantage to the Amateur service as a whole in having proper and prompt enforcement of the Amateur Rules and Regulations outweighs any possible advantage to be gained from the relaxation of the present identification requirements.

5. Accordingly, in view of the above, IT IS ORDERED, This 21st day of February, 1962, that the petition filed by the American Radio Relay League for the relaxation of the Commission's identification requirements in the Amateur Radio Service, IS DENIED.

FEDERAL COMMUNICATIONS COMMISSION
BEN F. WAPLE
Acting Secretary

(*Continued on page 98*)

Amateur Radio Week in Massachusetts will be observed from April 1 through 8, culminating in the ARRL New England Division Convention at Swampscott on Saturday and Sunday. Portable stations will be set up in public areas throughout the state, with operation taking place in the 75-, 10-, 6-, and 2-meter bands. In the photo, Governor John A. Volpe makes the week official while leaders of the Federation of Eastern Mass. Amateur Radio Associations look on. From the left: W1LEL, W1EYZ, W1VRK, W1HKG, K1OCD.



An aerial view of the Pentagon shows its symmetry and the shape from which it is named. But, symmetry or no, how simple it is for a stranger to become lost in the interior maze! Including parking lots and other associated land, the Pentagon covers a total area of some 583 acres. More than 27,000 employees daily wend their way through 17½ miles of interior corridors. (*U.S. Army photo*)

The Story of K4USA-K4AF

BY EDWARD S. LISCOMBE,* K4KNV

On the Concourse of the world's largest office building, the Pentagon in Washington, D. C., is located the most prominently and publicly displayed amateur radio station in the world.

Actually two stations under one roof, each with a dual mission, they are heard as K4USA and K4AF in the amateur bands, and WAR and AIR on MARS (Military Affiliate Radio System) frequencies outside the amateur bands. The combined station is jointly operated by the Army and Air Force under the jurisdiction of the Chief Signal Officer, Department of the Army, and the Director of Telecommunications, Department of the Air Force. In its dual role it serves as the amateur station for its parent service and as Headquarters station of the MARS network.

K4USA-K4AF is located in a 40- by 30-foot structure in the center of the south end of the Pentagon Concourse, in the midst of a daily hustle and bustle that is reminiscent of Grand Central Station.

K4USA-K4AF began operating in 1948 in separate fifth-floor rooms but joined on the Concourse when the present station was dedicated in October, 1950. The physical structure consists of eight rooms. Six are employed in two sets of three identical but separate soundproof operating rooms with glass wall panels. Identical Master Studio operating room consoles and associated equipment are in full public view through two large double-glass studio-type windows in each Master Studio. A carpeted reception room with overstuffed red leather furniture and a transmitter room are used jointly. Through the studio windows hundreds of Pentagon employees and visitors view the daily on-the-air operations of K4USA-K4AF or WAR-AIR. The guest book which is kept open in the reception room contains the signatures of many hundreds of visitors from all over the world.

WAR-AIR is manned 24 hours a day by enlisted military operators who may, if they are licensed amateurs and time permits, operate K4USA or K4AF in the amateur bands as an "off-duty" activity. Approximately 25 Army and Air Force operators are required to cover all scheduled MARS operations on a continuous 24-hour-a-day basis. Most of the operators assigned to the Concourse station consider it a select assignment, and normal assignments average two years. Many who are assigned direct from service radio schools study and obtain amateur licenses while on duty at the Pentagon. They are encouraged in this and, to the same end, classes are conducted by older licensed operators from time to time. The number of licensed operators varies. In December, 1957, the entire complement of 15 operators of K4USA were licensed amateur operators. The training that all operators receive is extensive. The higher rated, more experienced operator is assigned as Chief Operator or Trick Chief.

K4USA and K4AF employ remote and local transmitters. K4USA operates four transmitters at the Department of Army Radio Transmitting Station at Woodbridge, Virginia, 25 miles south of Washington, D. C. K4AF operates five transmitters at a remote Bolling AFB site in southeast Washington, D. C., approximately 5 miles distant. Both operate local receivers and additional local transmitters. Associated antennas are on the Pentagon roof. Local and remote transmitters may be used interchangeably on amateur or MARS frequencies. In addition, both operate mobile emergency radio communications vans. Either van can be operated on amateur or MARS frequencies. Both have appeared at amateur radio and MARS conventions and public affairs in all parts of the United States. No attempt is made to install the latest model military or commercial radio equipment but both are re-equipped periodically.

K4USA-K4AF operate under military unit amateur radio station licenses issued by the Federal Communications Commission. When operating on amateur frequencies an FCC licensed ama-

* Assistant Chief, MARS Army, The Pentagon, Washington 25, D.C.

Here's a view of the master control console at K4USA/WAR, with S/Sgt. K9PBR at the operating position. Through the window in the rear can be seen part of the Pentagon Concourse, which is a pretty fair-sized shopping center.

teur radio operator is required to be at the controls. When operating as WAR or AIR on MARS frequencies, an FCC-licensed operator is not required.

In the early years of its operation K4USA-K4AF appeared more regularly and often in the various ham bands than it does today. Over the years more and more time has been required of the station in its role as WAR-AIR. The change came about gradually as local Headquarters MARS stations were established in Germany, Puerto Rico, Canal Zone, Alaska, Hawaii, Japan, Korea, Formosa, the Philippines and Ryukyu Islands. As overseas stations became established and began to maintain schedules with WAR-AIR direct from European countries and through Hawaii from far eastern stations, the amount of personal third-party and MARS administrative traffic flowing both ways began to increase. The increase in traffic flowing on MARS frequencies resulted in a lessening of the amount of time that K4USA-K4AF could devote to ham-band operation. The increase in third-party personal traffic occurred naturally and was, to a large extent, expected in view of the large number of military personnel stationed in Germany and Japan. Because of international limitations placed on the transmission of third-party traffic on amateur frequencies between those two countries and the United States, it developed that the MARS network offered the only legitimate means over which such traffic could be passed. During the same period networks of MARS stations were being established throughout the United States. These networks tied to WAR-AIR through subordinate command and area MARS stations, completed the system whereby a message to or from a service man in Germany or Japan and other such countries could be delivered to families and friends in the United States. Most of the traffic flowing from the WAR-AIR is handled by RTTY and c.w. Some is handled on a.m. or s.s.b. voice circuits.

Since 1958, WAR-AIR has handled an average of 130,000 messages annually. Ten per cent or less of the total are MARS administrative messages which are exchanged between various MARS activities and stations. The remainder are personal messages exchanged by oversea military personnel and their friends and families at home. Many of these messages from overseas are refiled into amateur radio networks for delivery to addressees in areas not covered by MARS member stations. Since no U. S. amateur station may exchange third-party messages with amateur stations in Germany or Japan, MARS provides the only legitimate channel over which such message traffic can flow directly between those countries and the United States. Personal messages to U. S. military personnel in those two countries usually find their way through the amateur and MARS networks to WAR-AIR in the Pentagon where they are transmitted overseas on MARS frequencies.

During annual holidays the personal message traffic volume increases greatly. The greatest increase occurs in December of each year as a result of Christmas and New Year's greeting traffic. Several years past, the volume of this traffic became so great that MARS network stations were unable to handle the load efficiently. To overcome the difficulty, all MARS stations have, in recent years, been asked not to solicit greeting traffic, and to accept only that which they are capable of handling efficiently. Since that time a reduction in the volume has permitted speedier and more efficient service. No guarantee to deliver on time is ever given to the originator of a personal message, but the majority of MARS station operators take pride in providing the best service that the MARS network is capable of.

This is the story — it is a story which may have an important sequel. At the time of this writing a study by the U. S. Navy is being conducted to determine possible Navy participation in the MARS program with the Army and Air Force. If the Navy decides to co-sponsor MARS activities, serious consideration will be given to establishing a tri-service amateur-MARS radio station on the Pentagon Concourse. The Concourse station calls may then be K4USA-K4NAA-K4AF — WAR-NAV-AIR. QST

Strays

Here is the April schedule of the Air Force MARS Technical Forum (formerly known as the Air Force MARS Eastern Technical Net), which meets Sundays at 1900 GMT on 3295, 7540, and 15,715 kc.

April 1 — Advantages of Compactron Multi-Function Tubes in Electron Equipment.
April 8 — What Computers Can Do.
April 15 — Latest Trends in Military Type Transistors.
April 22 — Transistorized Citizens Band Transceivers.
April 29 — Use of Transistors as High-Power Amplifiers and Oscillators.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* WIFZJ

SEEMS like a mention of something you ought to do, without reference of how to do it, is a good way to get letters. Last month I mentioned the desirability of having a method of checking your modulation percentage if for no better reason than to comply with FCC regulations. I naturally felt that the basic tools of a hobby are something which even the greenest neophyte would not be without. Judging from my correspondence, such is not the case.

I would like to quote from the amateur bible (page 512, para. 1, 1962 edition). "It is practically impossible to operate an amateur station without making measurements at one time or another." My interpretation of the foregoing quote is as follows: "It is absolutely impossible to operate an amateur station without making measurements." I plead guilty to the suggestion that you ask your friends to give you an honest report. The responsibility of a clean signal is, however, yours and yours alone. You signed your license application and you assumed thereby the responsibility of complying with the rules and regulations. To quote further from the amateur bible: "For these purposes there is available a wide assortment of instruments, both complete and in kit form; the latter particularly, compare very favorably in cost with strictly home-built instruments and are frequently more satisfactory both in appearance and calibration." I'll stick with my assertation that everyone cannot be expected to have an oscilloscope to check transmitter performance. (After all, an oscilloscope kit might cost as much as $29.00.) An indicator for overmodulation, however, can be built for as little as three dollars. In fact, a negative peak indicator for any medium-power transmitter could be built for under one dollar. If you don't feel that this expenditure is worthwhile, you might turn to page 299 of the amateur bible, where it says: "The plate mill ameter of the modulated amplifier provides a simple and fairly reliable mean s for checking the performance of a phone transmitter, although it does not give nearly as definite in'ormation as the oscilloscope does. If the modulated amplifier is perfectly linear, its plate current will not change when modulation is applied if — 1) the upward modulation percentage does not exceed the modulat on capability of the amplifier; 2) the downward modulation does not exceed 100%; 3) there is no change in the d.c. operating voltages on the transmitter . . . With plate modulation, a downward shift in plate current may indicate one or more of the following:

1) Insufficient excitation.

2) Insufficient grid bias.

3) R.f. amplifier not loaded properly.

4) Insufficient output capacitance in the filter of the modulated-amplifier plate supply.

5) Excessive d.c. input to the r.f. amplifier, under carrier conditions. Alternately, the cathode emission of the amplifier tubes may be low.

6) In plate-and-screen modulation of tetrodes or pentodes, the screen is not being sufficiently modulated along with the plate. If the d.c. screen voltage is obtained through a dropping resistor, a dip in plate current may occur if the screen bypass capacitance is large enough to bypass audio frequencies.

7) Poor voltage regulation of the modulated-amplifier plate supply. It is readily checked by measuring the voltage with and without modulation. Poor line regulation will be shown by a drop in filament voltage with modulation.

Any of the following may cause an upward shift in plate current: 1) Overmodulation (excessive audio power, audio gain too high).

2) Incomplete neutralization of the modulated amplifier.

3) Parasitic oscillation in the modulated amplifier.

The foregoing quotes are in response to any number of inquiries I have received asking "What should I do? I don't have an oscilloscope." I will admit that it took me a few minutes to find the right place n the Book, but it *was* there. Now, by golly, I'd better not get any letters saying you don't have the Book. After all, we have got a free public library in this country. How you can get on the air in the first place without a *Handbook* is beyond me. If you managed to do it, however, don't push your luck.

*P. O. Box 334, Medfield, Mass.

Perennial contest winner at rest—Brownie, W9ROS.

Moonbounce

If you are thinking that the moonbouncers have given up,

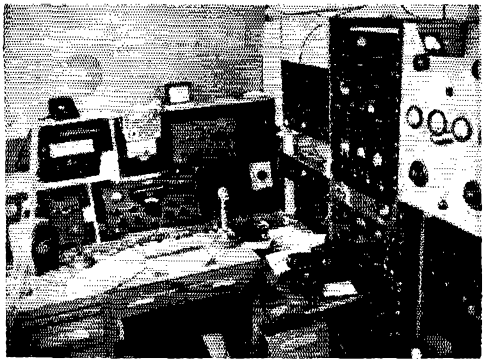
please be advised that more groups are working on their projects now than ever before. At least two European installations (DL3FM and HB9RG) are nearing completion. Carl, DL3FM, has finally received his polar mount and is now dickering with the local air force to helilift it into place. New York, New Jersey, Ohio, Indiana, Illinois, California and Hawaii all have installations nearing completion. (Massachusetts is still waiting.)

50 Mc.

For DX on 50 Mc. this month, word is out that VP7NP is now operating six meters, 50.023, c.w. only. As this station will be active only until May 1962, careful band monitoring will be necessary to hook this rare one. He (VP7NP) mentions that he has spotted a few phone carriers with inadequate audio from the direction of Florida, and as f.m. and TV from the Miami area are fair copy at Eleuthera, all that would be necessary for the southern Florida six-meter gang to work him would be for them to turn their beams and plug in the keys. The power and antenna should be sufficient also, for meteor scatter contacts up the eastern seaboard. He will be operating 2100–2200 EST on Mondays, Wednesdays and Fridays with the beam swept west through north. In addition he will try to operate these times Thursdays and Tuesdays as well, and 1030 and 1130 EST daily with beam on San Francisco. Additional schedules may be obtained by writing Gerald L. Meckenberg, VP7NP, Navy #141, c/o F.P.O., N. Y., N. Y. Thanks to Vic, W7QDJ, for this good news. Good luck, Gerry, and everyone else too.

Seems that Miami, Florida, might be a good place to be operating 50 Mc. during the month of January; according to Les, K4RNG, the band was open to Arkansas, Alabama, Kansas, Mississippi, Louisiana, Oklahoma and Texas on the 10th of January, and also to Puerto Rico earlier in the day. On January 11 only Texas came through and on the 16th Texas and Oklahoma were heard and worked. W8MBH in Detroit, Michigan, reports that on January 3 he heard W8WPD working a KL7 (whose call was not noted) and later in the day he heard the same KL7 working Ohio and Indiana stations. (Perhaps we'll hear from one of those who worked him what the KL's call is.) In Virginia Roger, K4IMF, got in on the opening of January 14 and worked Indiana, Illinois and Iowa: sez it was a fair to good opening with lots of QSB. Also from Virginia W4EJ mentions new stations now operating sideband on 50 Mc are WA4BGG and WA4AYP. K4KYL caught the opening of January 15th when stations from Connecticut, Massachusetts, Rhode Island, New Hampshire, Maine, New York, New Jersey, Pennsylvania, Vermont, Quebec and Ontario were all heard sometime during the day. From Jackson, Michigan and W8BAN, we hear of several nice auroral sessions particularly the one of January 9. Walt also worked the opening of January 15 when he worked VE5LD who was S9+. Dick Bailey, W6IEY, sez he finally heard some 50 Mc. DX on January 22 when K7URB, K7MIQ, W7RTH and several others (unidentified) were coming through. The first opening Dick has caught since mid-August of '61. K6AWL reported hearing 7's on January 10. Connecticut comes through via Al, W1ZGO, who mentions that ground wave is down considerably although Eastern Massachusetts and Eastern Philadelphia area can be worked nightly. Al reports hearing three W4's in Alabama on January 19, with W4NSO being the strongest heard. On January 14 Bertha, WA4BMC, had her first six-meter contact; two weeks later she had had 50 six-meter contacts, including 4 mobile contacts, six messages passed, two nets joined, had done some cross-band work and earned two certificates. Looks like Bertha intends to be as active on six as she was on two meters (if not more so). We hear from K7MFA, Armond, in Billings, Montana, that he has been busy putting together a new publication called *The Technician*. Two more new occupants of 50 Mc. in that area are K7GHR and W7YHS. W4C1L reports the band open to West Palm Beach, Florida, on January 9 and 10 when Corpus Christie, Texas and Puerto Rico were received simultaneously, and Oklahoma being heard later in the evening. K3GAU reports interesting things from Pennsylvania, such as K3ISH hearing CO2's and W4's working South America on back-scatter. Dave heard VE4's, W4's and W5's on January 14. Late report from Andy, W2UCZ, with the interesting word that on December 16 he worked K4PGL/VP9 and on the 17th he worked VE1BC. Most interesting opening of the year for K2MLB was the one of January 14 when he ran across VE4HS on 50.2; after waiting for the QRM to cool down for a few minutes Frank gave him a call and then had a seven-minute QSO during which Harold averaged S8 and 100% copy. This contact was followed by a contact with VE4LS on 50.25, then other contacts with Minnesota, Missouri, Kansas and Nebraska. Other states heard were Alabama, Mississippi, Iowa, Wisconsin, Ohio, Illinois and Tennessee and one of the Dakotas. Frank is running 250 watts and has two stacked eleven-element beams on six. The antennas are Telrex, 36-foot-long boom, spaced 33 feet apart with the lower bay at 30 feet and the upper at 63 feet above ground. Frank s thinking of running three feed lines and being able to select either the top or the bottom antenna or the two in phase. Just might prove very interesting. W3FEY is working on RTTY for 50 Mc.; everything is going, he's just ironing out the final "bugs." George sez there are several stations in the Lancaster, Pennsylvania area now on RTTY on 50 Mc. Another "Strange Happening" tale from W5JFB/5 in Baton Rouge, Louisiana, who reports hearing an HK5 in Cali, Columbia in QSO with another Spanish-speaking station. The date was October 28, 1961 and occurred shortly before a severe storm from the north. John's receiver is a Sixer, antenna is a 3-element beam 15 feet high. Signals on this "heard" were strong as a local with very slow QSB. Another advocate of n.b.f.m. is John, K8ANG, who can't understand why more hams don't use it. John sez: "There seems to be a great ignorance as to the possiblities of n.b.f.m. as well as cost and the installation of a reactance modulator. The unit I built is used by most of the few f.m. stations here. It is the reactance modulator out of the 1956 *Handbook*, article "VHF Man's VFO." Mine has a clipper installed, but this isn't a necessity. The total cost was certainly a wallet-buster. . . . $6.82!" "For several months my 90 watts of f.m. has been snagging 6-meter DX without a care in the world in regard to TVI, irate phone calls, lynchings, or the like." Sounds like John knows what he's talking about, having had experience. Report from the home state (Massachusetts) and Ralph, W1HGT, sez that on January 14 and 15 he worked or called frantically: Tennessee, Georgia, Alabama, North Carolina, Pennsylvania, Indiana, Illinois, Wisconsin, Michigan, Ohio, Minnesota, Iowa plus VE3. Pretty good for one opening, I'd say. Ole faithful, K9EID. Bob, sez that it looks to him like s.s.b. is moving in with a bang on 6 and 2 meters in the midwest. Most of his contacts are on s.s.b. although even he has to admit that occasionally he does switch to a.m. Bob has been working Ray, W9WXR in Moline, Illinois (300 miles north) every morning at 0130 CST on 50.134 and usually they pick up a few more contacts to make it an s.s.b. round-table. WØNYF, KØSXT, and K9SFX are a few of the boys who check in. This group welcomes all sideband breakers, so get busy you midwesterners on s.s.b. and break in. Sunday is another schedule day at Bob's QTH. At 1030 the sked with K9HAE (of two year's duration), when KØSVT at Burlington, Iowa, W9HGE of Beloit, Wisconsin, or some of the other sideband stations in the area also check in. At 1100 CST W4CSN, K4GEQ and K9ZTK from Kentucky and Indiana get on 50.110 for an hour's round table. This goes on every Sunday, so check in. A long and interesting letter was received from Les, W4VRV, concerning activity in the Clemson corner of South Carolina. Wish we could print the whole letter but

"Now where'll I put that new parabola?" must be the thought occupying Paul, W4HHK, well-known v.h.f.er.



If and when you hear Herb, W1DEO, famous v.h.f. Maniac, this is the operating position from which he'll be working.

space won't permit, of course; however, here are some bits of information from South Carolina: "There are about ten regularly active six-meter stations in the north west corner of the state and another four or five who come out during contests. Almost all of the regular ten have the capability for running at least forty watts input and all have rotatable beams of five or more elements. We have been given to understand that there is also some activity in the Columbia, South Carolina area, but as yet have not been able to verify it on the air, not knowing the calls of the stations involved makes it hard to arrange schedules. Most of the local activity is centered around 50.3, this being the net frequency and everyone has a crystal for this frequency. A number of the members set their receivers on that frequency and just leave them there when at home." Lew also mentioned the opening of January 14 when he worked K1PSE, Maine, and K1QAZ and W1HOY in Massachusetts. On January 23 Georgia stations were into that area with good signals. The active stations in that area are W4PYO, W4OYP, W4HQC, K4IIQ, K4JQY, W4DEN, K4DNT, W4V1W, W4HHE, K4SRQ, K4OVK and W4VRV. Bill, W4WGI in Huntsville, Alabama reports four openings during January. On the 9th to Texas, the 10th to Cuba, the 14th to the east coast, and the 17th to the east coast. K9IIBT has four openings to report also, but his were on January 14, 16, 17 and 20. Most of these were to the east coast but on January 16 he heard South Dakota and Montana. Jerry is one of the few to report hearing any skip during the contest in January. He says that Maine and New Hampshire were in for a short period during the SS. K9RRS is another station soon to be heard on s.s.b.; Bruce is working on a new final for his s.s.b. rig. In Wichita, Kansas, K9GIC noted only one opening during January and that was the one of the 17th. Dot says that only a few stations were heard in North Carolina and Virginia, but that those few had real fine signals. She worked a new sidebander, WA4CQK, Wyoming heard from once again via Bob, W7UFB who noted an opening to the northwest on January 18 when he worked K7PAL, W7CWV and K7PXG. He tells us that W7VTB is completing a 300–500 watt final for 50 Mc. and should soon be burning a hole through the ether. K2PQY tells us that W3MXW and K3CZI are heard constantly on six meters in Long Island; he also mentions that WA2FMC in Smithtown, Long Island, is heard in nightly round tables with the boys in I-land. According to August, "Frank must have his antenna on a weather balloon. I rarely hear his contacts." To our own positive knowledge, WA2FMC has contacts in the Boston area anytime he points his beam up this-a-way. W9EKZ writes that he too was "in on" the opening of January 14, when the band was open from him to the east coast and Canada. On the 17th the band opened for a very short period to Florida. Ken, K9YXX, reports just about the same news at his QTH; an opening on the 14th to W1, 2, 3, and 4 lands plus VE1.

144 Mc. and Up

Looks like another station *going on high power on* 144 Mc.; seems that Al, K2DDK has acquired a pair of Eimac 592s and he sez his 130-watt rig will be an excellent driver in the near future. Al's report on the aurora of February 11 brings his state total on 144 Mc up to 13 states and as he says "Pretty good for an indoor antenna!" Stations worked to attain this total were W3LST in Pennsylvania and W8GGH in Ohio for first Pennsylvania and first Ohio contacts for K2DDK. Meteor scatter skeds kept January 1 through the 4th did not pay off for Sam, K4EUS. He was keeping skeds with W5FYZ and although Sam heard nothing at all, W5FYZ did hear a few pings and letters from Sam. K4EUS also reports no positive results from his 432-Mc. beacon transmissions to the north. These are nightly transmissions at 432.2 Mc. at 2200 EST. Among the many other projects "going" at Chester, Virginia, is the construction of a converter for 1296 Mc. Word received from Lee, K9AAJ, sez that a considerable increase in s.s.b. is showing up on two meters in his area. Power ranges anywhere from one watt to one kw. Lee is running 300 watts p.e.p. to a 4X250B and a 15-element yagi; he's planning to increase power by summertime and then work some meteor scatter via s.s.b. Sideband operating frequency in that area is 144.350 kc. Two questions from Lee, K9AAJ: "Is anyone planning some meteor scatter skeds on s.s.b. this summer?" and "I wonder if anyone has information about the vertical pattern on the J (slot) beam. I think they claim a 40 to 45 degree beam width in the horizontal. If it is anything like that in the vertical plane it should be a natural for satellite scatter and would require little or no tilting — I would guess that it isn't nearly that wide on the vertical pattern." K4BEU and W4GGM have recently arrived on 145.35 kc. in Tennessee. These two boys would appreciate stations in Huntsville, Alabama; Nashville, Tennessee; and other towns fairly close listening for them. The boys are on every evening and a-lookin'. W4FJ in Richmond, Virginia, reports that the nightly skeds with W2ESX are continuing with never-a-

220- and 420-Mc. STANDINGS

220 Mc.

W1AJR	11	4	480
W1AZK	9	3	412
W1HDQ	11	5	450
K1JIX	10	3	
W1OOP	12	4	400
W1RFU	15	5	480
W1UHE	11	4	385
W2AOC	13	5	450
K2AXQ	8	3	230
WA2BAH	4	2	167
K2CBA	13	6	650
K2DIG	4	3	140
W2DWJ	15	6	740
W2DZA	12	5	410
K2LTP	11	5	265
K2ITQ	11	5	265
K2JWT	6	3	244
K2KIB	12	4	300
W2LRJ	10	4	250
W2LWI	12	4	400
W2NTY	12	5	300
K2PPZ	11	4	490
K2QJQ	13	5	540
W2SEU	4	2	150
K2UUR	4	3	105
W3AHQ	4	3	180
W3FEY	10	5	350
W3JYL	8	4	295
W3JZI	4	3	250
W3KKN	10	4	255
W3LCC	9	5	300
W3LZD	15	5	425
W3RUE	9	5	450
W3UJG	13	5	400
W3ZRF	5	4	112
K4TFU	8	4	400
W4TLC	4	1	165
W4UYB	7	5	320
W5AJG	3	2	1050
W5RCI	8	5	700
K6GTG	2	1	240
W6MMU	2	2	225
W6NLZ	3	2	2540
K7ICW	1	1	250
K8AXU	10	5	1050
W8IJG	9	5	475
W8LPD	6	4	480
W8NRM	8	4	390
W8PT	10	5	660
W8SVI	6	4	520
W9AAG	9	4	660
W9EQC	11	5	740
W9JCS	6	2	340
W9JEP	9	4	540
W9OVL	6	3	475
W9UED	4	4	605
W9ZIH	10	5	500
K0DGU	5	3	425
K0ITE	6	3	515
KH6UK	1	1	2540
VE3AIB	7	4	450

420 Mc.

W1AJR	10	4	410
W1HDQ	8	3	210
W1MFT	8	3	170
W1OOP	11	3	390
W1RFU	7	4	410
W1UHE	6	4	430
W2AOD	6	4	290
W2BLV	12	5	360
K2CBA	5	3	225
WA2DTZ	6	3	200
W2DWJ	10	4	196
W2DZA	5	3	130
K2KIB	4	2	100
W2NTY	3	2	100
W2OTA	10	4	300
K2UUR	7	3	175
K3CLK	9	4	
K3EOF	6	3	250
W3FEY	7	3	296
W3LCC	2	2	
W3RUE	2	2	96
W3UVG	6	6	4
W4HHK	6	4	550
W4VVE	7	4	430
W5HTZ	5	3	440
W5RCI	10	3	600
W6GTG	1	1	180
W7LHL	2	1	180
W8HCC	3	2	355
W8HRC	3	2	250
W8JLQ	4	2	275
W8NRM	3	2	390
W8PT	6	3	310
W8RQI	4	2	270
W8TYY	7	4	580
W8UBT	3		255
W9AAG	5	3	375
K9AAJ	4	3	425
W9GAB	9	4	608
W9OJI	6	3	330

The figures after each call refer to states, call areas and mileage of best DX.

2-METER STANDINGS

W1REZ	32	8	1300	W5EDZ	8	5	
W1AZK	28	8	1205	W5YYO	7	4	1330
W1KCS	24	7	1150	W5UNH	6	3	1200
W1RFU	24	7	1120				
W1AJR	23	7	1130	W6WSQ	15	5	1390
W1MMN	22	8	1200	W6NLZ	12	5	2540
W1HDQ	22	6	1020	W6DNG	0	5	1040
W1IZY	20	7	1180	W6AJF	6	3	800
K1CRQ	19	6	800	W6ZL	5	3	1400
W1AFO	18	6	920	K6HMS	4	3	850
K1AFR	17	5	450	K6GTG	4	2	800
				W6MMU	3	2	950
W2NLY	37	8	1300				
W2CXY	37	8	1360	K7HKD	13	5	1130
W2ORI	37	8	1320	W7JRG	12	4	1040
W2BLV	36	8	1020	W7LHL	5	3	1050
K2GQL	35	8	1365	W7CJM	5	2	670
W2AZL	29	8	1050	W7JIP	4	2	900
K2IEJ	27	8	1060	W7JU	4	2	235
K2LMG	25	8	1160				
W2AMJ	25	6	960	W8KAY	38	8	1245
K2CEH	24	8	1200	W8PT	38	9	1260
W2ALR	24	8	1100	W8SDJ	37	8	1220
W2DWJ	23	6	860	W8IFX	35	8	980
K2HOD	23	7	950	W8SFQ	34	8	1040
W2PAU	23	6	753	W8LOF	33	8	1060
W2RXG	23	8	1200	W8RMH	32	6	910
W2SMX	23	7	1090	W8GGH	32	8	1180
W2LWI	21	6	700	W8BAX	32	8	960
K2KIB	21	5	900	W8NOH	31	8	1090
W2ESX	21	6	750	W8SVI	30	8	1080
W2UTH	20	7	880	W8EHW	30	8	860
W2WZR	19	7	1040	K8AXU	29	8	1050
W2RGV	19	8	720	W8LPD	29	8	850
K2RLG	17	6	980	W8WRN	28	8	680
K2JWT	16	6	550	W8DX	26	8	720
K2DDK	13	5	465	W8ILC	25	8	800
WA2PGY	8	4	266	W8JWV	25	8	940
WA2JFA	10	4	340	W8WNM	25	8	900
				W8GFN	23	8	540
W3RUE	33	8	1100	W8LCY	22	7	680
W3GKP	31	7	1180	W8BLN	21	7	610
W3SGA	31	8	1070	W8GTR	17	7	550
W3TDF	30	8	1125	W8NRM	17	7	550
W3KCA	28	8	1110				
W3BYF	28	8	1070	W9KLR	41	9	1160
W3EPH	32	8	1000	W9WOK	40	9	1170
W3LNA	21	7	720	W9GAB	34	9	1075
W3NKM	20	7	730	W9AAG	33	8	1050
W3LZD	20	7	650	K9AAJ	31	8	1070
K3HDW	12	6	1015	W9REM	31	8	850
				W9ZIH	30	8	830
W4HJQ	38	8	1150	W9PBP	28	8	820
W4HHK	37	9	1280	W9LVC	27	8	950
W4ZXI	34	8	950	W9OJI	27	8	910
W4LTU	34	8	1160	W9ZHL	25	8	700
W4MKJ	33	8	1149	W9BPV	25	7	1030
W4AO	30	8	1120	K9AQF	24	7	900
W4VLA	26	8	1000	W9LF	22	7	825
K4EUS	26	7	1130	W9KPS	22	7	690
W4EQM	25	8	1040	K9SGD	21	7	1100
W4AIB	25	8	900	W9CUX	21	7	800
W4WNH	24	8	850	W9ALU	18	7	800
W4JCJ	23	6	725				
W4VVE	23	6	724	WØBFB	37	9	1350
W4RMU	21	7	1080	WØIHD	31	8	1030
W4TLV	20	7	1000	WØSMJ	29	9	1075
W4IKZ	20	6	720	WØLFE	28	7	1050
W4OLK	20	6	720	WØQDH	27	9	1300
W4LNG	19	7	1080	WØRUF	23	7	900
W4RFR	18	9	820	WØIC	22	7	1360
K4YUX	18	8	830	WØMOX	22	6	1150
W4CPZ	18	6	650	WØINI	21	6	830
K4VWH	18	6	590	WØTGC	21	7	870
W4MDA	17	6	757	WØRYG	20	8	925
				WØENC	20	6	1100
W5RCI	37	9	1215	WØAZT	18	7	1100
W5AJG	32	9	1360	WØJAS	18	6	1130
W5FYZ	30	9	1275	KØAQJ	16	6	1120
W5JWL	29	7	1150	WØIFS	16	6	1100
W5DFU	28	9	1300				
W5PZ	27	8	1300	VE3DIR	30	8	1330
W5LPG	25	7	1000	VE3AIB	28	8	1340
W5KTD	23	8	1200	VE3BQN	19	7	790
W5ML	16	5	700	VE3AQG	18	8	1300
W5FSC	12	5	1390	VE3DER	17	8	1340
W5HEZ	12	5	1250	VE3HW	17	7	1350
W5SWV	12	4	745	VE3BPB	14	6	715
W5CVW	11	5	1180	VE2ABF	10	4	580
W5NDE	11	5	620	VE7FJ	2	1	365
W5KFU	11	4	1300				
W5VY	10	3	1200	KH6UK	2	2	2540

The figures after each call refer to states, call areas and mileage of best DX.

miss. Skeds held at 2230 EST, and frequency is 144.009. Two-meter activity in the Mobile, Alabama area is increasing with the following stations now active: W7JCU/4, K4TSK, K4GGV, W4PBF, K4SFH, W4LEL, WN4EHK. 220-Mc. activity can now be found at the QTH of K2MLB. Frank has a 4X150 transmitter, 21-element 29 foot boom beam at seventy feet, and a Tapetone converter. He is looking for contacts either in the first hundred kc. or at 221.4 and would like to make some skeds. W4PLK is monitoring 432 to 433 Mc. to the north every evening with negative results. An interesting letter from W3QIZ re 432 Mc. sez that he is working W3RUE nightly over 55 miles of mountainous path with consistant 83 to 84 signals. W3RUE is running 50 watts input and W3QIZ about 35 watts. Lynn is preparing to put a 432.350-Mc. beacon on two or three nights a week. His QTH is 2200 feet above mean-sea level and he has a 15-mile visibility path north, west and south with a slight rise to the east. Another experimenter from Pennsylvania is K3DSM, who is working on amateur television. Gene is using a converted TV set for monitor and receiving on the band and is starting on flying spot scanner and scanning units. He is working with W3HPO who now has closed circuit with live TV camera and is building the transmitter. Looks like Pennsylvania either has most amateurs on 432 Mc. or else they're just more anxious to share their joys and trials. K3CLK sez: "I've been experimenting with parametric amplifiers of my own design and of others. The latest paramp now in use has been working so well (low noise and completely stable) that it is in use at all times, even for the locals. The paramp is definitely practical for continuous use on 432 Mc. I've been so amazed at what I can hear that I'm certain that long hauls can be made on the band during the winter or when conditions would normally be considered closed. I'm further convinced of this possibility because George, W2MDE, in Hicksville, Long Island was heard and worked during the latter part of December." In Virginia K4IMF and W4LPS are both working on rigs for 432 Mc.; while K4KYL sez he's beginning the slow process of gathering parts for 432-Mc. converter and r.f. section but makes no promises. Just, "one of these days." More amateur TV on 432 — in the Detroit, Michigan, area W8RLT, K8DWW, W8MPR and W8UAK are all working on their equipment and will give us news as they progress.

IARU Region I *Bulletin* (Europe) says "500-watt beacons going into operation on 145 and 432.5 Mc. at Graengsburg, Sweden. They will be on 1500 to 2400 GMT with identification each minute." More information later.

Word is out that there are four or five stations on 220 Mc. in the Seattle, Washington area, but Al, W7IST, sez he doesn't know just who they are. Al is working on a converter for 220 Mc. and hopes to have it on the air by February.

Still receive a small amount of information or inquiry concerning the 1215 Mc. band. Ron Jahr, K9VQA in Decatur, Illinois writes that he has ordered an APX-6 transceiver and after it is converted he'll be operating on 1215 and 1296 Mc. He'd like to hear from other hams in Illinois who are operating 1215 Mc. W6IEY in La Mesa, California sez he did manage to complete the 1240 Mc. antenna feed for 4-foot dish (except for final tuning in dish and silver plating), also the 1240 test antenna for pickup. Dick is still working on getting the dish up in the air. Quite a job, isn't it, Dick? WA6GHW sez that activity on his part has been limited, buy that WA6DII moved his 1215-Mc. rig from his business to his home and after putting his parabola up on a 30-foot mast and completing two contacts, the parabola was blown down by the gentle California ocean breeze. Larry Will passes on the information that he and K3HNJ are the first hams in their area on 1215 Mc., and they have extremely loud signals over a 1.9 mile non-line-of-sight path. The boys are both using corner reflectors about 40 feet off the ground. Larry is also working on a 432-Mc. converter but has no transmitting gear as yet. (One thing at a time, Larry.) Sam King, K4EUS, Chester, Virginia informs us that six half-hour skeds with W3LCC on 432 Mc. did not pay off with a contact. K5RCO in Beaumont, Texas, would like to hear from anyone in his area interested in 420 Mc. Ray sez "no sideband activity in this area and the band was deader than a doornail." Guess he means during the January contest. W2MDE sez: "My receiving equipment on 432 Mc. is capable of copying W3ZFW and K3CLK in Philadelphia practically any night but I'll be darned if I can hear that guy in Connecticut or the group in Northern New Jersey who are much closer. I have been listening for a few months every hour of every evening and don't know why I don't hear anyone talking to them. Also there are two very active stations in New York, W2OTA and myself. I am running a 5894 tripler and 5894 final, 50 watts input, a 32 element colinear beam and the 417A *Handbook* preamp. Tell those guys to look towards Hicksville, Long Island, once in a while." Consider yourselves told, fellas, and swing those beams! K3OGA in Baltimore, Maryland sez he is designing a crystal controlled converter for 432 Mc. with 28 Mc. i.f feed to be fed into an SX-111. Jim is also designing a 50-watt crystal-controlled transmitter; is building a 432-Mc. 15-

(*Continued on page 140*)

Club Licensing Programs

BY WILLIAM G. WELSH,* W1SAD/6

THERE are currently some 1200 active ARRL-affiliated amateur radio clubs — a potent factor in the strength of amateur radio. About fifteen per cent of these clubs conduct full licensing programs with both code and theory training, and these clubs are to be commended for their service. Other clubs provide either code or theory only, or else have no training program at all. If your club conducted a training program this past winter and spring, plan to improve it. If your club didn't conduct a licensing program, start planning on one now for next fall and winter.

A good licensing program should be conducted over a 16- to 20-week period. Two- to three-hour sessions once or twice a week can include at least 24 hours of classroom code instruction plus 24 to 32 hours of theory and regulations classroom instruction. In addition, each student is expected to perform a certain amount of homework.

It would be well to consider running two identical courses each year — one from September until Christmas, and the other from after New Year's until late spring. It has been my experience that programs which run longer than four to five months suffer from higher attrition rates no matter how well they are planned and conducted.

Advertise your program for at least a month before it starts. Make use of your local newspapers, radio stations, and high-school bulletin boards to attract students. Don't forget such strategic spots as the radio parts stores. And when the applications start rolling in, you must make sure that each applicant understands that he is going to have to apply himself diligently in your course!

Conduct your code classes separately from your classes in theory and regulations, but run them both on the same night. Some of your students won't need help in both code and theory, and your separate classes will make your program more appealing to them. Run the code portion of your program first, and the theory portion last and, if you have the facilities, have a short coffee break between the two. Don't try to conduct classes on a Friday or Sunday evening because I believe that you will find, as I have, that attendence is very poor these two evenings.

A good licensing program will benefit your club as much as it benefits your students. Your licensed members will derive a great deal of satisfaction from helping the students and your students will provide new life in your club as they become licensed and get on the air. A good licensing program will prevent your club from getting stagnant and suffering from dry-rot.

The amateur radio club is the logical place for new people to go when they want help in getting started. A planned program conducted by a club will do more good for more people than hit-or-miss instruction by individual amateurs. Individual instruction is far too time-consuming and amateurs quite naturally shy away from it, whereas club-sponsored programs should not be as much work for any one member and will get more accomplished.

Make use of all available training aids. Films, slides, tape recordings, etc., are all very useful, but you should follow them with a discussion of their main points and, if possible, a short quiz. Don't use any training aids which aren't directly related to the material covered in the course. It is sometimes necessary to use films in other than the desired sequence, but this as seldom as possible. ARRL's training aids are available to affiliated club groups and should be booked as far in advance as possible. Their TA-32 list (available on request) will help you correlate available subject matter to your course outline.

Code Practice

Taped instruction proves most successful and allows the instructor to accomplish a maximum amount of code instruction in a minimum amount of time. Preparing good code instruction tapes is a slow process but has the advantage that they can

* 2300 West Clark Ave., Burbank, Calif.

At ceremonies held in the Sheraton-Carlton Hotel, Washington, D.C., on March 1, W1SAD received the 1961 Edison Radio Amateur Award, presented annually by the General Electric Company for outstanding public service. Among those present for the occasion were, from the left, Edgar W. Hiestand, Congressman from California, where W1SAD is now living; W1SAD's wife, Mrs. Marie Welsh, W1COL; Bill Welsh, W1SAD, 1961 Edison Award recipient; L. Berkley Davis, G. E. Vice-President; and Major-General J. B. Bestic, K4BMR, Director of U.S. Air Force Telecommunications. General Bestic was the principal speaker for the evening, and paid tribute to the public service rendered by radio amateurs in general and W1SAD in particular. Bill Welsh, W1SAD, has conducted radio classes for some 2800 students, and in the accompanying article he provides some tips for others who would conduct similar courses.

be copied for at-home instruction for your students and, in addition, you can use them again in a later series of classes.

Teach correct hand sending techniques to each student early in your course, because it's easier to teach him correct wrist motion and rhythm early in the game than it is to correct poor sending habits later on. The training films *The Technique of Hand Sending* and *Rhythm, Speed and Accuracy in Hand Sending* are useful code training aids which should be shown early in your code course. These films are available to affiliated clubs from ARRL Hq. or through military groups as TF1-4539 and TF1-4540 respectively. Have each student send to the class at least twice during the course, and lead some constructive criticism of each sender.

I've found that an average student must practice code about 5 hours per week if he is to rise smoothly to the 13 w.p.m. level in four to five months. If he gets on-the-air practice with his Novice license, his code speed will rise quickly, because nothing increases one's ability to copy any more quickly than when he has to copy the other guy in order to answer him. So, on-the-air code practice with that Novice license is the best practice of all.

If you have the equipment and a fixed location, it may also be possible to set up a code station to allow your Novice licensees to operate on the 80-, 40-, and 15-meter bands. This will help your new licensees a great deal, especially if an experienced operator will stay with them while they each make the first few contacts.

Theory Class Comments

In teaching basic theory and principles of radio, I suggest that your club instructors develop a series of six or eight assignments for your students to complete at home. Use open-book assignments which will direct your students to study the material you are going to cover in class. Make your students realize that you are running a directed-study program and that they must put in some time ferreting out the information you've indicated. The short time-duration of these courses makes home study a must. You should be sure to correct their papers carefully and discuss every point in good detail after you've returned the corrected assignments to your students. Group your subjects in the examination assignments you prepare, as this will make it easier for your students to do their work and you can cover the material more smoothly during your review.

The League offers an outline of suggestions for a radio course that may assist you.

FCC Rules and Regs

When covering FCC Rules and Regulations, do so from a practical standpoint — tell your students the practical reasoning behind each regulation instead of merely reciting each regulation.

Your instructor doesn't have to be an expert in all phases of communications, but he should be competent and he must give a clear, relaxed presentation of his information. When on a subject he's unsure of, he should qualify his statements to the extent that his students are aware he is stating *his* opinion on that particular subject.

In Conclusion

The theme of the armed forces is "Power for Peace," and that makes sense — your club can help strengthen your city, state, and country by providing additional trained operators to handle emergency communications at times of natural disaster or national emergency. In addition, such a licensing program as we have outlined here is essential to sound club progress and the growth of amateur radio.

ARRL has an extensive array of fine training aids available to all affiliated clubs, and you should make use of them. One of them, a thesis prepared by me, is entitled *Licensing Classes* and contains many pages of information written specifically to help you to conduct as good a licensing program as possible.

Plan to get started *now!* QST

FEEDBACK

K8OCO writes to emend the tuning procedure for his OCO audio filter described in the January issue. After adjusting the last slug for minimum response, it should be back out one turn of the slug. This puts a sharp notch on the high-frequency side of the pass band.

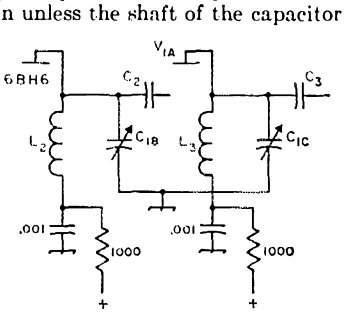
The G.E. source for the coils, mentioned in Footnote 2, should be found listed in telephone directories under "General Electric Company Appliance Service Departments, General Electric Major Appliances."

—•••—

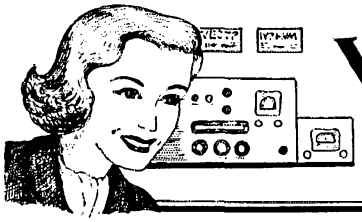
96 — not 86. Hallicrafters said 96 Milli and 96 is correct, but somehow the answer to question No. 2 came out 86 in the Hallicrafters ad on page 85 of February *QST*. Our fault, and we're sorry. Thanks to those sharp-eyed readers who reported our mistake. Interest in good sending is still very much alive, we are glad to find.

—•••—

In the article, "A High-Performance Tuner for V.H.F. Converters," page 30 of the January issue, the ganged capacitor C_1 in Fig. 1 cannot be wired as shown unless the shaft of the capacitor is one



that has insulated couplings between sections. If the conventional type of broadcast-replacement capacitor is used, the circuit must be altered as shown here.



YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

LAST month we mentioned the extraordinary traffic-handling accomplishments of Mae Burke, W3CUL. For twelve years Mae has been placing first, second or third (usually first) in the Brass Pounders League! Her record, as we've said before, is almost too staggering to comprehend.

Mae gave permission to quote from a recent letter, but she was concerned about sounding too braggadocio. On the contrary, the fact is, in our estimation, that she could never receive *enough* publicity for the public service she has given through amateur radio.

> "There is not too much time to think about anything else except traffic around here. It is a full-time job and then some.
>
> "Can you imagine someone getting up early every morning and then spending ten or more hours seven days a week for nothing except your own satisfaction? I love to sleep in too, and have always been known as a sleepy-head!
>
> "It does not seem like some twelve years a steady diet of traffic — some 150 consecutive BPL cards now and a total of more than 500,000 to the credit side. On the other hand, it seems a long time since September of 1949 when I at last made BPL for the first time. I think that was the hardest BPL of them all. The rest came much more easily.
>
> "One old 32V-1, now a modified one, and a 32V-2 have been with me for 14 years. It has some 50,000 hours on it and still going strong. The wiring in it is like pipe stem — so brittle. The shack now consists of a pair of 75A-4s and an SX101-A with an old National 57 and KWM-2; a pair of HT32s and HT33A with GSB101 and 30L1 s.s.b. finals; a pair of old 32V-2 and one kw. pair 810s and another pair of 4-250As. These do the big c.w. chores here. There is a Valiant that has done yeoman service in all modes. A 2- and 6-meter position help the short-haul traffic along. Now with RTTY, we are about ready to do a job, we hope.
>
> "Our antennas are about the same — five-band vertical of Navy type. A five-band horizontal and a couple of half waves tipped for particular use. There's a beam and now a 40-meter one to go up with a new tower, and a long wire on 2 and 6 for break-in use on c.w.
>
> "A special word about the boys in the Marine Corps — they have been especially nice to me. I schedule many of them each day. They grow into very close friends and when one is transferred, you really miss him. Some leave the service and we still keep in touch, with pictures of families, new homes, and all. With so many friends the loss of ham radio would be a very serious loss."

The foregoing would only be the sketchiest of introductions for a full story about W3CUL. A book could well be written about Mae and her fabulous accomplishments, and upon Mae Burke, W3CUL, of Morton, Pennsylvania, the term "fabulous" can truly be bestowed!

55 W.P.M.!!

In the March 1960 column we ran a photo of Eileen Cline, KØILM, soon after she certified at 55 w.p.m. in the Connecticut Wireless Association high-speed code program. Today Eileen is still our women's "champion" c.w. amateur high-speed artist.

From an article appearing in the *Evening Democrat*, Ft. Madison, Iowa, Feb. 3, 1962, we learned that Eileen had nearly qualified for 60 w.p.m. She missed one word — ambidexterity. "I think I was half guessing and I copied the word as 'ambitious'."

A ham for more than 20 years, Eileen got into radio when she enrolled in a radio school that was conducted under the sponsorship of President Roosevelt's National Youth Act. In three months she won a Civil Service radio telegrapher's position at an Army installation in Texas.

Now employed as a bookkeeper during the day, married, and the mother of two children, Eileen operates mainly "after the dishes are done," at a neat rig just a step away from the kitchen sink, stove, and refrigerator.

Second YL VHF Contest

Participation in last year's first YL VHF contest, sponsored by the YLRL, was light, and club vice president Lillian Byrne, K2JYZ, hopes that the turn-out this year will be heavier. All licensed YLs operating on frequencies

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

Ten hours a day—seven days a week—for over twelve years!

W3CUL calls this position "arm-chair operating for real." Even while on an annual vacation in Florida, Mae makes BPL monthly—from a cabana attached to her father-in-law's trailer!



(Left) Any challengers for KØILM's title? You would only have to copy at 60 w.p.m. to qualify! (Center) Lucky YLRL member Nr. 1000 is Thelma Bomyea, WA2RLU, of Star Lake, N. Y. For supplying the long-awaited answer to the question, "who will be YLRLer #1000?" Thelma received a pillow with YLRL insignia, stationery, and membership pin. Licensed in April 1961, Thelma operates both phone and c.w. on several bands. (Right) Portland Roses charter member, Donna Gettman, W7QKU, is one of the YLs hard at work on plans for the coming ARRL National Convention at Portland Labor Day week end. Donna is believed to be the only Oregon YL with an all-10-meter phone DXCC (received March '61). (Photo via W7HPT.)

from 50 Mc. and up are invited to participate. YLRL members only are eligible for the WRONE award — non-YLRLers are eligible for a certificate. The highest scoring Novice will receive a special certificate. Note well the rules that follow:

Start: Wed. April 11, 1962 at 1700 GMT
(12 noon EST)
End: Fri. April 13, 1962 at 0500 GMT
(Thurs. April 12 at 12 midnight EST)

Eligibility: All licensed YL and XYL operators are invited to participate. YLRL members only are eligible for the WRONE award. A non-member will receive a certificate. Contacts with OMs will not count.

Operation: Bands — 50 Mc. and above are to be used, phone and/or c.w. Crossband operation is not permitted. Only one contact with each station will be counted. A section may be counted only once toward multipliers.

Procedure: Call "CQ YL."

Exchange: Station worked, QSO number, RST report, ARRL section, U.S. Possession, VE district or country. Entries in log should also show band worked at time of contact, whether A1 or A3, time of contact, date, transmitter and power.

Scoring: Multiply number of contacts by the total number of ARRL sections, U.S. possessions, VE districts or countries worked. Contestants running 50 watts input or less at all times may multiply the above result by 1.25 (low power multiplier).

Awards: Highest score — WRONE award — to YLRL member only. Top three scores will receive certificates. Highest score in each ARRL section, U.S. possession, VE district and country will receive a certificate. Highest Novice score will receive a certificate.

Logs: Copies of all logs must show claimed score, be signed by operator and be postmarked not later than April 27, 1962, and received not later than May 11, 1962. Send copies of log to Lillian Byrne, K2JYZ, 24 Stillwell Place, Freeport, Long Island, N.Y. No logs will be returned. Be sure it is a *copy* of your log you send for confirmation.

Keeping Up With the Girls

Club & Nets

BAYLARC — New officers are Pres. WA6ALK; V.P. WA6GQC; Secy. WA6LIZ; Treas. WA6JGR. Board members are K6HIW; WA6PKP; WA6LYA; W6BIDE.

COLORADO YLs — Work any five of 21 members for the new "sYLver-doll-ar" certificate. KØRGU is certificate custodian. All licensed Colorado YLs are invited to join the club. Send $2.00 dues to Ethel Chastain, K5OPS/Ø, 851 Victor St., Aurora, Colorado.

WRONE — Club nets are Yankee Lassies, Wed. 1330

Being located close to West Point, Stewart AFB, and N. Y. State Military Academy prompts Jean McK. Bryan, WA2UZK, to spend considerable time handling traffic for service personnel. The former K1NKS, Jean checks into seven traffic nets daily, although she says she doesn't work as hard at traffic-handling now as she did as a Novice when she made BPL. Jean operates mostly on 75, between 3850 and 3855 kc.

For happy hamming K6LPN, Jeanie, and K6VJJ, Vern Gallinger, of Pasadena, California, recommend a house trailer as a solution to ignition noise. Both 40-meter c.w. fans, the Gallingers' last Christmas gifts to each other were shiny new keys, mounted on the same plate in "His and Hers" fashion.

GMT (0830 EST) 3900 kc.; 6-meter net Wed. 1900 GMT (1400 EST) 50.65 Mc.; and c.w. Fri. 1330 GMT (0830 EST) 3600 kc. In addition to the annual spring and fall luncheons, members are invited to congregate on the first Saturday monthly at noon at the 1812 House, Rte. 9, Framingham (April and May informals omitted — met formerly at Abner Wheeler House).

IMPS — Indiana Michigan Petticoat Sisters net meets Mon. thru Fri. 1800–1900 GMT (1300–1400 EST) on 50.4 Mc. Anyone working 5 IMPS (not during net) is eligible for IMPS certificate. Send info to NCS K9YIC.

PORTLAND ROSES — Publicity Chairman W7HPT writes that anyone attending the National Convention in Portland on Labor Day week end will not miss spotting a club member, for they will all be dressed alike. The ensemble will be a matching blouse, skirt, and sailor "skimmer," with the club emblem, a 3-inch red rose, prominently displayed. K7BII replaces W7ZKY as club secretary.

Coming Events

YL VHF Contest — The second annual, conducted by the YLRL. Starts Wed. April 11, 1962 at 1700 GMT (1200 EST) and ends Fri. April 13, 1962 at 0500 GMT (2400 EST, April 12).

WRONE Get-Together — The annual spring luncheon of the Women Radio Operators of New England will be held May 5, 1962 at the Publick House, Sturbridge, Mass. Jean Peacor, K1IJV, is chairman.

FLORIDORA Anniversary Party — To be held in conjunction with the Orlando Hamfest, May 5 and 6, at the Cherry Plaza Hotel, Orlando, Fla. Ev Shea, K4UIZ, is secy. of the Orlando Radio Club.

12th Midwest YL Convention — May 18–19, Flint, Michigan. Esther Stuewe, W8ATB, Chairman. Friday, May 18: registration, luncheon, buffet and party at Howard Johnson Motor Lodge, G-3129 Miller Rd., Flint. Luncheon and banquet Sat. May 19. Registration $2.00 in advance to W8ATB, G-4098 E. Atherton Rd., Flint, Michigan.

ARRL Southwestern Division Convention — June 1–3 at Disneyland, Anaheim, California. There will be a special YL-XYL program, including a poolside fashion show.

16th Annual AWTAR — The 1962 All-Woman Transcontinental Air Race will start at Long Beach, Calif., on July 7 and will end July 11 at Wilmington, Delaware. Carolyn Currens, W3GTC, will again serve as chairman for the amateur radio net.

ARRL National Convention — Aug. 31–Sept. 3 at Portland, Oregon. YL-XYL activities will be conducted by the Portland Roses. QST

Strays

KN7HWQ was a recent bride, and at the ceremony her groom must have felt something like an outcast. The bride's father was W7CTM, bride's mother was KN7HWN, maid-of-honor was KN7HWO, organist KN7HWP, and also in attendance were W7OCY and W7NPV.

25 Years Ago this month

April 1937

. . . There was a detailed report of amateur participation in the Ohio River Valley Flood emergency work, with plenty of pictures of the key stations.

. . . AARS code speed contest results included W9KJY (now W1LVQ) at 50 w.p.m. and W1CJD (Gil) at 45 per.

. . . W1JPE proposed (tongue in cheek) that a DXpedition to several rare countries be organized, financed by the contribution of $1 per country per QSO by each ham working same. A novel suggestion — then.

. . . Technical articles included dope on diamond antennas, an electro-mechanical i.f. filter, pentode and beam tube crystal oscillators, a push-pull 500-watt amplifier, inverse feedback for speech amplifiers, but no hints and kinks.

. . . Frederick Merrill gave advice to amateurs on how to determine whether they should choose radio engineering as a career.

. . . From Harvey Radio you could buy a two-tube transmitter kit, ending up with an 807 plus power supply, complete for $27.00. QST

Silent Keys

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

W1OQ, George Cowgill, Lowell, Mass.
KN1TSZ, Steven H. Weiss, Pawtucket, R. I.
W2CFO, Alfred H. Gerlach, Astoria, N. Y.
W2FYB, Albert T. Rooney, Shrub Oak, N. Y.
K2IPH, Ernest L. Sachs, Rockville Centre, N. Y.
W2YC, Charles W. Mason, Freeport, N. Y.
W3BJH, James M. Flippin, Baltimore, Md.
W3BSW, Charles E. Clarke, Lutherville, Md.
W3SSC, John J. Null, Woodsboro, Md.
K4AYK, John T. Larkin, jr., Livingston, Ala.
W4EDX, Thomas J. Urlage, Covington, Ky.
W4JRP, John W. Ziesemer, Richmond, Va.
K4UCS, Eldred Jones, jr., Owensboro, Ky.
W4UM, Gilbert T. Strailman, Hampton, Va.
W4ZNT, W. C. Harnsberger, Harrisonburg, Va.
K5HTB, James M. Moran, San Antonio, Tex.
W5KCM, L. L. Moorhead, Albuquerque, N. Mex.
W5LOF, Gurden W. Musgrave, Houston, Tex.
W5OPJ, W. S. Terry, sr., Corpus Christi, Tex.
K6CHZ, Rene C. Gaspar, Redwood City, Calif.
W6FSA, Walter B. Clayton, Santa Margarita, Calif.
W6HDR, David M. Josephson, Burbank, Calif.
W6NC, William S. Gould, Los Angeles, Calif.
WA6QOH, Clifford E. Martin, Sunnyvale, Calif.
W7AGN, Henry H. Storms, Spokane, Wash.
W7FPV, John R. Brott, Oroville, Wash.
W7HHN, John D. Venen, Vashon, Wash.
W7OIP, Harold Curry, Butte, Mont.
W8BLK, Frank B. Reid, Vassar, Mich.
W8CRB, Eugene A. Throop, Alanson, Mich.
W8HIS, Robert S. Munsell, Ashtabula, Ohio
W8OXS, Edward A. Radebaugh, Willoughby, Ohio
K8OZI, Willis L. Dillon, Minerva, Ohio
W8VU, Lewis C. Mantel, Belleville, Mich.
W9CGO, James E. Flanagan, Antigo, Wisc.
ex-W9FDJ, Matthias Gapko, Kenosha, Wisc.
W9FTN, John W. Southworth, Indianapolis, Ind.
W9IJQ, Wallace H. Berry, Chicago, Ill.
K9SUK, Stephen J. Jelinek, Milwaukee, Wisc.
WØLRR, Clement Strong, Hutchinson, Kan.
KH6AQ, James N. Orrick, Ewa, Oahu, Hawaii
VE1DS, B. M. MacNeil, North Sydney, N. S., Canada
VE1RU, D. M. Topple, Dartmouth, N. S., Canada
VE3BPC, Phil M. Braun, Toronto, Ont., Canada
VE3WM, W. C. Morgan, London, Ont., Canada

Correspondence From Members-

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

VIVA OSCAR!

¶ Have just read the article "Sixty Years of Radio Amateur Communication" by Bill Orr. May I compliment you on your selection of this article for inclusion in February *QST*. I have been in amateur radio for over 15 years, and a member of the ARRL for 12 of these years, and I must admit that you have never had a story more thrilling to me than this one.

I have watched several missile shots, being in the business, and I always get the same thrill and chill each time. This article brought the same feeling plus an extra feeling of being very proud to belong to the amateur fraternity that carried Project Oscar to its very successful climax. — *Sol Davis, W3WPN/6, Philadelphia, Pa.*

¶ We think that the success of the Oscar venture is so important that all the hams should be willing to help support it financially. Even if only one-quarter of the hams sent in one thin dime it would help the fellows at Sunnyvale with the postage and mimeograph expenses and possibly allow them to spend a little more on future satellites. The better showing we make for ham radio will be worth while for all of us, whether we are interested in satellites or not. — *Joe Comella, W9OBY; Keith Mason, W9OII; Wesley Greenlund, W9LST; Woodstock, Ill.*

¶ As a non-ham reader of *QST* I want to congratulate you and particularly Bill Orr, W6SAI, on his article. His style and presentation of facts is invigorating. I have participated in a ham radio club and have a son, Bob, WA6LIM, who is an active ham but as yet I have not attempted the inevitable. — *Frank H. Watson, Woodland Hills, Calif.*

CERTIFICATE EXPLOSION

¶ . . . During the last couple of years the explosion of certificates has been terrific! In old times the awards had some value, they were interesting to work, and they were issued for sensible requirements. Now the inflation of them has developed to a point where it simply spoils the original meaning of award hunting, and the requirements in many cases show a splendid fantasy! And it seems that in quite too many cases the active amateur is unable to judge which award is fully in accordance with amateur radio. Every QSO is valid for some certificate. Do we need certificates any longer? Take just a dozen QSL cards, any of them. Write a list of them, send it and your address with a dollar (very essential!) to some issuer, and receive the handsome, beautiful, colorful, eye-opening, etc., certificate! Write the same list in another order, send it along with your address and the essential dollar to another issuer, and see, you once again receive a nice certificate! And the more you want to use dollars, the more certificates you will have. Such it is today! And even in certain points this trend has grown to the degree of "certificate industry" with nearly 100 different certificates issued by the same individual (the price of each certificate being one dollar, of course.) Some original, esteemed awards even are imitated for business purposes! OK — why not to leave out the whole idea of QSL cards and substituting them with certificates? A QSO with me will bring you a beautiful certificate, just provided you remember to send me a large s.a.s.e. and the dollar (oh yes, and your own QSL, hi). . . . — *John Velamo, OH2VV, Lauttasaari, Finland.*

NEW & USED

¶ The pages of *QST* often contain instructions or suggestions for the modification of commercially built radio equipment in such a manner that re-sale value will not be altered. It seems to me that this is somewhat like tying a fox tail to the antenna of an automobile so that it will be "different" and yet retain its identity with all other cars of similar make and model.

If re-sale of the equipment is contemplated there is every reason for not changing things. This leaves the poor ham with a little technical ability and an adventuresome spirit in a sort of quandary. Is the loss of value worth the fun of changing things?

I would like to suggest that there is a way out of this dilemma. All that is required is one old radio receiver or transmitter which has already lost its re-sale value. A good look at the bargain counters will reveal lots of well-built but obsolete gear that can be improved and modified. The requirement here is that the fellow who does the modifying be already equipped with an operating ham station. This way, he is not off the air while experimenting, which would be the case if he were to "butcher" his only receiver or transmitter.

Although I have been a ham for a little over 25 years it has not been my misfortune to ever purchase a new piece of communication equipment. Every item was purchased second-hand, and much of it was inoperative at the time of purchase. The fun, experience, and pride of accomplishment in converting a worthless piece of junk into useful and functional apparatus is something that no ham should miss. There seems to be as much challenge in salvaging old gear as there is in designing from scratch, and often the experimenter is saved the agony of devising such things as dial drives and other mechanical gadgetry that is beyond the scope of the average ham shack tool box. . . . — *John S. Denham, KV4BO, Cruz Bay, St. John, Virgin Islands.*

BEHAVIOR GUIDE

¶ In very many less-richly-endowed parts of the world, Americans who have so much of everything are sometimes considered ostentatious and, at times, boastful. Our poor image, quite undeserved to our way of thinking, harms us in some of our international relationships.

The amateurs of the United States are in the unique position of being permitted to use a kilowatt input, both legally and economically attainable by vast numbers of our hams. In many other parts of the globe, a kilowatt is neither permitted not within the economic reach of all. The little fellow out in his steamy shack in the middle of a jungle must make-do with his 50 watts powered from a gasoline generator. (And he does quite well, too!)

But in view of this wide difference between what we Americans can and do have as compared with what our overseas brethren cannot and do not have, are we tactful when we describe our kilowatt rigs in the course of our DX contacts? This omission might eliminate just one more small irritation contributing to our image as "fat cats." . . . — *Gale H. Curtright, KØTYO, Kansas City, Missouri.*

TNX

¶ I feel the success and enjoyment I have had is entirely through the help of the League, all the way from the *License Manual*, and W1AW code runs, to section nets and contests. Of course, I received assistance from many local amateurs here. Again, thanks very much. — *Donald W. Keith, WA4BDW, Springville, Ala.*

WHAT COURTESY!

¶ It is becoming increasingly noticeable that a few amateurs are disregarding the normally accepted behavior of intelligent people. It is recognized there may be provocations; patience is often necessary with the newcomer, the inexperienced, or one not as intelligent as we!

Recently I overheard a U. S. citizen on a Caribbean Island tell a WA2 on 7 Mc. that he was a pest. This same citizen later told the writer that the air might be better without him! Another U. S. citizen, also on a Caribbean Island, was heard to tell an amateur to "shut up."

When a rare DX station is struggling to cope with a pileup, and perhaps not managing as well as some think

he ought to, snide remarks of "lid," "nuts" and other choice expressions of ill-mannered exasperation are being heard far more frequently than in the past. . . . — *H. A. M. Whyte, VE3BWY, Toronto, Ontario.*

GREEN SHOOTS

¶ In answer to W3KNG's note in January *QST*, I am forced to suggest that after the "old op" has had time to get over the shock of seeing building instructions for a mere modulator, he would do well to remember that there are always those green shoots among us who have yet to enjoy the mysteries of some of these primeval devices.

My congratulations to *QST* for ensuring that each new crop of hams can find in this publication items which will help them toward a greater knowledge and enjoyment of our hobby. — *A. D. Murray, VE2AHM, Rosemere, Quebec.*

NOVICE ACCENT?

¶ There is a group of Novices playing a game which helps add to the havoc already on the Novice bands. It consists of the following:

One player sends a series of "dits" in a certain sequence dit-ditditdit-dit) and another player will then send, "ditdit" in reply. This game goes on constantly and the transmissions are usually unidentified. Other operators will send "dit-ditditdit-dit" for long periods of time while not expecting an answer. This activity is unnecessary and should be eliminated — *M. W. Oliphant jr., WN4CBR, Arlington, Virginia.*

¶ It seems to me that the Novice is considered to be ignorant of operating ability when he emerges into ham radio. I have heard many higher class amateurs make statements against Novice operating procedures and fists. It occurs to me that before any amateur corrects others in their operating ability, he should see if he measures up to his own criticism. I have heard some hams call CQ and sign with a "di-dit." What is this? Please let other hams know about it.

Also, many hams use the question mark for any other punctuation mark. For example, I've heard them send: "The QTH is New York City? N. Y.?" Is it? I don't know. I don't live there! Perhaps *QST* should print a pamphlet entitled: "Your General Accent"! — *Walter Marble, WN4AQV, Gadsden, Ala.*

DUE CREDIT

¶ A pat on the back does not cost any more than a kick in the pants, and it's much easier to administer. I have read gripes and complaints from some hams about the length of time they have had to wait for action from FCC, but FCC is due some compliments from me.

On December 29, I requested a form for renewal from the Philadelphia FCC office. The form arrived three days later. I hastily filled it out and mailed it. The application was returned to me, with the notation that I had failed to fill out items 10 through 14 and had failed to have the application notarized. This was immediately attended to, and the the form returned to Washington.

On February 3, my renewed license reached me. Considering my error, this is exceptionally good service from any government agency. — *Wesley W. Brogan, W3ARM, Ambler, Pa.*

[Editor's note: W3ARM is by no means alone in filing an incomplete application. The amateur licensing unit could give us all still-better service, if we checked the forms carefully before mailing.]

¶ Congrats are in order to the FCC, they're getting more efficient every day. I sent my Tech exam to them on January 2, 1962, and when my mailman stopped at my door the tenth time later, Jan. 13, 1962, there was my ticket. How's that for the new world record — 11 days? — *Stephen Moses, WA2YUI, Flushing, New York.*

BS1BUL?

¶ Boy! You should have been on fifteen-meter c.w. this morning. The band was really open, and on my first CQ DX I tied into a really rare one — a station with the exotic call BS1BUL!!! I nearly flipped when I heard him come back to me RST 579, because, you see, I have been trying to work BS1 for quite some time, and now he falls right into my lap.

In case you're wondering about his QTH, he said he was in Umsk, a "new country near MP4 in Asia." New it must indeed be, because I have a very comprehensive 68-inch-wide by 36-inch-high wall map. Finding MP4 is a breeze, as it is about 2 inches square, in bright yellow on the map. However, I tried to find a place by the name of Umsk, and that is a different matter entirely. The closest thing to Umsk is Yezd, in Iran. He also said that he was on a DX-pedition there and that I was his first contact from Umsk. Moreover, he promised to QSL, so when (if) I receive it, I am going to ask that Umsk be immediately given new-country status for DXCC.

I could say what I think of guys like that, but you couldn't print it. I think maybe the first two letters of his call (B.S.) come fairly close. Also, I would like to thank the ham who, when I signed with BS1BUL, called him. His sentiments apparently run along the same lines as mine — would you please write to me, OM? You're the one who called "BS1BUL BS1BUL de JT1AA JT1AA hi hi LID!"

Here's for more DX — but not *that* kind of DX! — *Pat Bailey, K7KBN, Las Vegas, Nevada.*

"FLUB-A-DUB"

¶ I heard a gentleman we all know (he doesn't talk to lids, kids, school-bus riders or space cadets) call me a "flannel mouthed flub-a-dub" on the air one Saturday afternoon recently.

Since his words are always pearls of wisdom, and since he is such a nice man (he does like dogs!) I know it must be a compliment. But since I am several generations removed from this nice man, I have had a little difficulty interpreting what must be another of his archaic references. (He has others . . . "a.m. only," "no phonetics" . . .).

"Flannel mouthed" must mean soft spoken, warm and comforting. (How did he know?) But what is a "Flub-a-dub?"

I am so grateful for the attentions of my special pal that I am organizing a secret project in his behalf. You see, he doesn't have a receiver! Honest! He's always calling CQ right on top of S9 QSOs and whenever he does get a new respondent, he has trouble hearing him. So I am collecting Green Stamps to get him a receiver. It's a pity he hasn't had one before.

My morning riders most sincerely hope that he will hurry home from Florida, invigorated and renewed. They don't mind the 50¢ I charge when they can have their morning happy hour listening to his comedy program on 75 meters.

Send your Green Stamps in care of this station. — *Terry van Dyck, WA2LVU, Rome, New York.*

RACES RECORD

¶ Recently, on a Sunday, I mailed a letter to the Tennessee Section Emergency Coordinator, Mr. Donald V. Goodin, K4OUK, requesting information and assistance in organizing a local RACES program. On Tuesday I received a long distance telephone call from Mr. Goodin stating that he would arrive in Clarksville on Thursday. He arrived and set me straight on many RACES points. Friday morning we met in the mayor's office with the local civil defense director. Mr. Goodin outlined a plan for RACES and also suggested other Civil Defense solutions, for which the director was appreciative. Friday afternoon Mr. Goodin and I visited other hams in the area including W4GEN. Through Mr. Goodin's efforts, W4GEN (who by the way has an excellent location and equipment for RACES operations) offered to assist wholeheartedly in the RACES program.

Mr. Goodin's XYL, K4CNU was also informative and added interest as a husband-wife ham family working shoulder to shoulder for the amateur fraternity at large and ARRL in particular.

I wish to express my thanks for the prompt and efficient service given by Don Goodin, K4OUK. — *Thurston L. Lee, W4NGK, Clarksville, Tennessee*

NO QUARTER

¶ I have just read the Lewis G. McCoy article in January, 1962 *QST* on "Choosing an Antenna". I have always appreciated Mr. McCoy's style of presentation in his articles in *QST* over the years. So many times his ways of saying things are most easy for me to understand.

Mr. McCoy need not send me a quarter. — *George Chambers, K0BEJ, Coffeyville, Kansas.*

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, W1DGL, Ass't Comm. Mgr., C.W.
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr., Phone

Public Service the Keynote. FCC's 27th Annual Report just recently published for fiscal 1960 had this to say (p. 82) about amateurs:

"Public service is the keynote of amateur operation. A large part of disaster emergency and civil defense communications service is performed through the Radio Amateur Civil Emergency Service (RACES). In addition to peacetime operation, RACES will function during wartime, when other amateur activities must cease, so that amateur radio may continue to furnish essential public service communications."

We're proud of our participation in general preparedness for and accomplishments in this emergency communications field. FCC might have elected to speak of our self-training aspects, our traffic handling abilities, National Traffic System, or our advances in techniques. The developments exemplified by Project Oscar were indeed mentioned. But FCC in its report especially recognizes our traditional and consistent service to the nation in the RACES framework. Based on EC reports we have 35,000 AREC members; they are all urged by ARRL to sign up in RACES. A full one-third of our AREC RACES potential is mobile equipped. All classes of licensed amateurs are needed in the AREC and RACES. To share in the pride and emergency strength of amateur radio, all amateurs should contribute the little time it takes to be a part of this. Only about 7% of these AREC RACES amateurs are Novices, and 14% Technicians.

To Get Started in AREC or RACES. To get into these programs that provide operating zest and add to the prestige and effectiveness of amateur radio through organization is possible by contacting the nearest EC or Radio Officer; this may sometimes be the same person. Fill out one of the ARRL AREC registration forms (No. 7) and give it to your EC, SEC, or SCM (address p. 6, *QST*). See the Radio Amateur Civil Emergency Service rules in the *License Manual*. FCC issues RACES authorizations in accordance with certification by local or state governments concerning their approved civil defense communications plans. In connection with the upcoming ARRL Field Day we hope every EC will put on a drive to double AREC registrations, as well as complete an annual updating on existing AREC membership cards . . . and a distribution of an AREC decal to every active operator in the AREC. We would like to see the amateur enlistment in both AREC and RACES increase. The FCC report as noted commends our public service in RACES. There's a good feeling in being part of a hot and successful emergency net made up entirely of our own amateur facilities . . . and you'll enjoy the teamwork and fraternal side of amateur emergency work.

Got Your Field Day Forms? Each year more and more clubs go out on Field Day. Many clubs appoint a committee to start planning for the next FD at their very first club meeting *following* FD. It's that popular! Log forms for the ARRL Field Day, June 23–24, are now available. We suggest that you ask for yours by radio or mail well in advance.

Getting Ready for FD. Field Day rules, as usual, have been mailed out to all clubs in an affiliated club bulletin. The rules will be printed in June *QST*. The dates are June 23–24. Advance planning will help you get the most from *your* Field Day. There's time to build and test club or individual provisions for emergency power. On FD individuals may enter as well as clubs. Instead of taking big stations afield there's a trend to home-brew equipment suited for portable emergency power operation. The April CD Party and June VHF QSO Party are activities to provide an acid test for new FD gear.

Club plans can be worked out under the direction of a chairman. Club policy on determining which transmitter class to enter and choice of FD location is customarily ratified by the whole club. Organization can be by teams for different bands or modes. We suggest an extra setup for Novices if you have such a new group in your club. It's also as important for operator ability and procedure to be reviewed between now and Field Day as for a check on equipment. Effective communication in a real emergency depends largely on operator know-how.

A good starting point in the club might be to survey the entire membership to see how many can go out on Field Day. Year after year even the old timers report enjoyment. They say they still find new and valuable operating and equipment lessons. ARRL Emergency Coordinators ought to make this a time for talking up FD with their groups. A message from every group in the field sent by radio during the FD exercise rates 25 points credit. This will report the AREC strength on FD. Where there's no club, we suggest that ECs organize for Field Day as an AREC exercise in itself.

Ten Points About Net Operation. In *The Oregon Netter*, W7FTA records that the net's governing body wishes a speed-up in operating "by a more business-like approach to net activities, still maintaining a friendly type operation . . . . Only the phone net members can make

the net the smooth efficient operation all wish it to be." The bulletin proceeds to develop a list of points to keep before members. Since most of these are of practical application to all phone traffic nets, we reproduce the following with credit to the *Nutter*:

(1) Don't be *too eager* to relay. (Others may have heard. Give your call. Wait for recognition.)

(2) Don't relay unless you have complete information. (If you have low power and are not received better than average, hold that relay. Relaying the relay is a waste of net time.)

(3) During roll-call make your check-in brisk and brief, holding unnecessary remarks.

(4) If you miss check-in, wait for "channel open" or completion of roll-call.

(5) Refrain from using military type phonetics but save humorous phonetics for other than net sessions.

(6) To be a traffic station, aim for enough power to punch your signal through without relays under most conditions.

(7) Plan ahead; be ready to move should net control request a QSY; have a frequency picked.

(8) Conserve net time by taking full advantage of break-in operation.

(9) FCC issues W7 and K7 calls, not William sevens and kilowatt sevens.

(10) Good examples are contagious.

— *F. E. H.*

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

Apr. 5: CP Qualifying Run — W6OWP
Apr. 14-16: C D Party (c.w.)
Apr. 19: CP Qualifying Run — W1AW
Apr. 21-23: CD Party (phone)
May 4: CP Qualifying Run — W6OWP
May 18: CP Qualifying Run — W1AW
June 7: CP Qualifying Run — W6OWP
June 9-10: V.H.F. QSO Party
June 16: CP Qualifying Run — W1AW
June 23-24: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Mar. 31-Apr. 2: Delaware QSO Party, Delaware ARC (p. 82, last issue).

Apr. 7-8: Ohio QSO Party, Ohio Council of Amateur Radio Clubs (p. 104, this issue).

Apr. 7-8: Millennium SP Contest, (c.w.), PZK (p. 65, last issue).

Apr. 7-9: Massachusetts QSO Party, Northeastern University Radio Club (p. 114, this issue).

Apr. 14-15: Millennium SP Contest (phone), PZK (p. 65, last issue).

Apr. 14-15: The French Contest (phone), REF (p. 62, Feb. *QST*).

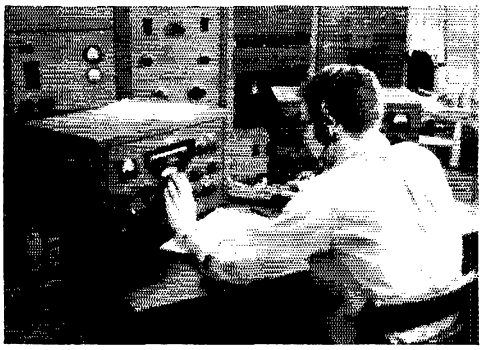
May 4-6: West Virginia QSO Party, State Radio Council (next issue).

May 5-6: International Telegraphic Contest, USSR Federation of Radio Sport (p. 25, this issue).

May 5-7: Connecticut QSO Party, Candlewood Amateur Radio Club (p. 112, this issue).

May 12-14: Georgia QSO Party, Columbus Amateur Radio Club (next issue).

June 1-4: CHC/HTH 1962 World-Wide QSO Party (next issue).



Bud, K2KIR, shows "How to Top the CD Party" (July 1958 *QST*, p. 68) with highest Eastern Mass. c.w. score and second highest January CD Party score nationally. Operation was from the M.I.T. Radio Society club station, W1MX, which sports a 75A3 and 310B on the desk with kilowatts for 40, 20, and 15 in the racks and 150 watts on 80-meters.

RESULTS, JANUARY CD PARTIES

The January CD Parties were photo finishes on both phone and c.w. Tennessee OBS, K4PUZ, has always been right up there with the leaders in recent CD Parties, but he really put forth a superlative c.w. effort this time to top W1MX's K2KIR by a whisker. 630 QSOs in 67 sections put K4PUZ at the top, while W1MX scored 644 contacts in 65 sections. K4AMC and W6BES also topped 200K with K4BAI at 188K rounding out the top five. VE7AAF really handed out that popular B.C. multiplier! Phone was just as close, as W4VRD, in his initial CD Party effort, piloted W9YT home just barely ahead of W1ECH at W1MHF in a battle of super-stations. K5MDX, W1NJL, and K2EIU followed in that order with the latter admitting that s.s.b. is crowding him out of the uppermost scores. All in all a good CD Party all around, although a lack of activity in some spots was beginning to be noticeable. Compared to the October CD Party, there were 30 c.w. scores of over 100,000 points claimed to 49 in October. On phone there were 28 over 5000 points in October compared to only 16 in January. Quite a drop, men! Let's all make the April CD Party and hope that conditions will take its usual springtime upswing.

The following are the high *claimed* scores. Figures show the score *claimed*, number of QSOs, and the number of different sections worked. Final and complete *official* standings will appear in the *April CD Bulletin*.

— *W1DGL*

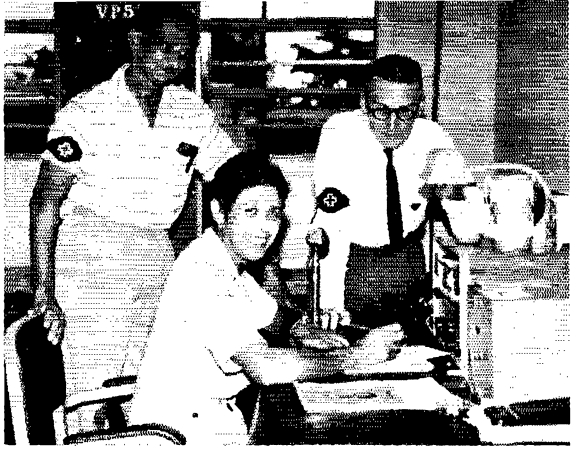
C.W.

K4PUZ	212,390-630-67
W1MX[1]	211,575-644-65
K4AMC	204,685-606-67
W6BES	202,290-606-66
K4BAI	188,100-563-66
K2EIU	174,720-540-64
W1MHF[2]	171,600-513-66
K4BVD	151,470-452-66
K2KTK	148,525-450-65
KØIDV	140,480-433-64
K8RMK	139,810-446-62
W9YT[3]	137,655-430-63
WØWYJ	135,005-396-67
K5OCX	134,200-434-61
W4MLE	126,945-397-63
VE7AAF	125,055-391-63
K4TEA	122,260-420-58
W9NYU	122,220-381-63
W2GKZ	119,700-373-63
W9LNQ	113,765-368-61
KØIVQ	108,300-355-60
W4LK	107,675-365-59
W4BZE	103,545-346-59
WA6ECF	103,005-321-63
WØETT	102,050-310-65
K1LPL	102,030-351-57
W6ISQ	101,100-330-60
K6BHM	100,345-322-61
W1AW[4]	100,170-311-63
WA6GFY[5]	141,920-431-64

PHONE

W9YT[6]	35,250-150-47
W1MHF[2]	35,190-146-46
K5MDX	33,975-151-45
W1NJL	23,680-122-37
K2EIU	19,305-111-33
K1MEM	11,900- 80-28
K8RMK	10,295- 64-29
W4BGP	8370- 62-27
K2QDT	7800- 60-26
W4FQQ	7290- 54-27
WØEEE[7]	6900- 46-30
W4LK	5400- 45-24
W1PYM	5300- 48-20
K1LPL	5250- 43-21
K4KWQ	5200- 40-26
W4KFC	5000- 43-20

[1] K2KIR, opr.; [2] W1ECH, opr.; [3] W9SZR, opr.; [4] W1WPR, opr.; [5] WA6HRS, W6CUF, K6BPB, oprs.; [6] W4VRD, opr.; [7] KØLGZ, opr.



VP5RA, station of the Jamaica Amateur Radio Club, located in the Red Cross Building in Jamaica, was active during Hurricane "Hattie" in October, 1961. Shown in the picture above (l. to r.) are VP5AK, the Director of Jamaica Red Cross, and VP5EM.

With the AREC

The boys in Florida, equipped with a working state AREC plan, are just sitting around waiting for emergencies to come along, so they can pounce on them. On Jan. 5 one did, a vicious tornado that struck Crestview, near the western end of the state, injuring many, causing millions of dollars worth of damage, and causing many communications outages. Western Fla. SEC W4MLE immediately activated Florida Nets B (3836 kc.) and D (3650 kc.) and the statewide alert was in progress. Meanwhile, SCM W4RKH, along with K4JSJ and W4UXW, all mobile, drove to Crestview, followed shortly by W4SYP. A ten-meter fixed station was set up at the Okaloosa County court house using emergency power, with the help of K4LOL and W4KPE, who also operated mobile on their way into the area. Contact was established with Eglin AFB, operated by *W4s* MMW MTD and ZGS, which in turn established contact on 10 and 2 with *W4s* AOK and BPJ operating home rigs on Net B, and with W4BVE and K4UBR on QFEN. Thus, traffic into and out of the Crestview area went through two Net B circuits and two Net A circuits.

At about 0500 the Gulf County C.D. van, manned by *K4s* HWA and RZF, arrived on the scene and checked into Net B and also set up on ten meters to tie in with the local net.

Operation continued in this manner until 2200Z Jan. 6, when Net B operation was discontinued from Crestview. Traffic to and from distant points was relayed via ten meters to Fort Walton stations. At 0100Z, Jan. 7, welfare traffic increase made it necessary to bring in a fixed and two mobiles on two meters. (W4SXI, W4ZGS/mobile and K4KXM/mobile), which were in operation by 0300Z. They were also able to establish direct contact with Eglin AFB. This operation continued until 0530Z, when all Crestview stations were closed down. At 1500Z, ten and two meter activity was resumed until 1900Z, when amateur communication was declared no longer needed.

Crestview amateurs *K4s* ADM and HXV assisted at c.d. headquarters, while *W4s* OCG and HYV operated from home on ten meters and QFEN, relaying outgoing welfare traffic. K4VWE and W4BEL assisted in Crestview as fixed station operators. Other operators consisted of *K4s* SKP CUC LFR, *W4s* UEJ KZX and WA4DXF. Traffic consisted mostly of welfare requests and replies, most emergency-type communications being handled by law enforcement agencies and Air Force units. Total operating time was 33 hours and about 100 messages were handled. Other stations reported active: *K4s* DHR SWG RZF PTP VLB QOJ VND NER LQQ RZM GVV AOK BDF CUC DHK FTJ ZWH PYD WAK UAT ZTT RDP VFY LJC VYX OOC AQZ UYC WHX DSO CYH RUQ, *W4s* HKK SGG WFB CCA POY ECM OVD FCW TJS EJN LJKVYX OOC AQZ UYC WHX DSO CYH RUQ, *WYs* HKK SGG WFB CCA POY ECM OVD FCW TJS EJN HFK ZGE GET MYA LGQ, WA4AGL K3JNO *K5s* WGY TLB *W5s* SUX BKQ IJQ K7EGM W8LQ W9DOK. — *W4MLE, SEC W. Florida.*

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Communications from W9MWQ/mobile on New Years Day may have saved some lives and almost certainly prevented some accidents in La Crosse, Wis. Almost involved in one himself because of slippery conditions on a hill, he notified K9EHL and W9EZD that sliding cars were all over the place. They promptly notified the highway patrol, which was the first they had heard of the condition, and help was dispatched. — *W9BGB.*

Amateurs were active in the Caribbean during "Hurricane Hattie" during the last three days in October. A network of Jamaican hams was set up, but the storm missed Jamaica and the Cayman Islands and smashed into British Honduras on Oct. 31. First contact with Honduras was established by XE3AF. Later, VP5RA at Jamaica Red Cross Headquarters, established contact with XE3AF, with the help of W4NPE and W5BKK. With XE1QE appointed warden of the 14-Mc. emergency frequency, first messages emanating from the disaster area were handled.

The following day, VP1AB moved his station into the police station in Belize, and contact was established with XE3AF and VP5RA. The first few hours were extremely difficult because of QRM. W4NPE managed to copy from XE3AF a message from the governor of British Honduras to the governor of Jamaica, and it was finally received at VP5RA. As the QRM on 14,160 kc. cleared, XE3AF and VP1AB contacted without too much trouble. XE1QE, who speaks both Spanish and English, helped immeasurably in keeping QRM away. VE3AML performed a similar service with respect to VE QRM. VP5RA, which operated on emergency power part of the time, was operated by *VP5s* EM DX VI and AK. — *VP5EM.*

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We have received quite a few EC annual reports, but much less than half the number we received last year. Have you sent us yours, OM? It has come to our attention that the three reporting cards were left out of some of the bulletin envelopes; somebody goofed. If this happened to you, just send in a post card with numerals 1 thru 28 marked on it and give us your responses to the numbered questions on the question sheet. Or, if you wish, we'll send you the cards, but by the time you read this it will be pretty late. Anyway, get us your EC annual report! We don't want to show a *decrease* from last year, do we?

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Amateurs in Chicago were active when an airplane crashed at 63rd and Claredon Hills Drive on Sept 1, 1961. Under the leadership of EC W9SPB and control stations K9IBZ and W9PVK, amateurs provided communications services for the Fire Department, Rescue Service, Sheriff's office and the Coroner's office. Also taking part were *K9s* SPY SUS SIK PLV GNX and W9YOW.

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On Jan. 13 at 1850, WA6LDD/3 was driving along route 602 near Laurel, Md., when he witnessed a severe auto accident. Being first on the scene, he positioned his car so as to be able to warn approaching cars; then he investigated injuries, returned to his own car, fired up the rig and gave a short emergency call. He was answered immediately by W3TBH, who promptly called the Laurel Rescue Squad and the Maryland State Police, both of whom arrived within five minutes, along with the Jessup Volunteer Fire Dept. The prompt action was made possible through the use of the Free State Amateur Radio Club's emergency frequency of 50.15 Mc. — *K3IYT.*

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During the early evening of Jan. 28, WA6LQX/mobile observed an auto accident in which one of the victims obviously needed medical attention. He contacted WA6BYR on six meters and assistance was immediately summoned, an ambulance and police arriving within five minutes. — *W6NAA, EC E. San Gabriel Valley Area, Calif.*

Members of the East Shore V.H.F. Club (Eastlake, Ohio) rendered material assistance in January when ice blocked the mouth of the Chagrin River, causing it to overflow its banks. Shown in the picture above are (seated, l. to r.) Mayor Johnson of Eastlake, K8AOE, W8UXJ, and (standing) Eastlake City Service Director, W8IOT, K8NPY, K8HYZ, W8DLG, W8WTJ, K8MSB, K8RFX and W8ASA.

The East Shore VHF Club of Eastlake, Ohio, performed a communications service on Jan. 26 when ice jammed the Chagrin River upstream, threatening the town as the river started backing up. K8AOE set up a portable station at city hall, and two mobiles, *K8s* RFX and HYZ were dispatched upstream. W8ASA, accompanied by W8SLZ, used a hand-carried unit to follow the dynamite crew as they blasted ice from trouble spots. K8LBK maintained liaison service from his home station and continued to alert members. By midnight, others on the scene included K8NPY/-mobile, K8MSB/mobile and portable, K8HIE/mobile, W8ANQ/mobile and W8IOT/mobile.

At approximately 0100, Jan. 27, the ice jam broke loose and released a 9-foot-above-normal wall of water and ice. Mobiles reported progress of the crest as it passed downstream, and the mayor gave orders to evacuate low areas in the path. Mobiles assisted in alerting some 200 people. Just before the crest arrived, a fire broke out in one of the evacuated houses; while firemen were fighting the flames the flood arrived and drowned the flames, the fire engine and almost the firemen.

Prompt action and good communications prevented what might have easily been a major disaster; as it was, no one was injured and damage was minimized. All operation was on the club frequency of 52,008 kc. The net was finally secured at 0300. — *K8AOE.*

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On Jan. 6 W4EFH received a call from YV1DH who stated that a local doctor had a patient who required a rare drug, available only in the United States. The chain reaction was set in motion, with W8SQP, W4SGB/1, K5LOY and K5AUN answering calls until finally K4ICA in Miami succeeded in locating the drug at a Miami hospital. Efforts to procure it in time for a plane departure for South America failed, and W4EFH spent many hours and much money making phone calls trying to find transportation for the drug, which was finally arranged through the U.S. Coast Guard. The next morning, K4EFH established contact with YV1IK who telephoned the doctor to ascertain that the drug had arrived and an additional dosage was needed. This was procured, again through the efforts of K4ICA, and sent to Venezuela the next morning.

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We have received mixed reactions from the field regarding the "Hurricane Carla" article in Feb. *QST*. Thanks to those who said nice things (both of you). To the rest — well, thanks for reading it, anyway. We now have some additions to make. K5YCP tells us that omitted from the list of participants were eight amateurs located at different schools in Houston, working with the Red Cross, some of them working 36 hours without sleep or relief. These amateurs certainly deserve to be included: *K5s* BTC REX YCP ZAH ZEG UMJ, W5IEZ.

K5WIM also reports that he and K5YDA were active in Lockhart, Texas, during Carla, working for civil defense on evacuation and housing problems.

W1LIG reports that last September K1QAL heard a marine mobile off Block Island (R.I.) calling for assistance. It appears this K1 was lost in a fog and had five other people aboard. K1QAL took a bearing, notified the Coast Guard and spent ten hours guiding the lost boat back to Bridgeport.

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We received *thirty* December SEC reports, representing 13,881 AREC members, considerably better than the 1960 December record in both respects. Four of our sections show better than a thousand AREC members, and several others will be topping the four-digit figure soon. According to December reports, those four, in order, are NYC-LI, Mich., Ind. and Ohio. Other sections submitting December reports: S.N.J., N. Dak., S. Dak., Iowa, Maine, E. Mass., Ore., Wash., Hawaii, Colo., Utah, Ala., E. Fla., Ga., Los A., N. Texas, S. Texas, Ont., Alberta, Nevada, Minn., Okla., West Va., E. Pa., Tenn., SCV. The report from Hawaii is the first one on the record

This makes a total of 337 SEC reports received in 1961 (353 in 1960) from SECs in 47 different sections (42 in 1960). This reverses the trend from the previous year, which was to more reports from fewer sections.

The following sections show a 100% reporting record for 1961 (number of consecutive years in parentheses): Eastern Fla. (10); New York City-Long Island (8); Santa Clara Valley (6); Southern Texas (3); Mich (3); Oregon (2); E. Mass. (2); S. Dak. (2); Eastern Pa. (2); Wash. (2); Indiana (2); Tenn.; Nevada; Iowa. These 14 sections and their SECs deserve congratulations for their fine reporting.

RACES News

The Office of Civil Defense has sent us a copy of its new "Planning Guide for Utilizing Existing Wire and Radio Communications Facilities for Emergency Communications Operations," designated as interim Part IX of the manual "Civil Defense Communications Facilities and Communications Center Procedures." It seems to be in the nature of an emergency communications manual for c.d. communications, and it contains paragraphs on RACES and USCDARA. Radio services are divided into four groups: (1) Those whose normal operation would be suspended so that facilities and personnel could be used for c.d. (2) Those whose normal operation would be curtailed, so that facilities could be partially used. (3) Users whose normal operation is essential. (4) Those which cannot readily be adapted to c.d. RACES falls into the first category, along with public safety services, industrial, land and business radio. RACES has about two full pages devoted to it, and mention is made therein of the AREC and its function.

OCD tells us that copies are available, and that a postcard to the Communications Operations Division, OCD, Battle Creek, Mich., would do it. Although this is by no means a RACES manual, it does show how RACES fits into the picture with all the other communications services to make a complete c.d. setup. RACES radio officers might do well to request a copy from OCD.

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On Oct. 18, Chicago RACES was activated to assist in an emergency identified only as the "Helen-Curtis Explosion." Radio Officer W9SPB reported to the fire commissioner at the scene of the explosion and relayed his orders from his mobile to K9s HGZ and HGY, who further relayed them to the Chicago C.D. — *W9SPB.*

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The Jefferson County (Ala.) RACES was called into session on Dec. 11 at 1756 CST when more than five inches of rain flooded the lower areas in and around Birmingham. Mobiles were dispatched to various locations to report conditions back to headquarters. This session ended at 2228 CST, but at 0010 they were called out again and advised a number of people were marooned by high water. W4s ORX WVS and HGN were activated at the scene and base stations K4DSO and W4DFE served as base stations. Mobiles were unable to get through until W4WVS's equipment was installed in a truck which was able to go through the high water. After some time, the stranded people were duly rescued. R.R. W4DFE says that neither of these alerts was made by telephone. Stations were monitoring the c.d. frequencies on 10, 6 and 2 meters.

CONTEST NOTES

December *QST* summarized the results and certificate winners of the September 1961 V.H.F. QSO Party. Since that time the winning of the Michigan section award has been reconsidered by the ARRL Contest and Awards Committee. The result of that review is that the entry of W8NOH is hereby announced as disqualified, and K8QMX/8 declared the certificate winner for the Michigan section.

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In view of further documentary information from FCC, the c.w. score of W4MCM, reported in October 1961 *QST* as disqualified from the 1961 ARRL DX Contest, is hereby ruled a valid entry. W4MCM's score is 168,336-167-336-C-73, thereby making him c.w. certificate winner for the Georgia section. The club score of the Southeastern DX Club is therefore amended to 429,910, with W4MCM winner of the club's c.w. certificate.

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 reasons of expiring memberships, individual signers uncertain or ignorant of their membership status etc.

The following nominating 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*
San Joaquin Valley	Apr. 10, 1962	Ralph Saroyan	Oct. 10, 1961
Manitoba	Apr. 10, 1962	M. S. Watson	Dec. 10, 1961
Maritime	Apr. 10, 1962	D. E. Weeks	Feb. 15, 1962
South Carolina	Apr. 10, 1962	Dr. J. O. Dunlap	Mar. 1, 1962
Alaska	Apr. 10, 1962	John P. Trent	Mar. 10, 1962
Quebec	Apr. 10, 1962	C. W. Skarstedt	June 10, 1962
Ontario	Apr. 10, 1962	Richard W. Roberts	June 15, 1962
Eastern Massachusetts	Apr. 10, 1962	Frank L. Baker, jr.	June 15, 1962
Western Pennsylvania	June 11, 1962	Anthony J. Mroczka	Aug. 7, 1962
Western New York	June 11, 1962	Charles T. Hansen	Aug. 10, 1962
Northern Texas	June 11, 1962	L. L. Harbin	Aug. 10, 1962
Vermont	June 11, 1962	Miss Harriet Proctor	Aug. 10, 1962
Santa Barbara	June 11, 1962	Robert A. Hemke	Aug. 10, 1962
North Dakota	June 11, 1962	Harold A. Wengel	Aug. 19, 1962
Wyoming	June 11, 1962	Lial D. Branson	Aug. 22, 1962
Montana	June 11, 1962	Ray Woods	Sept. 1, 1962

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.

East Bay	B. W. Southwell, W6OJW	Jan. 10, 1962
Eastern New York	George W. Tracy, W2EFU	Feb. 10, 1962
Ohio	Wilson E. Weckel, W8AL	Mar. 28, 1962
Arizona	Kenneth P. Cole, W7QZH	Apr. 15, 1962
Washington	Robert B. Thurston, W7PGY	Apr. 30, 1962

In the Northern New Jersey Section of the Hudson Division, Mr. Daniel H. Earley, WA2APY, and Mr. David B. Popkin, WA2CCF/WA2UZH, were nominated. Mr. Earley received 643 votes and Mr. Popkin received 347 votes. Mr. Earley's term of office began Feb. 19, 1962.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for January Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	256	1590	1379	202	3427
K6BPI	78	1038	912	118	2146
W0LGG	323	592	519	56	1490
K0ONK	60	566	522	20	1168
W9MM	2	598	567	0	1167
K4AKP	12	486	446	40	1014
K2UAF	323	317	235	6	871
W7BA	1	444	364	39	844
W8DAE	51	386	275	73	785
W3VR	54	376	329	15	774
W9JOZ	19	375	361	1	756
K4SJH	60	348	265	1	734
W0OHJ	4	356	338	18	716
W0ZWL	1	513	5	181	700
W3EMU	42	341	282	15	680
W0SCA	19	328	328	0	675
W6GYH	178	252	228	15	673
W1SMU	19	342	303	7	671
W3WRE	60	302	278	10	650
WA2GPT	25	297	208	82	612
W5CEZ	11	329	205	49	594
K6EPT	2	291	152	139	584
W7DZX	5	288	223	55	571
K6KCB	23	289	239	13	564
W9DYG	59	267	188	32	546
W9IDA	11	264	259	4	538
K2UCY	57	248	221	24	533
K2UBG	21	262	251	14	528
W0GGP	29	478	3	3	513
W4TUB	10	254	232	16	512
WA4BMC	168	235	80	21	504
Late Reports:					
W2OE (Dec.)	140	704	578	79	1501
W3IVS (Dec.)	12	707	627	80	1426
W1AWA (Dec.)	41	246	46	243	576

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6YDK	1784	267	203	54	2308
W2APF	1500	0	0	0	1500
W8HAV	11	123	129	305	868

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

K8JJC	240	WA2TQT	131	W0LST	103
K0LTJ	194	K8VRF	123	K8KSN	102
WA2RNF	177	K6QZ	118	W9FAW	101
W2EW	173	K0WWD	118	W9IT	101
W2GKZ	165	K4ILB	117		
W4FOR	164	K6EHS/1		Late Reports:	
W3RV	151	KR6AR	107	W3KUN (Dec.)	137
K4HOE	149	K0IKU	107	WA2CSE (Dec.)	133
W9RTH	148	K8KMQ	106	K3DCB (Dec.)	129
K4RNG	145	WA2CCF	105	K1MEM (Dec.)	108
W1TXL	138	K4AHU	105	W2RUF (Dec.)	106
W0ANI	133	W9NZZ	104	K7NHV (Dec.)	104

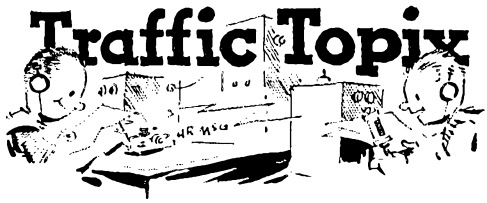
More-Than-One-Operator Stations

W1AW	140	W0YC	109

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W4CNZ, K4KGB, W4TUB, W9RTH, KL7DIR.

The BPL is open to all amateurs in the United States, Canada, 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.

Traffic Topix



The number of bulletins coming into the department these days is little short of astounding. Among these are a good share of traffic bulletins — so many that we scarcely have time to do any more than scan them before marking them for file. Our "Traffic Bulletin File" is bulging and beginning to take up so much space that we have to clean it out every year to make room for new bulletins.

There is nothing like a bulletin to weld a net into a fraternal unit, and in amateur radio fraternalism is important. We have been very much impressed with some of the bulletins we have been receiving in the mail, and with the amount of work, time and money which obviously went into their preparation. No, we're not going to mention any specifically or hold any up as examples; if we did that, someone would inevitably be omitted and consequently feel slighted. But to those net managers who are not now producing a bulletin or having one produced, a few hints might be in order.

Foremost, of course, is the matter of finances. Usually, the first issue comes out of the net manager's pocket, or money pitched into a hat by some of the more ardent (and affluent) net members. If the net manager cannot afford this and no one steps forward to help foot the initial bill, often a large business organization or government agency employing one of the net members can supply the wherewithal (maybe without knowing it!) to produce the first issue. Such facilities are pretty widespread, these days, and aren't as hard to come by as they used to be. Future issues can be financed by contributions by net members. Such a method is pretty marginal, as a rule, and sometimes the gang has to be stirred up by an appeal if the exchequer is to remain in a solvent condition. But mostly, if the bulletin is interesting the gang will be glad to contribute to its support.

And that brings up the next question: what should such a bulletin contain? If you have a net member who can serve as editor and who has a way with the pen, a big part of your problem is solved. However, most nets are not blessed with such talents, and getting material and writing it up in readable form are the worst kind of drudgery. A well-balanced bulletin should contain items that are both educational and entertaining. A good formula includes a little philosophical editorializing, a few statistics (take it easy on these!) and quite a bit of personalized matter, plus a joke or two or three, even if it has nothing to do with amateur radio. The bulletin need not (in fact, it *should* not) be long; the ideal length, on a monthly basis, is about two sheets, or four pages. It can make up for a lot of detail about net operating, functions, activities and personnel that has to be left out of the pages of *QST* as we grow ever larger. —*WINJM*

January Net Reports.

Net	*Sessions*	*Check-ins*	*Traffic*
7290	46	1562	527
East Coast Traffic	20	97	249
20 Meter Insterstate SSB	22	643	1001
Eastern Area Slow	31	105	27
Early Bird Trascon	30	—	184
Northeast Area Barnyard	—	1023	22
Northeast Ten	12	45	6
Fourth Region Day	31	43	179

National Traffic System. When conditions get bad and we decide to try to do something about it, trouble is that by the time we actually do something, that particular trouble no longer exists but another one has arisen. The long-skip conditions we have been plagued with this past winter have caused many of us to plan 160-meter rigs, and some of us have actually started operating up there. But now that the days are getting longer, the difficulty is less prevalent; instead, the annual QRN season is starting, and our 160-meter rigs aren't going to be much good in a month or two.

Traffic men are humans, and as such are prone to plan ahead only slightly beyond present conditions. We knew two or three years ago that the sunspot cycle was on the decline, and that we would shortly be faced with just these conditions, but most of us did nothing about it until the condition actually existed; *then* we started fleeing to 160. Now, as summer approaches and the QRN on 160 gets worse and the skip on 80 isn't so bad any more, we'll cease all work on our 160-meter rigs and antennas until fall, when old man skip starts knocking out our local nets again — as we know full well it will, probably worse than this winter.

Or will we be more foresighted this time? During the warm weather quiet, you guys in Florida and Southern Cal!) is an ideal time to get those 160-meter skywires put up and fool around with the loading. We don't think it is very practical to change most of our local nets to 160 — at least not with the amount of space we have there now — but it makes an ideal QNY band for stations that are skipping over each other on 80, and therefore your 160-meter rig should either be separate from the 80 rig, or part of a quick-band-switching arrangement. How about some of you traffic men whomping up an article on building a rig for 160 out of junkbox parts? We might be able to sell such a gem to our technical editors for a summer edition looking forward to stinko conditions this fall and winter.

January reports.

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation*
EAN	31	993	.611	32.0	98.4
CAN	31	959	.620	30.9	100.0
PAN	31	775	.483	25.0	97.8
1RN	58	432	.328	7.5	57.1
2RN	60	376	.296	6.3	94.5
3RN	31	343	.401	11.1	100.0[1]
4RN	62	568	.319	9.1	95.0
RN5	61	638	.308	10.4	74.7
RN6	43	369	.262	8.6	88.5
RN7	51	199	.124	3.9	44.2
8RN	78	295	.180	3.8	71.7
9RN	38	691	.535	18.2	76.3
TEN	77	560	.266	7.2	64.4
ECN	22	62	.119	2.8	87.8[1]
TWN	36	296	.335	8.2	78.3[1]
Sections[2]	1184	5570		4.7	
TCC Eastern	124[3]	683			
TCC Central	93[3]	616			
TCC Pacific	118[3]	528			
Summary	1894	14853	CAN	6.9	CAN/3RN
Record	1974	25982	1.039	12.5	100.0

[1] Region net representation based on one session per night. Others are based on two or more sessions per night.

[2] Section nets reporting: NJN (N.J.); BUN (Utah); MDD, MDDS (Md.-Del.-D.C.); ILN (Ill.); NCN, SCN, SCVN (Calif.); GSN (Ga.); Wolverine & QMN (2 nets) (Mich.); QKS (Kans.); POI & RICE (Hawaii); NEB (Nebr.); SCN (S.C.); AENB, AENM, AEND, AENP, AENP Morn, AENO, AENT (Ala.); WIN & WSSN (Wis.); GBN (Ont.); Texas CW; OQN (Ont.-Que.); MJN, MSN, MSPN Morn, MSPN (Minn.); Tenn. CW; RISPN (R.I.); CN & CPN (Conn.); VSN, VN, VSB (Va.); WSN (Wash.).

[3] TCC functions reported, not counted as net sessions.

W9DYG brings news of some old timers who used to be the backbone of CAN — W9LCX, who is enjoying life and taking it easy; W9DO, who reports health improved and spends much time DXing; and W9KQB who continues to recover from a heart attack but must take things easy. W6WHE/7 reports for PAN manager WA6ROF; WØBES has been awarded a PAN certificate. W3UE reports that 3RN has discontinued its late sessions temporarily, until the skip changes. W4SHJ notes that 4RN now has direct representation from West Indies (KP4BDS), believed first time in 4RN history. RN5 Manager W5GY muses on moving to 160, thinks it would cause even more problems; still no representation from Miss. RN6 Manager K6KCB writes a nice letter with his report, commenting on the month's doings. W7DZX is doing his interim RN7 managership job with zest and says that with a little support from the sections it would be a going thing. Ohio is the backbone of support for 8RN, but according to W8DAE Michigan could do a lot more. A 9RN certificate has been issued to K9OCU.

Transcontinental Corps. Russ, WØBDR, is taking a little vacation from traffic work; meanwhile, K4AKP takes over TCC-Central. K6DYX has taken over TCC-Pacific temporarily from W7DZX, who has taken the vacancy on RN7 until a new RN7 manager can be found. TCC struggles

along with the rest of the system, and not much more successfully because although skip has been long, it has also been most erratic.

January reports.

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	124	80.6	1228	683
Central	93	92.5	1232	616
Pacific	118	86.3	1045	528
Summary	335	85.9	3505	1827

DXCC NOTES

Attention is called to the new DXCC Honor Roll system starting in *QST* this month.

It has been the contention, by some, that the deleted countries are a factor in attaining an Honor Roll position. Inasmuch as the number of deleted countries has reached a point where it is not only conceivable but in some cases it could be an actual factor in a participant's possible attainment of an Honor Roll position, recognition of this is made. Henceforth, Honor Roll positions will be based on a person's DXCC total less those credits given for deleted countries. As will be noted, both totals are shown. Endorsement stickers will still be issued on the basis of over-all totals.

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Announcement is hereby made of the deletion to the ARRL Countries List of two listings. Effective as of January 1, 1962, the listings of *Damao*, *Diu*, and *Goa* are deleted. Only confirmations for contacts made with these listings prior to January 1, 1962 will be creditable toward these listings.

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date of receipt. All totals shown represent submissions received as of the end of the last day of the month of January, 1962.

PY2CK....306/318	W1GKK....304/317	W7GUV....301/313	W8KIA....299/311	W5MMK...298/309
KV4AA....305/318	W6GUQ....304/317	W6AM....301/314	W7PHO....299/309	W2LPE....298/310
W3JNN....305/317	W9RBI....303/316	W8BKP....301/312	W6EBG....299/312	W8JBI....298/308
W2AGW....305/317	W5ADZ....302/313	W9NDA....300/313	W9HUZ....299/310	W7GBW....297/307
W4DQH....305/317	W8DMD....302/313	W1ME....300/312	LU6DJX....298/310	W9LNM....297/310
W8BRA....305/317	W3KT....302/314	GE3AG....300/312	W5ASG....298/310	W1JYH....297/309
W2HUQ....305/317	W8BF....302/313	W2BXA....300/312	W8KML....298/309	G2PL....297/309
W3GHD....305/317	W9YFV....302/314	W2HMJ....300/311	W1CLX....298/309	W6GPB....297/308
W8JIN....304/317	W8UAS....302/313	WØOVZ....300/310	G4CP....298/310	CX2CO....297/309
		4X4DK....299/309		

Radiotelephone

PY2CK....306/318	W9RBI....300/311	VQ4ERR...298/310	W8PQQ....297/307	W6YY....295/306
W8GZ....303/314	W3JNN....298/309	W7PHO....298/307	CX2CO....296/308	W6AM....290/302
W8BF....301/312	W4DQH....298/308	4X4DK....297/307	W8KML....295/306	W2BXA....287/298

From January 1, to February 1, 1962, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

New Members

K6EIV....247	W2AQT....117	W8CIQ....110	W4IKL....106	WA2IKL...101	W4QVJ....100
W8RQ....208	K6OF....115	W1PLA....109	W7JEN....105	K5LNN....101	W6YZD....100
W6PAL....166	VE3VU....115	W4SHW....109	W1BQL....104	K7ADL....101	K8HEJ....100
OK1LY....150	Z85RM....115	W8LWU....109	JA6ZD....104	K9UIT....101	WØFEY....100
W6SFO....147	DL4ZX....113	G2HMG....109	WØOIZ....103	VE8RX....101	WØOVQ....100
TI2WA....135	W1ERR....112	OK2XA....109	K1KPS....102	K1IMD....100	G3JEA....100
Z83E....135	E12V....112	K3DMO....108	OA4AI....102	K2PTU....100	HB9JG....100
VU2JG....131	K6QIW....110	DL7AU....108	W2DFV....101	W3WBH....100	SP6AAT....100
W7BPS....127					5U7AC....100

Radiotelephone

W4CBQ....183	W7BPS....118	VE3VU....112	JA2KX....105	MP4BDC...101	W8CIQ....100
EA8AH....130	W8BDP....117	DL4ZX....111	WA6MAZ...102	OZ5KD....101	DL4ZW....100
G3NMR....122	W2LMJ....116	W6PAL....106	W2GDS....101	XE1HHT....101	YN1TAT...100
Z83E....122	W4SSU....113	W7CMO....105	W6TGB....101	WA2SFP....100	

Endorsements

W9GIL....292	W1OGU....227	KL7MF....190	CN8DJ....170	SVØWI....149	DL4ME....122
W2FXN....290	W2RA....221	K8DYX....190	ZS6IW....170	VE3LZ....147	W1CPJ....121
W3KDP....282	W4NNH....221	W9WHY....190	K8OHG....169	K4HMX....145	K2SQM....121
W3RNQ....280	VE2YA....215	W8QW1....186	W3JW....164	W4LZW....143	SM5AIO....121
VK4FJ....274	K4TML....213	ZS6ATA....186	HZQ....162	W1FJJ....142	W1WF....120
W5LGG....272	OE3WB....212	K4JEY....184	W2HDW....160	WØNGM....142	W1WSN....120
W4DHZ....268	W7CSW....210	SP4JF....184	DJ2MN....160	W6TMX....140	WA2AEI....120
W5BRR....262	W9BEK....210	W4HUE....183	WØVFE....155	W7YAQ....140	K2CMN....120
DL7AB....261	W6OF....205	WA2CCC....181	K8VDV....153	WA2ELS....139	K4SCI....120
W2FZY....260	K1MLI....202	K2DBN....181	W9YT....152	VP3PN....137	W8QNW....120
G6XL....260	W5EJT....202	VE3ADV....181	ZS5KU....152	K6CQF....134	K9ORC....120
W6UQQ....251	K2HIY....200	K2TQC....180	W2MES....151	W4EEU....133	F9XL....120
DL1IN....243	W4SSU....200	ZL4CK....180	W7MCK....151	W4OEP....132	KL4WX....115
W2TE....241	W7UMJ....200	W6GRX....179	W8GMK....151	K9PNV....131	W8RMF/5....115
W8UMR....240	W6MUF....195	W9AZP....179	WA2CBB....150	EP1AD....131	KA2NY....113
W6JR....240	K8ONV....192	W2IQH....170	K3DCP....150	WA6FGY....130	G2VV....112
W4LRN....239	W6FLT....191	K4CIA....170	K5UXP....150	W8CUT....130	KP4APY....111
K4YCW....232	WA2DIG....190	W4TK....170	W7STC....150	VE7BW....130	W2CUE....110
W1ORV....231	K2JFV....190	W6ZMW....170	VE4OX....150	DL4BS....130	K2UJQ....110
W2ZKQ....229	K2YXY....190			W4OEP....123	W8GKB....110

Radiotelephone

W7HIA....280	K1IXG....202	HPDN....151	K1BDP....141	W9WIO....131	W4EEU....116
W2FXN....252	W2GBC....190	K2TAP....150	W3YZI....140	K8ONV....126	K8DYX....116
W7ADS....241	W6YMV....185	W4UWC....150	K4HMX....139	PA0TV....121	W1VRK....115
VK4FJ....225	K2FW....182	VE5GF....150	VK4RQ....139	W4CWO....120	K4QWM....113
Z86FN....216	K2JFV....181	W8IJZ....142	K1IDW....135	W9GAI....120	W8GA....111
W1ORV....210	K9LUI....180				K8NZD....111

NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

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.

SUGGESTED RTTY OPERATING FREQUENCIES

3620, 7040, 14,090, 21,090 kc.

GMT CONVERSION

To convert to local times subtract the following hours: ADST −3, AST −4, EDST −4, EST −5, CDST −5, CST −6, MDST −6, MST −7, PDST −7, PST −8, Honolulu −10, Central Alaska −10.

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 April 19 at 0230 GMT. Identical tests will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,700, and 145,800 kc. The next qualifying run from W6OWP only will be transmitted April 5 at 0500 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION:* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT April 19 becomes 2130 EST April 18.

Any person can 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.

W1AW conducts code practice daily at 0230 GMT on all frequencies listed above with speeds of 15, 20, 25, 30, and 35 w.p.m. on Tuesday, Thursday, and Saturday, and at 5, 7½, 10, and 13 w.p.m. on other days. Approximately 10 minutes' practice is given at each speed. To check your copy, the texts used on several transmissions are listed below. The order of words in each line of *QST* text is sometimes reversed. To improve your fist, try to send in step with W1AW.

Date — Subject of Practice Text from Feb. *QST*

Mar. 3: *The Oscar Satellite*, p. 21
Mar. 7: *An Easy-To-Build V.F.O.*, p. 25
Mar. 9: *Communications for Project Oscar*, p. 19
Mar. 13: *An All-Transistor . . . Receiver*, p. 29
Mar. 18: *Zero-Bias Sweep-Tube Modulators*, p. 34
Mar. 24: *Building an Antenna Coupler*, p. 39
Mar. 27: *The Beetle Box*, p. 44

W1AW SCHEDULES

(Effective thru April 28)

Operating-Visiting Hours

Monday through Friday: 3 P.M.-3 A.M. EST.
Saturday: 7 P.M.-2.30 A.M. EST.
Sunday: 3 P.M.-10.30 P.M. EST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request. The station will be closed April 22, Good Friday.

Operating Frequencies

C.w.: 1820, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800 kc.
Voice: 1820, 3945, 7255, 14,280 (s.s.b.), 21,330, 29,000, 50,700, 145,800 kc.

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes. Amateurs are respectfully requested to refrain from transmitting on the above frequencies during W1AW bulletins and code practice.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in Greenwich Mean Time.

C.w.: Monday through Saturday, 0100; Tuesday through Sunday, 0500.
Voice: Monday through Saturday, 0200; Tuesday through Sunday, 0430.

Caution. Note that in the U. S. and Canada, because times are GMT, bulletin hours actually fall on the evening of the previous day.

W1AW CONTACT SCHEDULE

Would you like to work W1AW? W1AW welcomes calls from *any* amateur station in accordance with the following schedule:

GMT	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0030–0100	.....	.....	7255	.....	7080	.....	7255
0120–0200 [1]	.....	.....	7080	3555	7080 [2]	3555 [2]	7080
0210–0230 [1]	.....	.....	3945	50.7 Mc.	145.8 Mc.	3945	3945
0330–0430	.....	.....	3555	3945	7080	1820	3555
0440–0500 [1]	.....	.....	3945	14,280	3945	14,280	3945
0520–0600 [1]	.....	.....	3555 [2]	7255	3555	7080 [2]	3945
0600–0700	.....	.....	14,280	14,100	3555	14,100	.....
0700–0800	.....	.....	7255	3945	7080	3945	7255
2000–2100	.....	.....	14,280	21/28 Mc. [3]	14,100	.....	.....
2100–2200	.....	14,280	21/28 Mc. [3]	14,100	21/28 Mc. [3]	21,330	.....
2200–2300	.....	14,100	14,280	21,075 [2]	14,280	14,100	.....

[1] General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins at 0200 and 0430 on phone and at 0100 and 0500 on c.w. Starting time is approximate.
[2] W1AW will first listen for Novices before checking the rest of the band for other contacts.
[3] Operation will be conducted on either 21,075, 21,330, 28,080 or 29,000 kc.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: DUI, RM; EML, PAM; IVS, V.H.F. PAM; SAO. Please note the addition of SAO, as V.H.F. PAM to assist in OES appointments. Other appointments include K3NBU as ORS, K3NLW as OPS and K3MLI as OES. The traffic-guessing contest announced last October was won by K3MVO and UIU. The teachings of BUR ended with KN3ROL and ROM added as Novice operators. CUL, VR and IVS are working duplex on 6 and 2 meters to clear the traffic load. New Gear Dept: AHZ a Heath Tower, K3CNN a Hornet V-75 vertical antenna, K3NLW a TA-33 triband beam, RV an RME-6900 receiver and K3IMP a Heath Warrior KW Linear. Awards Dept. K3JHT got RCC, K3JLW the W-DEL, K3ETS has started a code and theory class in the Mifflinville Area. JKX, NNL and KLT are plotting, plundering and producing more gear for the coming Field Day. OLV has been successful with amateur TV on 434.6 Mc. K3RPH has his mobile back in shape again *but can't find time to use it.* K3MDG is looking for 6- and 2-meter outlets in Montgomery County for traffic outlets. ELI investigated the 20- and 40-meter bands on his receiver and is now working DX. After some serious "manhaggling" EU was made the proud owner of a new surplus receiver. His other gear was destroyed in a shack fire a few weeks ago. New club officers: Susquehana Valley ARC—K3ACH, pres.; K3MQE, vice-pres.; K3KBB, secy. West Philadelphia Radio Assn.—K3HWX, pres.; DJW, vice-pres.; VDN, secy.; K3QDT, treas. 807 Society—K3IPA, pres.; K3KKU, vice-pres.; K3OJK, secy.; K3NBU, treas. Reading RC —EYN, pres.; WJC, vice-pres.; UQC, secy.; CDS, treas. K3MRE *was hit with a stroke of bad luck; his* rectifiers blew then his v.f.o. broke and to top it the wind blew down his antennas. We would eliminate K3 from calls to save space but understand the national policy will require identifying all prefixes soon, now FCC has WA-, WV-, etc. Traffic: (Jan.) W3CUL 3427, VR 774, EML 680, K3IMP 430, W3RV 196, UIU 116, W4DVT 115, W3JKX 103, K3HTZ 73, W3MJM 66, ZRQ 58, K3JSX 57, BHU 45, KTC 38, W3FEY 35, K3NLW 28, LKQ 25, CAH 23, W3ITI 20, K3JHT 15, NBU 14, W3-HNK 13, K3MVO 12, RFH 12, DCB 10, W3NNL 9, OY 8, BUR 7, ADE 6, K3MDG 5, BFF 4, W3IWO 4, K3-ANU 2, W3DUI 2, EEN 2, ELI 2, K3JLW 2, W3ID 1. (Dec.) W3IVS 1426, K3DCB 215.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—Asst. SCM Delaware: M. H. Nelson, jr., K3GKF. SEC: W3CVE. The MDD Traffic Net meets on 3650 kc. at 0015Z daily; MDDS (slow) Net, 3650 kc, 0130Z daily; MEPN, 3820 kc, 2300Z M-W-F, and 1800Z Sat.-Sun.; Del. Emg. Net, 3905 kc, 2330Z Sat., BKE soon will have a new Valiant transmitter on the air. BUD reports the following new officers of the SMARA: 4TYH, pres.; K9BFJ, vice-pres. BUD guards 29.640 kc. for any calls. K3BYJ is more active with the new power supplies completed. CDG has a new 160-meter Windom antenna working but is unable to find many Md. stations on that band. CDQ says the radio room is too cold to do much operating. K3CXX is busy at Hopkins U. DRD is busy reconditioning his equipment. ECP has received a 45-w.p.m. certificate; the High Speed Test was conducted by the Connecticut Wireless Assn. K3EWK likes his new triband and beam and is now working some DX. 4EXM/3 claims his share of DX using the S/Line of equipment. FRZ has moved to Gaithersburg, Md. K3GKF keeps busy visiting the Delaware radio clubs and keeping his OBS skeds along with working 117 countries on 7 Mc. GQF worked several new countries on 160 meters, and has worked 35 states on that band. K3HPG has a new TA-33 jr. beam and is now working DX. HQE is putting 50-ft shafts on his antennas so that he may work on the rotators at the 20-ft. level up from ground. HWE is now living in Silver Spring, Md. JDG is the new EC for Hartford County. JFR checks into MEPN-DEM-PFN Nets. K3-JYZ sent out the MDD Net bulletin to all ORSs. Andy is RM for the section. Check into that net and see how smoothly the traffic moves under his direction. K3LFD is NC on the MDD and is going to make some improvements to the station equipment. K3LLR is looking for 50.7-Mc. c.w. and m.c.w. contacts. LQY says that EBF is the new NCM for MEPN. Ex-30QFH, from Delaware, is now WA4EHD at Rocky Mount, N.C. MCG is working DX and will be on 160 meters. K3NKX had a good time in the CD Party. NO, an old-timer, is back on c.w.; he also is program director for the BARC. K3OCE is the new Asst. EC for Kent County. OHI has much better reception with a new antenna coupler. PMQ *is getting the AREC going in Western Md.* TMZ is working 3.5-Mc. DX. UE is holding down two jobs and cannot be on the air as usual but sends in a fine traffic report. YZI reports not much DX. ZAQ send in a good OO report. ZNW will be operating on 160 meters soon. The following are new amateurs in the Dover, Del. Area: K3NVV, K3OCC, K3OCE, K3OCF, K3OCI and K3OPF. Traffic: (Jan.) K3JYZ 144, LFD 125, W3TN 101, IVC 90, UE 82, MCG 74, K3WBJ 44, W3BKE 42, K3-EWK 33, W3ZNW 32, K3NCM 24, W3ECP 20, EKO 19, JFR 16, LQY 14, GQF 10, K3MZY 8, W3BUD 6, K3-HPG 6, MDL 6, AMC 4, AXW 4, W3CDG 4, K3CXX 2, LLR 2, W3OHI 2. (Dec.) W3LDD 164, GQF 161, GZK 67, UE 46, K3LGJ 16, KPZ 11, EBB 4, HPG 2.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. RMs: W2HDW, WA2-VAT, W2ZI, WA2KWB, Yardville, is working DX on 160 meters and is active on the NJP Net. W2JQU, ex-KL7-DJR, is now located at Fort Dix. Also at Ft. Dix are K1ODK, K2DDM, WA2VGB, WA2WBM, W4IPO, W7-GNX and KP4FF. The N.J. Phone Net totals for Jan. are: Sessions 31, QNI 538, traffic 106. W2ZI advises there will not be an OT Nite Round-Up this year. W2BEI, Audubon, has added the 100th county to his DX list. WA2OAA is a new Tech. in Barrington. The NJN Traffic Net had a traffic total of 471 for Dec. and 257 for Jan. The net's mgr., WA2GQZ, issues a monthly bulletin loaded with information. WA2GSO succeeds K2HOD as editor of SJRA's *Harmonics.* The club's chairmen for coming events are: DX Contests, K2HBY; May QSO Party, WA2EMB; Field Day, WA2HSP and WA2ONB; *Hamfest,* WA2KRX, Delaware Twp. High School RC, W2MBC, boasts of 78 licensed members and 50 more in training class. K2PQD and W2KE have gone s.s.b. W2-KE celebrated his 43rd year on the air in Jan. K2ECY, ex-EC of Burlington County, now in KX6-Land, works the home area regularly with a kw. s.s.b. rig. W2ZVW/2, ex-SCM, of N.N.J. is now located in Beverly. Look for the 144-Mc. Net Mon. nights and also 3620 Wed. night. K2ARY, Carneys Point, our SEC, will consider applications for EC in Mercer, Cumberland and Cape May Counties. WA2EIY, SJRA's Sun. 10 A.M. on 29 Mc. NCS, reports the following regular QNIs: K2HDX, K2MKD, K2HBY, K2PFZ, W2RUI. Traffic: (Jan.) WA2VAT 252, W2RG 129, W2ZVW/2 47, WA2KWB 24, K2CPR 15, K2-RXB 13, WA2JQU 11, WA2ARJ 3. (Dec.) WA2KAP 12.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE. RMs: W2RUF, W2EZB, W2-FEB. PAM: W2PYI. NYS C.W. meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 1800, NYS C.D. on 3610.5 and 3993 kc. at 0900 Sun., TCPN 2nd call area on 3970 kc. at 1900, IPN on 3980 kc. at 1600, 2RN on 3690 kc. at 0045 GMT and 2345 GMT. Please note change in frequency for the NYS C.W. Net, which had to move because of RTTY QRM. Endorsements: WA2GCH, Clinton County EC. Congratulations to W2RUF on December BPL. New Officers of the Erie County Net are K2EQB, mgr.; W2CUU, asst. mgr.; K2AUW, secy.-treas. The Chautauqua Lake Amateur Radio Assn. (CLARA) recently was organized in Mayville with WA2ISB, pres.; WA2GHN, vice-pres.; K2-OQO, secy.-treas. New officers of the OTSEGO ARC are K2KKH, pres.; W2QHM, vice-pres.; WA2ILE, treas.; W2SHZ, secy. The club is planning an exhibit for the sportsman show. The Utica ARC elected W2RQD, pres.; W2IXR, vice-pres.; WA2ANU, secy.; W2IPO, treas. W2HQX has been issued a new call, K2IQ, in recognition of 50 years in ham radio. The Walton Radio Assn. elected W2TFL, pres.; K2QPZ, vice-pres.; K2-STS, secy.; W2OSL, treas.; W2THO, act. mgr.; W2-

(Continued on page 98)

Station Activities

(Continued from page 87)

WQU, trustee. The Auburn ARA is one of many clubs actively working on the license plate bill, reports W2QHQ. W2SB reports a joint meeting was held by the Chautauqua ARC, Evans Radio Society and the Westfield Radio Society. WA2WEE is back on the air after a 25-year layoff. The Fulmont ARC Membership Contest resulted in 22 new members and the club now totals 92, reports K2PBU. WA2RSP is a new General. W2TCU reports that the Auburn ARA has a club station set up with the call WA2QBL located in Cayuga Museum. WV2YPV thanks W2TAC tor his help in securing his ticket. When was the last time you gave a SWL a hand? WA2FKK reports the Ogdensburg ARC has 12 students in its code and theory class. WA2FJN, WA2FDJ, K2RUK and WA2FUE are instructors. WA2LKW has a TA-33 beam and 37-ft. homebrew tower. See *QST* Hamfest Calendar Traffic: (Jan.) W2OE 475, W2EZB 385, W2FEB 231, WA2OPG 187, K2RTQ 96. W2RUF 73. W2MTA/2 70, WA2KZQ 66, K2QDT 49, WA2IXY 40, K2BBJ 38, K1BVI/2 38, WA2HSB 34, W2QQK 31, WA2HEC 30, W2ZRC 22, W2RQF 21, WA2ANE 20, K2OFU 19, W2PVI 18, W2FCG 13, K2RYH 12, W2AFE 10, K2HOH 10, K2OQO 9, WA2WEE 8, K2EE 7, WA2GLA 7, K2PBU 7, K2DNN 4, WA2GCH 4, K2TDG 3. (Dec.) W2OE 1501, W2RUF 315.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: WRE. RMs, KUN, NUG. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets at 2300 GMT on 3585 kc. Mon. through Fri. SMV and K3KMO are operating on 160 meters and seriously thinking of organizing a 160-meter traffic net. The Clearfield county ARC's officers are KQR, pres.; ZRB, vice-pres.; K2MHC, secy.-treas. MGP has CHC Award No. 440. K3GQA won the POOS contest on 6 meters. The Western Penna. Mobileers issues a nice quarterly bulletin, *The Whip*. Meetings are held the 2nd Mon. at the Westinghouse Research Building. The South Community Y.M.C.A. ARC (K3HUO) elected K3JEB, pres.; K3IWC, act. mgr.; K3PJY, secy.-treas. SMV received his A-1 Award. The Dividing Ridge V.H.F. Net serves to link net facilities on the eastern side of the Alleghenies with net facilities on the western side on 6 meters with 1OB and K3JCZ as net controls. Coke Center RC reports: NCE has a new Drake 2B; KN3PPW put together a DX-60. WRE received her TCC certificate. ZZO is on 6 meters with s.s.b. K3AKR has a rig on 220 Mc. The Cumberland Valley ARC (K3GFW) participated in the recent V.H.F. Contest with good results. It is with deep regret we record the passing of KFW, of Lewistown. A new General is K3OFN. The Bedford County ARC reports via *Shorts* that new officers are K3OBI, pres.; K3MYC, vice-pres.; K3MIU, secy.; K3ESX, asst. secy.; KN3QIX, treas. Up Erie way: K3KZZ is working on 6 and 2 meters; BPB is attending Case Inst.; KPU has a new HQ-110; K3DDX is attending Western Reserve. The Steel City ARC reports through *Killowatt Harmonics*: KPI received an Apache and Warrior Linear; the club station participated in the recent V.H.F. Contest; W3s NKM, OKU and ZDW are going on 160 meters. The Etna RC reports via *Oscillator*: LKZ is operating mobile with an HE-50; SIR is getting on 2 meters; LHO celebrated his eighty-first birthday recently. The Mercer County Radio Assn. elected CSA, pres.; KWL, vice-pres.; KN3OZZ, secy.; JRV, treas. The Nittany and Huntingdon AR Clubs report via *Beacon*: K3LVO has a new HT-42; KN3PGL is filling K3CQU's job as editor of the paper; KN3s PPM and PPO have Knight R-100s; NEM is looking forward to his BPL medallion. The Penna. C.D. Net meets every Sun. on 3538.5 kc. at 1400 GMT. Traffic: (Jan.) W3WRE 650, KUN 150, NEM 140, SMV 45, LSS 42, UHN 40, K3DKE 27, GQA 24, HID 20, KMO 19, W3KNQ 12, K3EDO 9, W3IDO 6, K3COT 4, W3RTV 3, K3HTJ 2, W3NUG 2. (Dec.) W3KUN 343, K3GQA 23, HTJ 4.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9PSP. RM: W9USR. PAM: W9RYU. EC of Cook County: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. From all the reports received it is apparent that this section was very active in tracking the 2-meter transmitter project Oscar. New calls heard on 6 meters are K9HRL and K9UYK. K9RAS and KN9CQS are the officers of the newly-organized Radio club of the Luther High School of the City of Chicago. K9YTY is DXing with his new Johnson Valiant. K9AQW is a new General. W9FVL is now s.s.b. with an SB-10/DX-100. W9BMG has a new DX-100 and K9AQW is sporting an Apache. The Sangamon Valley Radio Club (Springfield) graduated 17 Novices from its latest code and theory class. K9VGM finally is on 2 meters after several years s.s.b.ing. The Crawford County Amateur Radio Club is the newest addition to the Illinois club roster and its meetings are held in Robinson, Ill., according to K9CGG, its chairman. The 220-Mc. gang in the Chicago Area is increasing in its membership and plenty of new FB signals are being heard on this band. Traffic net totals for the month include: The North Central Phone Net with a score of 272, the ILN with 213 messages in 22 sessions and the Chicago Area Emergency Net with a traffic count of 140. W9SKN, K9RMW, K9SKX, K9SLT, K9OZF, K9WVX, W9BOQ, K9QXD, K9ICX, K9WLP, W9DBJ and K9ATK were recipients of certificates of merit by the Will County Emergency Net. K9IUA will move his QTH to Denver soon. W9OAR is recovering after a very critical operation. W9EBM received his WAC certificate. Our deepest sympathy to the family and friends of K9WGB, who passed away unexpectedly Jan. 29 at his home. K9LPQ recently was elected president of the Danville Auto Dealers. New Novice calls heard were WN9BJD, WN9BJF and WN9BJX. K9QPJ is assisting W9RDX in organizing radio station K9VSB at the Chicago Naval Armory. New appointments made were K9BDJ and K9WED as OESs; K9ZPZ and K9KRW as OOs. K9BZL is building an 811 linear. Fellows, many appointments are expiring at this time. This is especially true of most of the EC appointees. Please check the dates on your certificate and send them in for renewals. BPL certificate recipients this month are W9IDA and W9FAW. Traffic: (Jan.) W9IDA 538, W9USR 347, K9UOV 251, K9BTE 229, W9JXV 210, W9FAW 207, W9AKV 102, W9IMN 101, K9LXG 60, K9OAD 57, W9MAK 51, K9CRT 42, K9ZQT 22, K9SCP 16, K9RAS 13, W9PRN 10, K9VQA 4, W9SKR 2, W9SXL 2. (Dec.) W9JXV 194, K9JLP 128, K9ZQT 22, K9SCP 6, K9QPA 1.

INDIANA—SCM, Donald L. Holt, W9FWH—Asst. Clifford M. Singer, W9SWD. SEC: W9SNQ. PAMs: W9MM, K9KTL, K9GLL. RMs: W9VAY, W9TT and K9OET. Net skeds: IFN, 0800 daily and 1830 M-F on 3910 kc. ISN (s.s.b.), 1930 daily on 3920 kc. QIN (training), 1800 M-W-F on 3745 kc. QIN, daily at 1900 and RFN, 0700 Sun. on 3656 kc. New appointments: K9KTL as OPS, K9ATY and K9VBA as OESs. New officers of the LCARC are W9GRA, pres.; W9GUX, vice-pres.; K9QLP, secy.; and K9SNQ, treas. New officers of the Kokomo Radio Club are K9PEF, pres.; K9BJN, vice-pres.; K9PNT, treas.; W9MJM, secy.; W9QUI, director; W9DKR, trustee. QIN Honor Roll: W9TT/27, W9VAY/26, K9SGZ/24, W9ZYK/23, K9VEJ/22, K9WET/18, W9QLW/17, W9JBQ/15, K9ZLA/15. WN9DTH is a new Novice in Seymour. New officers of the Tri-State College Club are W4CTU/9, pres.; W8MINP/9, vice-pres.; K9YDC, secy.-treas.; W8NDG/9, stn mgr. *Amateur radio exists as a hobby because of the service it renders.* Those making BPL were W9MM, W9JOZ, W9TT, W9NZZ and W9RTH. Jan. net reports: IFN, 351; ISN, 523; QIN, 231; QIN (training), 5; RFN, 94; Hoosier-V.H.F., 216. W9ZYK reports ninth region traffic total as 1962. Traffic: (Jan.) W9MM 1167, W9JOZ 756, W9VAY 389, W9TT 311, W9ZYK 294, K9OET 185, W9NZZ 167, W9RTH 165, W9UQU 131, W9RE 111, K9GLL 107, K9SQZ 91, K9WET 83, W9FWH 79, K9YIC 71, K9KTL 53, W9SVL 53, K9HYV 50, W9QWI 47, W9QVQ 47, W9GJS 46, W9QLW 38, W9BUQ 37, W9OG 37, W9DZC 34, W9JBQ 33, W9DOK 25, K9ZZS 24, K9AOM 23, K9ILK 23, K9QSI 23, K9ZLA 23, K9CRS 22, K9HMC 21, K9YJW 17, K9CMH 16, K9ARW 15, W9IMU 15, K9LJP 15, W9SNQ 15, W9EJW 13, K9FVT 13, K9STH 13, W9SWD 9, W9CWG 8, W9HUF 7, K9OFG 7, W9BF 6, K9JCP 6, K9RGF 5, K9ATV 4, W9BDP 4, W9JSV 4, K9QVZ 3, K9SPH 3, K9TJF 3, K9ZUP 3, W9YVS 2, K9FVK 1, W9STC 1. (Dec.) W9SVL 100, W9QLW 41, K9VHF 5, K9GEL 4, K9MAN 2.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9BCC. PAMs: W9NGT, W9NRP and W9SAA. RMs: W9VHP and W9VIK. New appointees: W9EKZ as OES and W4VRD/9 as OO Class III and IV. W9RQM worked UA0KZA to complete his 80-meter WAC. W9KKM has been handling Ft. Lewis traffic on 20-meter s.s.b. K9WIE has 78 countries confirmed. K9YEL has a new HQ-170 and beam antenna. W9MDG and K9WGN were appointed to the MRAC board of directors. W9QYW is loading his tower on 40 meters with amazing results. The Milwaukee Red Cross station received the call W9EKW. W9NLJ has about mastered his new electronic keyer. K9HJS is active on s.s.b. with an HT-37 and an HQ-170. W9YT's 40-meter vertical has been rebuilt. K9UJJ has added three new states to his WAS list. W9HPC is active with a 20A, a Valiant and a 75A-4. The new officers of the Neenah-Menasha ARC are W9RNZ, pres.; W9SJZ, vice-pres.; K9VSY, secy.-treas. Rock River Radio Club officers are K9VCN, pres.;

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WHY DON'T WE ALL DO SOMETHING ABOUT AMATEUR RADIO WEEK?

ONE of the aims of a Public Relations Program is to create and maintain a favorable public image, and this is often achieved through association of ideas.

AS an example in reverse, consider the man who, whenever he hears the word "ham", gets a mental image of that blankety-blank in his neighborhood whose little black boxes mess up his television set.

AMATEUR Radio Week, coming up soon, offers a fine opportunity (or excuse) to do some amateur radio things that will give outsiders nice thoughts of us when they hear the word "ham".

IF the mood of your boss and the circumstances of your job permit, you might try this idea which worked well here last year.

THE entire K8JLK home station was moved into the office at the beginning of the week and set up on a spare desk.

COFFEE-BREAK and after-work hours were spent operating the station and explaining the rig, and amateur radio, to the very interested co-workers.

THE highlight of the week came when contact was made under a previously arranged schedule with A4/W4TIS, the amateur station at Ft. Benning, Georgia, so that people here could talk directly with a former co-worker who'd moved away some time before to be with her husband stationed at the Base.

THAT little schedule is still being talked about and since that week there have been inquiries as to how things are going with Station K8JLK, and if it will be brought back again this year.

PEP up your self-esteem and the reputation of amateur radio in general; try this or similar ideas as an individual or club project during Amateur Radio Week.

— DICK ELLERS, K8JLK
(Guest Editor)

Jean Marshall K9EBE W J. Hallgren W9AC for hallicrafters

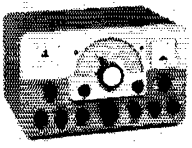
FOR NOVICE OR EXPERIENCED AMATEUR...

Viking transmitters are your best buy! And here's why...

Excellent dollar value... solid power ... dozens of convenience features—just a few of the many good reasons why you get much more with a Viking! Yes, dollar for dollar, a Viking is your best buy... and that's why Viking transmitters are "first choice" among the nation's amateurs!

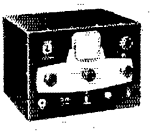
NEW! "10 METER PERSONAL MESSENGER" Two models: 100 milliwatts for short range; 1 watt for extended range—11 transistors and 4 diodes—super-heterodyne receiver with tuned RF amplifier gives excellent sensitivity—two stage transmitter punches signal home, delivers high power output—smooth operating "Quiet" control silences receiver on standby. With battery compartment for penlight cells (less cells) Rechargeable cadmium battery and other accessories available.

Cat. No.	Amateur Net
242-103 100 milliwatt	$109.50
242-104 1 watt	$129.50



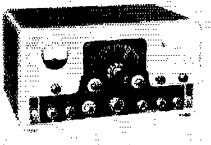
RANGER II—Now—a new version of the popular 75 watt CW or 65 watt AM "Ranger". The "Ranger II" transmitter also serves as an RF/audio exciter for high power equipment. Completely self-contained instant bandswitching 160 thru 6 meters! Operates by built-in VFO or crystal control. High gain audio-timed sequence keying, TVI suppressed. Pi-network load matching from 50 to 500 ohms. With tubes, less crystals.

Cat. No.	Amateur Net
240-162-1 Kit	$249.50
240-162-2 Wired, tested	$359.50



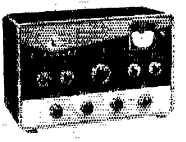
ADVENTURER—Completely self-contained single knob bandswitching 80 thru 10 meters... effective TVI suppressed... and puts 50 watts of power into a rugged 807 transmitting tube. Operates by crystal or external VFO control. Front panel meter switching permits monitoring of the final grid or plate currents... keying is clean and crisp. Wide range pi-network output. With tubes, less crystals.

Cat. No.	Amateur Net
240-181-1 Kit	$54.95



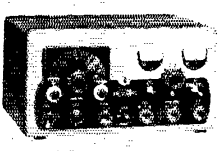
VALIANT—275 watts input CW and SSB(P.E.P. with auxiliary SSB exciter) 200 watts phone. Instant bandswitching 160 thru 10 meters—built-in VFO or crystal control. Pi-network output matches antenna loads from 50 to 600 ohms. TVI suppressed—timed sequence keying—built-in low pass audio filter—self-contained power supplies. With tubes, less crystals.

Cat. No.	Amateur Net
240-104-1 Kit	$349.50
240-104-2 Wired, tested	$439.50



6N2—Rated 150 watts CW and 100 watts phone—offers instant bandswitching coverage of both 6 and 2 meters. Fully TVI suppressed—may be used with "Viking I, II", " Range I, II", "Valiant" or similar power supply/modulator combination. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals.

Cat. No.	Amateur Net
240-201-1 Kit	$129.50
240-201-2 Wired, tested	$169.50



FIVE HUNDRED—Full 600 watts CW—500 watts phone and SSB(P.E.P. with auxiliary SSB exciter). Compact RF unit designed for desk-top operation. All exciter stages ganged to VFO tuning—may also be operated by crystal control. Instant bandswitching 80 thru 10 meters—TVI suppressed—high gain push-to-talk audio system. Wide range pi-network output. With tubes, less crystals.

Cat. No.	Amateur Net
240-500-1 Kit	$749.50
240-500-2 Wired, tested	$949.50

FACTORY AUTHORIZED SERVICE

Instead of shipping to our factory, equipment to be serviced may also be sent to:

Empire State Elect. Service
139-140 Hillside Ave.
Jamaica, New York

Park-Armature Co.
1218 Columbus Ave.
Boston 20, Mass.

Heights Electronics, Inc.
1145 Halsted Street
Chicago Heights, Ill.

B and S Electronics, Inc.
6326 W. Roosevelt Rd.
Oak Park, Ill.

Radio Communication and Engr.
Pinehurst Place
Charlotte 9, N. C.

INVADER—More exclusive features than any other Transmitter/Exciter on the market today! Specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db. sideband suppression—more than 55 db carrier suppression! Instant bandswitching 80 thru 10 meters—no extra crystals to buy—no realigning necessary. Delivers solid 200 watts CW and P.E.P. SSB input; 90 watts AM (25 to 30 watts output—upper sideband and carrier). Built-in VFO—exclusive RF controlled audio A6C and ALS (limiter type) provide greater average speech power. Wide range pi-network output circuit—extremely smooth VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. Wired and tested, with tubes and crystals.

Cat. No. 240-302-2 Amateur Net.....**$619.50**

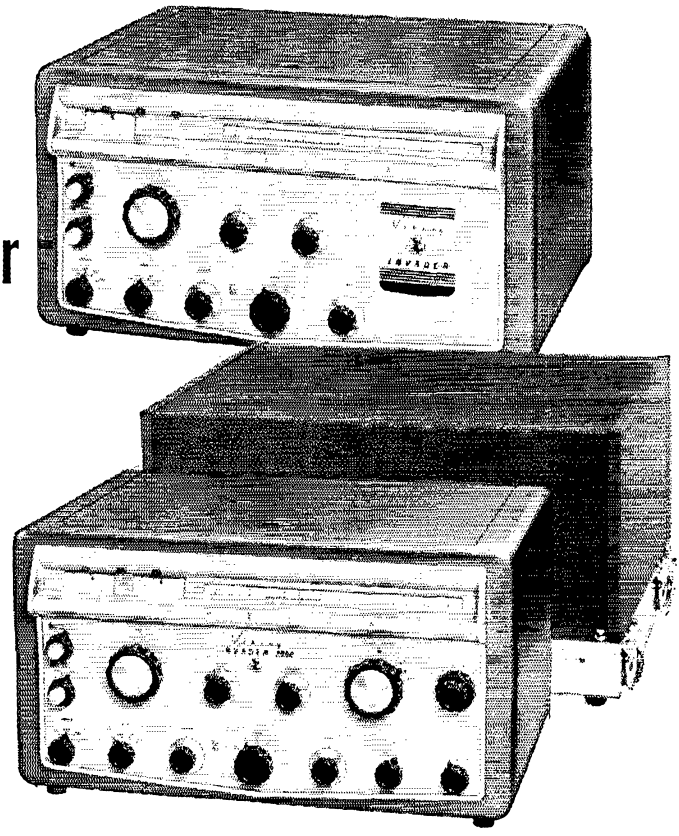
INVADER 2000—Here are all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated a solid 2000 watts P.E.P. (twice average DC) input on SSB; 1000 watts CW; and 800 watts AM (250 to 300 watts output—upper sideband and carrier). Wide range output circuit (40 to 600 ohms adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. Wired and tested, with power supply, tubes and crystals.

Cat. No. 240-304-2 Amateur Net.....**$1229.00**

HIGH POWER CONVERSION—Take the features and performance of your "Invader"... add the power and flexibility of this unique Viking "Hi-Power Conversion" system . . . and you're "on the air" with the "Invader 2000". Completely wired and tested, includes everything you need—no soldering necessary—complete the entire conversion in one evening.

Cat. No. 240-303-2 Amateur Net.....**$619.50**

choose your next transmitter from the feature packed Viking line!



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Write today for our newest amateur Catalog! Available now . . . contains photos, schematics and detailed specifications!

First Choice Among the Nation's Amateurs

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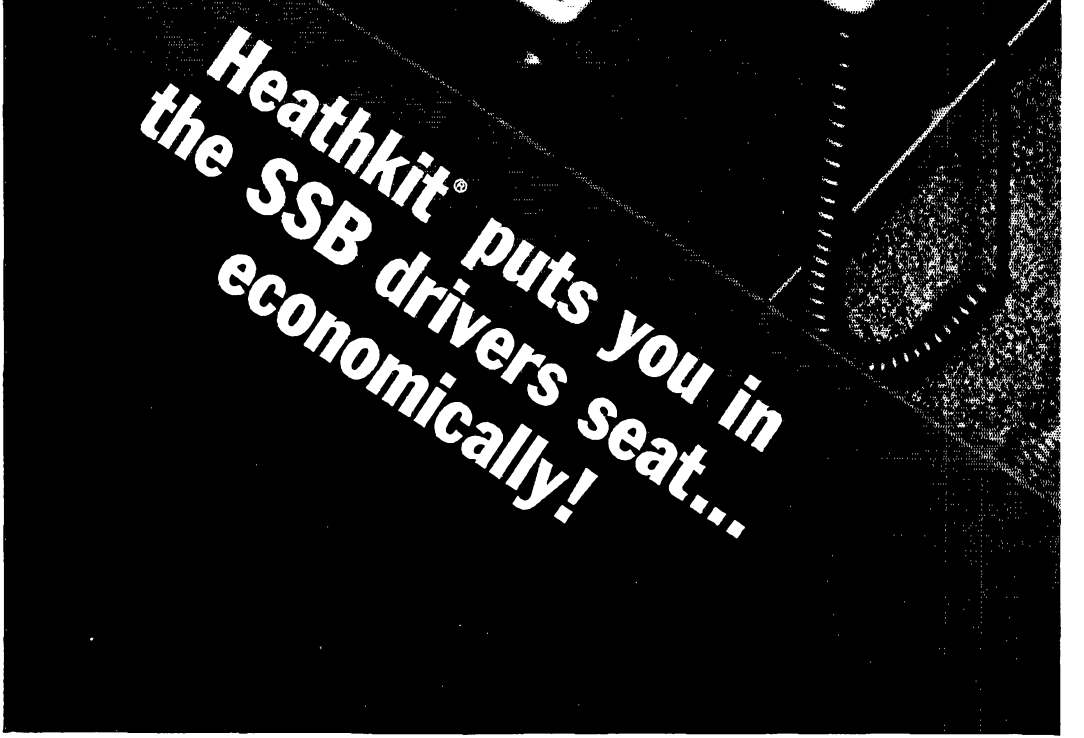
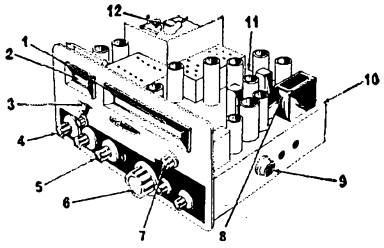

Heathkit® puts you in
the SSB drivers seat...
economically!



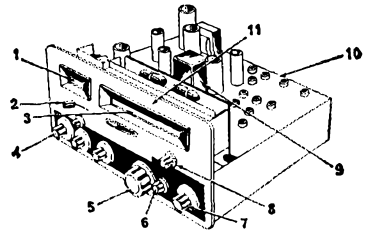
HEATHKIT HX-20 SSB MOBILE TRANSMITTER... A SENSATIONAL VALUE AT ONLY $199.95

1. Easy-to-read, edge-lighted, slide-rule dial 2. Relative power output indicator for ease of tuning 3. Spot function for zero-beat or talk-on frequency setting 4. Fixed 50 ohm loading for easy tuneup 5. Bandswitching 80 through 10 meters—all crystals furnished 6. Full gear drive vernier VFO tuning 7. Mode switch for LSB, USB or CW 8. Hermetically sealed crystal bandpass filter 9. VOX or push-to-talk operation 10. External linear amplifier cutoff bias 11. Built-in antenna relay plus external antenna relay control 12. 6146 for 90 watts P.E.P. input. Automatic level control for maximum talk power, low distortion Crystal control, dual conversion, heterodyne circuitry. Frequency stability 100 cps overall, after warm-up. 50 db carrier suppression, 55 db unwanted sideband suppression.

SSB Portable, fixed station or mobile

less than $395.00 with power

All the features you want and need for top mobile performance. Handsomely styled with die-cast panel, chrome-plated knobs. Units require only 1 cubic foot of space for easy installation in auto. Rack mounting allows easy removal for fixed or portable use. Operates with Heathkit HP-10 or HP-20 power supplies. Here's quality, economy and versatility that can't be beat anywhere!



HEATHKIT HR-20 SSB MOBILE RECEIVER... MANY EXTRAS FOR TOP PERFORMANCE $134.50

1. Built-in calibrated "S" meter 2. Fast or slow AVC selection 3. Rotating slide rule dial 4. Crystal controlled BFO for selectable sideband reception 5. 30-1 gear drive vernier tuning 6. Antenna tuning control, 1 uv sensitivity on all bands 7. Full coverage 80 through 10 meters 8. Series noise limiter for AM reception 9. Crystal bandpass I.F. filter 10. Additional 500 ohm output for anti-trip circuit or headset 11. Die-cast control panel & knobs. Product detector for SSB & CW, diode detector for AM. Fully compatible for use with HX-20. Excellent mechanical and electrical stability.

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Send in today for your free 100-page catalog. Over 250 kits in this most complete catalog of kits. Every piece is top quality . . . save up to 50%

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HEATH COMPANY
Benton Harbor 9, Michigan

Please send my FREE 100 page 1962 Heathkit Catalog

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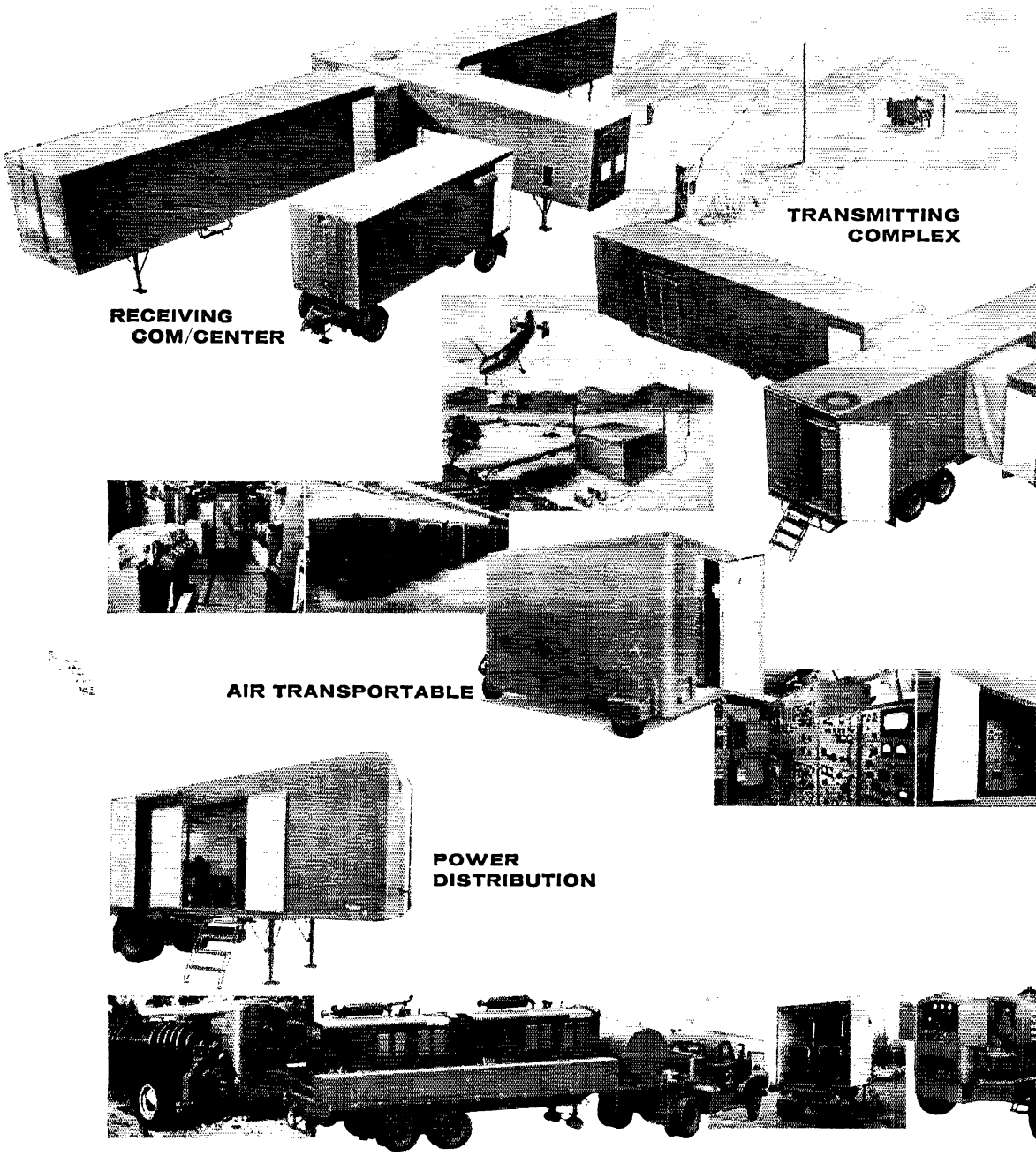
PRODUCTION LINE COMMUNICATION



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, NEW YORK

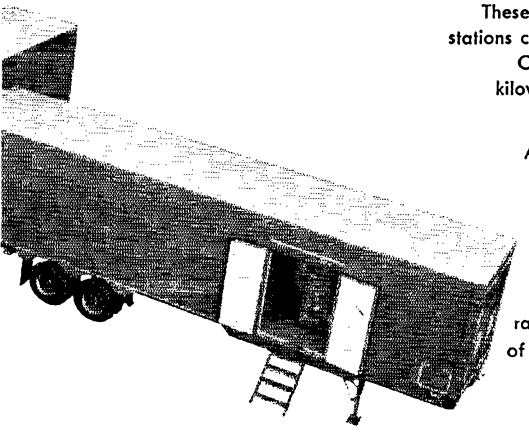
and Subsidiaries

OTTAWA, CANADA • ALEXANDRIA, VIRGINIA • GARLAND, TEXAS • LA MESA, CALIFORNIA • POMPANO BEACH, FLORIDA

STATIONS IN MODULAR CONCEPT

ON WHEELS-READY TO MOVE!

In these days of brush fire wars, global shrinking, and quick decision, the need for faster, more accurate communications has taxed the imagination of the industry. To help solve the complex needs of our military and government agencies, TMC has created, designed and manufactured various transportable communication complexes, some of which are illustrated on these pages.



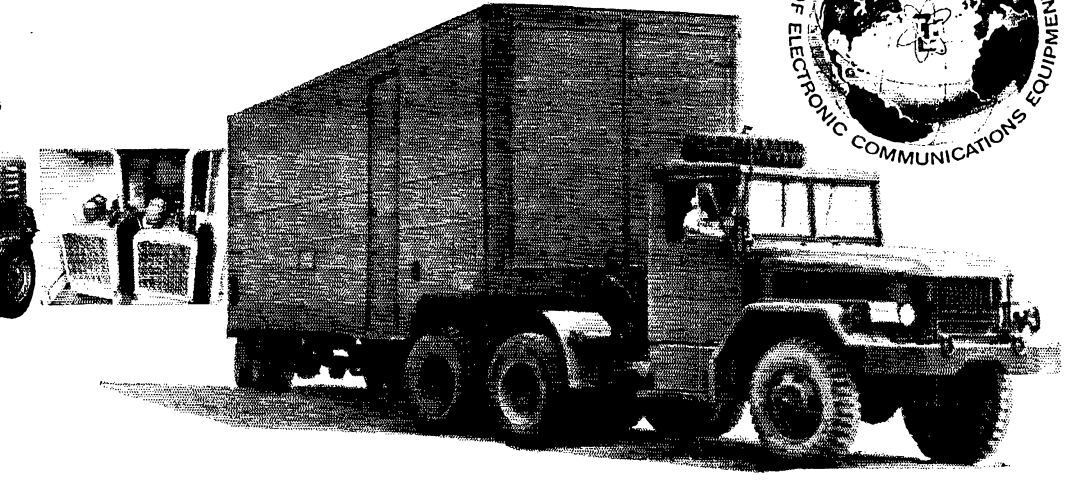
These complexes house complete HF transmitting and receiving stations capable of any of the various modes of operation, SSB, AM, CW and FSK. Transmission power capabilities reach to 200 kilowatts with any of the various lower wattage stages, 1KW, 10KW, 40KW also available in single and multiple units.

All the equipment is TMC conceived and designed with off-the-shelf, standard TMC electronic equipment throughout, thus simplifying servicing, addition and replacement.

These "get-up-and-go" communication communities are completely independent of any locale in which they are placed. Portable power plants, conservatively rated for long hours of continuous use are the product of TMC Power Distribution, Inc., TMC's newest subsidiary.

Any complex communication requirements can be designed into these TMC's modular concepts. Our Field Service Engineers are available throughout the world to assist in creating a transportable modular package to solve your needs. Contact Field Service Engineering Division of TMC, Mamaroneck, New York.

COMPLETE SSB SYSTEMS



• WORLD WIDE SUPPLIERS • OF ELECTRONIC COMMUNICATIONS EQUIPMENT

NOW... PROOF OF DX PERFORMANCE

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-T12TG)

OR IS K4ZRA THE NEW CHAMP?

Read his letter, and see his diagram of a typical installation and what it achieved:

2539 Christie Place
Owensboro, Kentucky

GOTHAM
Miami Beach, Florida

Gentlemen:

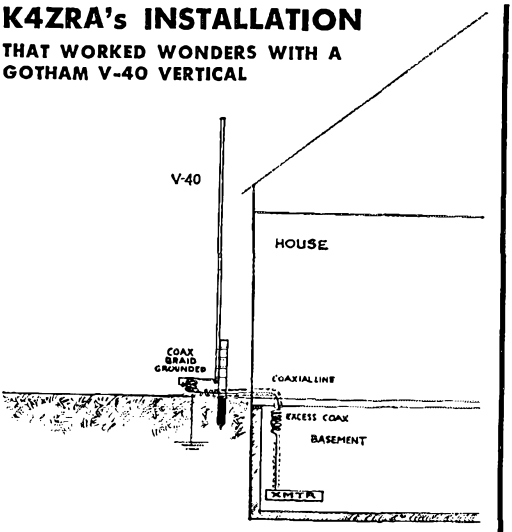
During the time I used this antenna, I worked well over 100 DX stations in 44 different countries, earned a WAS certificate, and worked the necessary stations for WAVE, receiving very fine signal reports from all. My rig ran from 75 to 100 watts plate input and the receiver was an old military ARR-7 (Hallicrafters reboxed SX-28.)

The above mentioned contacts were made with the vertical mounted several inches off the ground, without radials, with only a simple ground connection to the coaxial shield.

Daniel F. Onley, K4ZRA

K4ZRA's INSTALLATION

THAT WORKED WONDERS WITH A GOTHAM V-40 VERTICAL



FREE

Send a card for our valuable catalog of 50 different antennas with specifications and characteristics. Gives bands and frequencies covered, element information, size of tubing used, boom length, shipping weight, feed line used, polarization, and other data.

OLD-TIMER K4KXR (ex-W2JAY) SAYS:

"The all-band operator is best equipped to serve his community in emergencies. A Gotham antenna is the key to many life-long friendships. To get QSLs by the thousand, and make your call letters known all over the world, use a Gotham antenna."

WHY

THE GOTHAM V-80 IS THE BEST ALL-BAND ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Non-corrosive aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price. ONLY $16.95.

73.
GOTHAM

DO YOU KNOW

1. YOU WILL HAVE NO DIFFICULTY INSTALLING YOUR GOTHAM VERTICAL ANTENNA IN JUST A FEW MOMENTS, REGARDLESS OF YOUR PARTICULAR PROBLEM, SO ORDER WITH CONFIDENCE EVEN IF YOU HAVE RESTRICTED SPACE OR A DIFFICULT SITUATION.
2. LOADING COIL NOT REQUIRED ON 6, 10, 15 AND 20 METERS. FOR 40, 80, AND 160 METERS, LOADING COIL TAPS ARE CHANGED MANUALLY EXCEPT IF A WIDE-RANGE PI-NETWORK OUTPUT OR AN ANTENNA TUNER IS USED; IN THIS CASE BAND CHANGING CAN BE DONE FROM THE SHACK.
3. EVERY GOTHAM ANTENNA IS SOLD ON A TEN DAY TRIAL BASIS. IF YOU ARE NOT FULLY SATISFIED, YOU MAY RETURN THE ANTENNA PREPAID FOR FULL REFUND OF THE PURCHASE PRICE. THIS IS YOUR GUARANTEE OF FULL SATISFACTION.

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15..... $14.95

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... $16.95

☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name.....

Address.....

City.....Zone.....State.....

Happenings of the Month

(*Continued from page 65*)

LICENSE SUSPENSIONS

In parallel actions, the Commission has suspended the licenses of Bernard Kirschner, K2HMP, of Los Angeles and Isadore Paul Gillenson, WA6KCI, of Burbank, California, for the remainder of the respective license terms (November 19, 1962 and July 7, 1965) effective February 1, 1962. The FCC discovered that a General Class examination taken at the Los Angeles office on December 21, 1960, in the name of Mr. Gillenson, the holder of a Technician Class license, had actually been taken by Mr. Kirschner. Orders for the suspension of the licenses of both men were originally issued on April 6, 1961, but both requested hearings, which were held on October 17 and 18 before Hearing Examiner Elizabeth C. Smith. The Initial Decisions issued by the Hearing Examiner on December 11, 1961, upheld the original orders of April 7. After the required fifty days during which appeals could have been filed, the suspensions were placed into effect by the Commission. [*Violation of Section 12.162 of the Rules Governing the Amateur Service.*]

FCC FEE PROPOSAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D. C.

In the Matter of Establishment of fees for the Commission's licensing and regulatory activities } DOCKET NO. 14507

NOTICE OF PROPOSED RULE MAKING

Notice is hereby given of rule-making in the above-entitled matter.

In the provisions of the Independent Offices Appropriation Act of 1952, (5 U.S.C., Sec. 140), set out in Appendix A hereto, Congress has stated, "that any work, service, publication, report, document, benefit, privilege, authority, use, franchise, license, permit, certificate, registration, or similar thing of value or utility performed, furnished, provided, granted, prepared or issued by any Federal agency . . . to or for any person . . . , except those engaged in the transaction of official business of the Government, shall be self-sustaining to the full extent possible." In order to bring about the accomplishment of this objective, Section 140 of Title 5 authorizes the head of each agency to prescribe by regulation such fees and charges as he shall determine to be fair and equitable "taking into consideration direct and indirect cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts."

The enabling legislation referred to above also provides that the fees and charges shall be as uniform as practicable and subject to such policies as the President may prescribe. The Bureau of the Budget operating in behalf of the President has issued Circular No. A-25, September 23, 1959, which sets forth general policies for developing an equitable and uniform system of charges for certain Government services and property so as to implement the provisions of the Independent Offices Appropriation Act of 1952.

The Federal Communications Commission, in conducting its regulatory activities, conveys special benefits to identifiable recipients above and beyond those which accrue to the public at large. In fairness to the general taxpayer — who bears the major burden of supporting Federal agencies — the Government has adopted the policy that the recipient of special benefits conveyed by a Federal agency should pay a reasonable charge for the benefits received. In accordance with this policy, the Commission has determined that the public interest would be served by the establishment of a fair and equitable schedule of fees for its licensing and regulatory activities, thereby recouping for the Government a portion of the Commission's cost of regulating the communications industry. The authority for proceeding in this area is clearly outlined in the provisions set forth in Appendix A.

In arriving at the proposed schedule of fees, considerable effort has been directed towards selecting those services provided by the Commission which are readily identifiable and assigning to each a fair and equitable assessment, taking into consideration cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts.

The fees as scheduled below do not differentiate between commercial and noncommercial services. It has been suggested alternatively that noncommercial services such as noncommercial educational FM and TV, the public safety radio services, and the experimental services should be charged either a token fee or should be free of any fee obligation. Comments on this point are specifically requested.

The contemplated fees relate generally to the filing of applications. All filing fees would be payable at the time of filing and would be charged regardless of whether the application is granted, designated for hearing, or otherwise handled. The proposed fee schedules follow:

Proposed Schedule of Fees for Broadcast Services For Filing Application	Fees AM	FM	TV
For New Station or Major Change	$150	$150	$250
For Renewal or Assignment of License or Transfer of Control *	$150	$150	$250
For Special Call Sign for Broadcast Station	$5	....	....
All Other Applications in Broadcast Service (Including all TV Translator Applications)	$30 for each applic.		

* Excluding pro-forma transactions, on which $30 would be paid under "other applications."

Proposed Schedule of Fees for Safety and Special Radio Services For Filing Application	Fees
For Amateur, RACES and Disaster Radio Services	$ 5
For Citizens Radio Service	10
For All Other Safety and Special Radio Services	20
For Special Amateur Call Sign pursuant to §12.81.	5

Proposed Schedule of Fees for Common Carrier Services For Filing Application	Fees
Applications for Initial Construction Permit (no additional charge for license to cover):	
Domestic Public Land Mobile Radio Service (includes base station and associated mobile units)	$150
Point-to-Point Microwave Radio Service	100
Local Television Transmission Service	50
Rural Radio Service and Domestic Public Land Mobile Radio Service Individual User Units	10
International Fixed Public Radiocommunication Services:	
Additional Transmitter	150
Replacement of Transmitter	50
Other Common Carrier Services	10
Applications for Renewal of License:	
Domestic Public Land Mobile Radio Service (includes base station and associated mobile units)	75
Point-to-Point Microwave Radio Service	50
Local Television Transmission Service	25
Rural Radio Service and Domestic Public Land Mobile Radio Service Individual User Units	5
International Fixed Public Radiocommunication Services	75
Other Common Carrier Services	5
All other common carrier radio applications	10
Section 214 applications by telephone companies	100
Section 214 applications by telegraph companies	25
Cable Landing License applications	250
Section 221 applications	50
Interlocking Directorate applications	10
All other common carrier non-radio applications	10

(*Continued on page 142*)

More power— greater flexibility for the MOBILEER with the NEW Gonset "Gooney Bird"

$251.00
Amateur
Net

The Gonset GC-105 is a complete, self-contained 2 meter station, with transmitter, receiver and built-in power supply. In a stream-lined case of contemporary design, it provides a new low silhouette for convenient under-dash mounting. The Gonset "Gooney Bird" gives you top performance at moderate cost—plus famous Gonset reliability.

The 2 meter Gonset GC-105 "Gooney Bird" offers these deluxe features:

Silicon diodes to save current drain • calibrated tunable receiver utilizes low-noise 6BZ8 RF tube in sensitive "Cascode" circuit • AVC is applied to avoid possibility of blocking by strong local signals • special gang-tuned circuits give high image rejection • dual purpose meter automatically switches from relative signal strength to relative output • increased modulation capabilities with high level clipping • all tunable circuits controlled from front panel • tune-up procedure simplified by use of broad-banded exciter stages • completely compatible with Gonset's new model 3357 VFO or 6 crystal positions available.

Input: 6/12 DC or 115 AC volt operation, power cables supplied
Output: 6 watts nominal
Dimensions: 6½" high, 15½" wide, 8" deep

See the all-new Gonset GC-105 at your Gonset Distributor NOW!

GONSET®

DIVISION OF YOUNG SPRING & WIRE CORPORATION

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K9VDD, vice-pres.; K9ZMI, secy.-treas. K9HBT is active on 6-meter phone and c.w. January BPL was made by W9DYG. W9SAA and K9EHS/KR6AR made the BPL with 100 or more originations plus deliveries in December. Traffic: (Jan.) W9DYG 546, W9CXY 275, W9NQW 162, W9SAA 160, K9EHS/KR6AR 114, W9VHP 88, W9KKM 81, K9HJS 74, W9WJH 44, W9YT 35, K9BSC 34, W9VIK 30, W9CBE 29, K9GSC 24, K9YEL 23, W9IRZ 20, W9KQB 16, W9LFK 13, W9NRP 11, W9IHN 10, W9MWQ 9, K9WIE 9, K9HDL 8, W9HPC 8, W9NLJ 6, W9RQM 4, W9IQW 3, K9ELT 2, K9OCA 2. (Dec.) K9GDF 93, W9NLJ 15, K9DOL 10, W9ONI 6, K9ZMI 3.

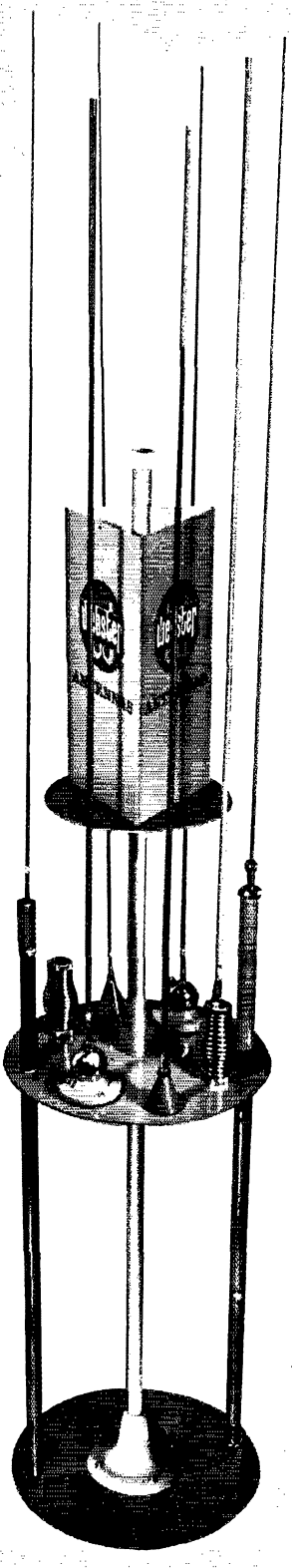
DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, WØHVA—SEC: WØCAQ. PAM: KØTYY. The North Dakota 75-Meter Phone Net reports for January: 25 sessions with 634 check-ins; a maximum of 34, minimum of 12; 66 pieces of formal traffic and 46 informal handled with 20 relays. The Goose River Net reports for December: 111 check-ins, 5 formal messages and 9 informal. The Goose River Net meets at 9 A.M. every Sun. on 1990 kc. The Grand Forks amateurs have reorganized the Forx Amateur Radio Club. New calls in North Dakota are KØFOP, Hettinger, and KØJNB, Bismarck. WØWPD is now on 40 and 15 meters. WØCAQ has been working DX on 15 meters. Traffic: (Jan.) KØIVQ 297, KØITP 50, KØGGI 47, KØRSA 35, KØQWY 32, KØMHD 31, WØYCL 19, WØIRN 18, WØAYJ 17, KØTPK 9, WØAQR 8, WØCAQ 8, KØVDP 5, KØTYY 3, WØMQA 2. (Dec.) WØCDO 3.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—SEC: WØSCT. The SFARC reports 32 stations now on 144.9 Mc. KØZMQ, of Brandt, is moving to Miller. KØJHO is now stationed at Fort Bliss, Tex., and has his Tech. Class ticket. KØWJT built the W2AZL converter for 144 Mc. KØLOW and KØCRD are working a 2-meter link from Leola to Ipswich. New tickets: WNØAYM, the XYL of KNØINJ; WNØBGD, the XYL of WØARC (both from Sioux Falls); WNØBAQ, Rapid City; WAØCCS, Olivet; KØYGZ, the XYL of KØJGM, Mitchell. Newly elected officers of the Mitchell ARC are WØGWW, pres.; KØZEW, vice-pres.; WAØAOY, secy.; KØJGM, treas.; KNØJMW, act. mgr. WAØAOY has a new Valiant. The Black Hills ARC 50-Mc. net time has been changed to 2030 MST. Mitchell ARC holds business meetings the first Thurs. of each month and classes every Thurs. KØVYY, Ridgeview, is now an ORS. WØZWL made BPL for the fourth consecutive month. The SFARC has scheduled auctions for the fifth Mon. of each month in which there are five Mon. The Radio Research Club, Inc., Brookings, has appointed an interference committee and registered it with FCC. Traffic: WØZWL 700, WØSCT 256, KØRMQ 127, WØDVB 124, KØAIE 54, WØOFP 32, KØVYY 30, WØPMA 24, WØVQC 19, KØDHA 15, KØWJT 14, WØCQN 8, KØTNM 8, KØZBJ 8, WØZLB 8, KØBSW 7, KØCXL 7, WØDIY 4, WØGWW 4, WØYVF 4, WØFJZ 3, KØTVJ 3, WØNNX 2, WØRRN 2, KØTXW 2, WØACG 1.

MINNESOTA—SCM, Mrs. Lydia S. Johnson, WØKJZ—Asst. SCM: Charles Marsh, WØALW. SEC: KØJYJ. PAMs: WØOPX, KØEPT. RMs: WØKLG, KØAKM. YL WØUOA is attending IBM school in Chicago and in April will work for Bell Labs as a scientific programmer. OES KØAKC is building a transistorized conelrad monitor. Congrats go to WØLST, WØYC and KØIKU on making BPL. KØFGX has an Apache transmitter and an HQ-180 receiver on the air. KNØGXQ, age 14, can be heard on 40 and 80 meters with a DX-30 and an S40-B receiver. EC KØICG will vacation two months in W6-Land. WØDOP spoke on RACES at the SPRC. KØLNE, SPRC president, is vacationing in Ariz. and Calif. OO KØORK cited 18 violations and WØKLG cited 87. WØCOS, of Rochester, spoke at the MRC, Minneapolis. Asst. SCM WØALW will be heard on the RTTY frequencies. He has a Model 19 and a Model 14 reperforator. KNØIJU, in Utica, licensed 8 months, completed WAS with an Eico 720 and a Lafayette KT-200 on 40 and 80 meters. WNØABU and WNØADX are waiting for their General Class tickets. WØEI has a Valiant to a trap vertical and an HQ-100 receiver and can be heard on 15 meters. OBS KØORK sends Official Bulletins on 3590 kc. at 0015 GMT Mon. through Fri. KNØJOA has a Knight T-50 transmitter and an S-53A receiver on the air in Crookston. The following appointments were cancelled: ECs KØVCC and WØKYG; OBS WØUYR; OO LST. These are renewals: WØLST, WØFGP, KØICG as OPSs; KØICG, WØFGP KØBFS as ECs; KØAKC as OES. KØCNI, of Olivia, is the new Renville County EC. KØZSE, Redwood Falls, has a 75S-1, a 32S-1 and a 30L-1 linear amplifier to a TA-33 beam. RM KØAKM reports that John Marshall High School has a Valiant transmitter, an SX-111 receiver and a V-5 vertical. Traffic: (Jan.) WØLST 196, WØYC 169.

(Continued on page 102)



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DELTA DIVISION

ARKANSAS—SCM, Odia L. Musgrove, K5CIR—SEC: K5IPS. PAM: W5DYL. RM: K5TYW. Looks like spring is here at last, and it's time to start making plans for Field Day and hamfests for the summer: also time to check antennas and emergency power supply before the tornado season begins. K5PRL mobiled to Florida. K5BJW, home on vacation, filled two pages in his log book before the old dynamotor gave up the ghost. W5MPV has a new Heath Seneca. The South East Arkansas Amateur Radio Club has a new c.d. headquarters and all members are requested to attend meetings so that plans can be made to set up the base station and tower. Traffic: K5TYW 95, K5YCM 12, K5CIR 6, K5CIX 6, W5DYL 6, K5UEK 6.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—Congratulations are in order for W5URW for his emergency communications effort during Hurricane Carla. Bob received a special citation bringing honor to the Delta Division and specialty to Louisiana. K5USX has been ill for some time and on the inactive list. New officers of the Jefferson Club are W5MXQ, pres.; W5BIJ, vice-pres.; K5ODD, secy.; K5HEK, treas. This being a Delta Division Convention year, the New Orleans Council of Clubs is really rolling so look for announcements on the Labor Day event at the Jung Hotel, New Orleans. K5CTR received his 3-400Z tube and will start on his linear soon. K5ARH received some RTTY equipment. K5QXV has been active on MARS. W5CEZ reports that traffic-handling has been a little rough with long-skip messing up local nets. W5EA still is banging away on a few nets. Tulane University's ham station, W5YU, has a spark plug in K5HSJ. K5BXX will be operating out of Lafayette for the next few years. The reason the s.s.b. gang has not worked W5HHA is because he has been brass-pounding at the other end of the band. K5LZA, W5JET and W5NDV, all active with RN5, have been reappointed as ORSs. Your SCM would appreciate your notifying him of changes of address, ARRL membership, availability for ARRL appointments and activities in general. Appointees are requested to check on expiration dates. Traffic: W5CEZ 594, W5KRX 156, K5QXV 107, W5MXQ 78, K5LZA 34, W5EA 10, W5JYA 10.

MISSISSIPPI—SCM, Floyd C. Teetson, W5MUG—The city of Columbia gave the Columbia Amateur Radio Club a room to set up a civil defense radio station. W5JCL reports that classes are planned in connection with RACES and amateur radio. K5DGL reports that he is on with a new DX-100. K5YPV is a new AREC member. We have a few appointments left. Contact me for one. W5CUU reports that the Meridian gang is very interested in 2- and 6-meter work. Recently I presented the Meridian Club its new charter. W5CUU is reporting the Official Bulletins on schedule. W5CKY reports that the Jackson DX Club had the pleasure of working VPORT recently. W4WDR has left the section for Amarillo. We need more help in RN5. How about checking in and giving us a hand here in the Mississippi section. Traffic: W4WDR/5 102. K5YPV 27. K5DGL 26.

TENNESSEE—SCM, R. W. Ingraham, W4UIO—SEC: K4OUK. PAM: W4PQP. RM: K4AKP. K4AMC has joined the Air Force but hopes to QNI TN soon from a MARS station. W4PFP has been trading again and has ended up with a 75S-3. The Fort Loudon Emergency Net meets M-W-F at 6:30 P.M. EST on 50.25 Mc. K4UPX hopes to get an SB-10 going soon. New 6-meter mobiles in Oak Ridge are K4OUK and K4JBA. New calls in the O-R- Net are K4IUY, K4EAK, W4HPN, and WA4DAB. New appointments are W4OQG as OBS and K4WUG as ORS. Reports received: SEC—K4OUK; OO—K4RIN, W4TDW; OES—K4KYL; OBS—W4TDW, W4OQG, W4VJ; nets—W4PQP, K4AKP, W4UIO; clubs—Loudon County, Oak Ridge. Traffic: (Jan.) K4AKP 1014, W4PL 427, W4OGG 207, W4OQG 155, W4FX 146, K4WUG 95, W4PQP 68, W4VJ 49, K4AMC 24, W4PFP 23, W4UIO 22, W4ZJY 19, W4VNU 12, W4TZG 9, W4LLJ 4, W4TYV 3, K4VOP 1. (Dec.) W4PQP 112, K4WUG 77, W4VTS 20, K4VOP 12.

GREAT LAKES DIVISION

KENTUCKY—SCM, Elmer G. Leachman, W4BEW—SEC: W4BAZ. PAM: W4SZB. RM: W4CDA. V.H.F. PAM: K4LOA. A new s.s.b. phone net is being started under W4KRY. The annual round-up meeting of the Owensboro Club was held recently with Director Cartwright, W8UPB, and SEC Walthen, W4BAZ, in attendance. We regret to report the passing of K4UCS. K4DFO is operating from a U. K. dorm and will be on KYN. K4NYO, a new member, also is on KYN. K4LDA still is working on extending 6 meter nets. Let's give him a hand. W4SZB reports MKPN held 31 sessions, total traffic 51. K4SWE is the new EC tor the East Central Kentucky counties of Boyd, Carter, Greenup, Lawrence and Lewis. Stations in this area should apply for AREC membership immediately. The new RM for KYN is W4CDA, former Asst. SCM. Al is working hard to increase membership and traffic activity. All active Kentucky stations are urged to report in at least twice weekly. Stations in Western Kentucky are strangely silent. Come on boys, give us a hand. We need coverage. W4BAZ is the new Director of Civil Defense Communications for Louisville. Traffic: K4KWQ 240, W4BAZ 175, K4HOE 167, W4CDA 94, W4RHZ 54, K4OZG 51, W4CSH 40, W4ZDB 30, K4KSC 28, K4TQZ 27, K4VDO 25, W4SZB 22, W4SUD 20, W4RNF 19, W4KKG 18, K4LOA 17, K4ZQR 17, W4YYI 15, K4HSB 14, W4BEW 13, K4DFO 13, K4ZRA 5, K4NYO 4, W4JUI 2.

MICHIGAN—SCM, Ralph I. Thetreau, W8FX—SEC: W8LOX. RMs: W8EGI, W8QQO, W8FWQ, K8KMQ. PAMs; W8CQU, W8JTQ. PAM/V.H.F.: W8PT. Appointments: K8EXE, K8IUZ, K8MEG, W8QQO, W8TBP, W8ZJE, VE3CYG/W8 as ORSs; W8AQA, W8CQU, K8EPZ, W8JTQ, K8KVM as OPSs; W8IUC, K8JJD, W8OCU, K8PVC as ECs; K8GUE, W8MPD as OBSs; W8TIN as OES. New officers: Central Michigan ARC—W8FSZ, pres.; K8YRD, vice-pres.; W8BQD, secy.; K8IQW, treas.; W8TIJ, W8WWT, directors. Branch ARC—K8ZGO, pres.; K8ILC, vice-pres.; KN8ZKS, secy.-treas.; K8AXN, act.; Kalamazoo ARC—W8KWJ, pres.; W8KSZ, vice-pres.; K8WPI, secy.-treas. Detroit ARA—K8UEU, pres.; W8JKD, vice-pres.; W8MOB, secy.; K8AMH, treas. Cosmo G. Calkins Award will be awarded Apr. 14 by the Cent. Mich. ARC at the Grand Rapids 15th State Convention. The Wolv., BR/MEN, QMN and Mich PO Nets all have meetings scheduled here; also the Mich. Council of Clubs; K8NTE, secy. W8TNC sits on an electric pad in the shack to keep warm. W8JYJ finished the Colin B. Kennedy Universal receiver for the Mich. museum. BPLers: K8JJC, K8KMQ, K8VRF, W8HAV. The GRARA now has four 3-kw. generators, trailer mounted. Michigan "youngest ham" (?), W8COW, now is 80. New officers of the Saginaw Valley ARA are W8QQK, pres.; K8KWG, vice-pres.; K8JLD, secy.; W8LNE, treas.; W8HZF, trustee. K8GOU now is in Detroit. VE3CYG/W8 is on 6 meters now. W8IXJ says the old HQ-120 was better than his new HQ-180. The U.P. traffic total was boosted by the WLUC-TV "March of Dimes" Telethon. W8FJR, K8ZAC and K8-AQO have new daughters. K8YWR got his General Class license. W8ALG still is working WSSB. W8EMD is using c.w. on 147.9 kc. K8HRK is portable at U. of M. K8LOS builds a "new" kind of receiver called "superregenerative." This will kill his popularity! K8WQV has moved to a new QTH. W8JX comes to life with a new SX-110 on 160 meters. K8UFI has a Clegg 99. W8NRX (Bangor Bill) is now called "Bubbles." K8-KCD has a "tower bee." Christmas "goodies" K8DCS, SX-115; W8SPX, SX-101; W8AXA, SX-101; K8UGM, Dewald trans.; K8LZL, Nuvistor preamp. Traffic: (Jan.) W8HAV 868, K8JJC 422, K8KMQ 212, W8EOI 202, VE3-CYG/W8 171, W8IUJ 150, K8MEG 140, W8ELW 138, W8IXJ 134, K8VRF 123, W8OCC 94, W8JTQ 87, K8HLR 82, W8WQH 74, W8FX 65, K8QLL 61, W8FWQ 53, W8EU 52, W8EGI 47, W8RTN 44, W8TBP 42, W8HKT 36, W8MPD 36, W8MAI 35, K8EXE 34, K8PVW 34, K8TDJ 33, W8ACW 26, W8DSW 25, K8GJD 23, K8WQV 21, W8PXA 20, W8ZHB 15, K8JED 14, W8COU 11, K8OTJ 11, W8AHV 10, K8EPZ 10, K8KQV 7, K8RQO 7, K8LZF 6, K8TJH 6, K8CDO 5, K8IUZ 5, W8AUD 4, W8BEZ 3, K8SHQ 3, K8QCJ 1. (Dec.) W8JTQ 82, K8-EXE 74, K8PKU 60, W8TBP 32, W8COU 19, K8TDJ 13, W8FSZ 8, K8PSV 7, K8NHC 4, W8QQO 3.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE, W8VTP, K8ONQ. PAMs: W8VZ, K8KSN. K8JYI has a new baby boy. K8DQB and K8VIE are in the hospital. W8WHE demonstrated a rotary spark transmitter at the Tusco RC meeting. W8NBK has a new quad. K8EKG received CHC. WAGB and QCWA certificates. W8KIX was home for Christmas. W8IBX received WSPX Class 3 and 2 awards. W8QCU is on training duty at Ft. Monmouth. K8PFX received his Extra Class license. Williams County ARC's officers are K8REQ, pres.; K8REC, vice-pres.; K8GGN, secy.-treas.; W8CFO, act. mgr. The Tenth Annual Ohio Intrastate QSO Party will be held the second week end of April and again we will have a chance to work the

(Continued on page 104)

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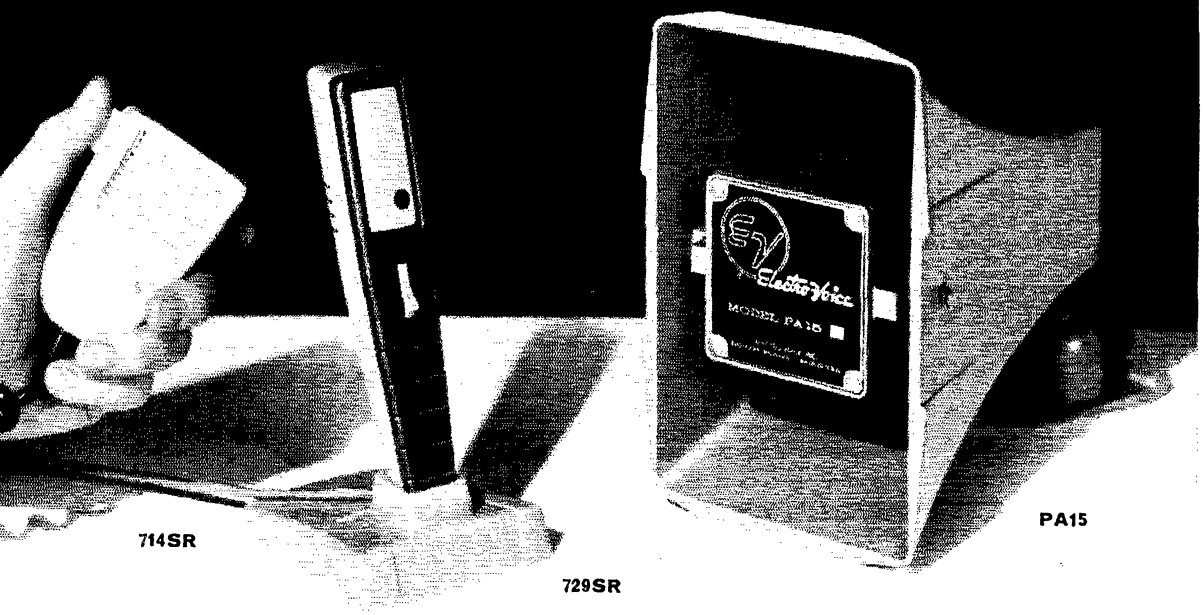

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TENTH OHIO QSO PARTY

April 7-8, 1962

All Ohio amateurs are invited to take part in a QSO party, sponsored by the Ohio Council of Amateur Radio Clubs.

Rules: 1) The party will begin at 2300 GMT Saturday April 7 and end at 2300 GMT April 8. 2) All types of emission and all bands may be used, but a station may be worked only once regardless of mode. A maximum of ten stations may be worked in a single county. 3) The general call will be "CQ Ohio." 4) *Scoring:* Multiply the number of Ohio stations worked by the number of Ohio counties contacted. Logs should include calls of stations worked, time, date and the county in which the station is located. 5) Suggested frequencies are: 3550, 3740, 3860, 7100, and 7250 kc. On the other bands, take your choice. 6) A cup and four appropriate certificates will be awarded to the highest scoring stations. 7) All contest logs must be postmarked not later than May 7, 1962, and should be sent to the contest manager, Hamlin King, W8EQN, 353 South Arlington Avenue, Springfield, Ohio.

counties we need to get the Worked All Ohio Counties certificate. Stations in counties where there are only a few stations are asked to please get into the contest and have fun for you will be like a station in a rare country. Champaign County ARC's officers are W8HFK, pres.; K8WOA, vice-pres.; K8LWE, secy.-treas.; W8APY, W8HNY, W8JXM and W8SXQ, trustees. Jefferson County AREC received W8CWO as its call, with K8VBH as trustee. W8ERR was appointed County RO with K8VBH as Asst. RO. K8KSB, the son of W8EQN, still is in Italy. The Seneca RC heard a talk on Stereo F.M. Multiplex and took a tour of the Bell Telephone building. Tusco RC's *Beam* states the members toured the studios of WJER; K8SMA has a new 75S-3 and a new quad; KN8ZHH is in Florida with the Navy; K8RNM has a TA33 Jr. Dayton ARA's *R-F Carrier* tells us Mr. Turner spoke on U.H.F. and Microwave Radiating Devices for Space Communication. Lancaster & Fairfield County ARC's *The Ragchewer* says W8QEH and K8YYO are on 6 meters and K8USB has gone s.s.b. K8MTI received DXCC and CHC certificates. W8OUU has the new Collins S/Line. Warren ARA's *Q-Match* reports that WA8ABE and WN8ANV are new hams. K8BXT reports that K8AMR has a new Gonset 63; K8BXT and K8ORG have a new 200V; W8KJE and W8RZK vacationed in Florida; W8RQ received USA-CA 500 Award; K8GVY has a new Shawnee. W8BND, K8BXT, K8VNY and KN8ZNB have new 62B transceivers; K8KHS has an HR-50. Massillon RC's *MARC News* states that W8TPS has a new HQ-70. Findlay RC's *The W8FT News* tells us W8QP is 89 years young. Parma RC's *P.R.C. Bulletin* states the club held Old Timers Night and its officers are W8CZM, pres.; W8ZAH, vice-pres.; W8SUS, secy.; K8BFT and K8EBF, asst. secys.; K8CNZ, treas.; K8NXV, asst. treas.; K8BAK and K8WHM are Silent Keys. *Smoke Signals* from the Indian Hills RC stated that K8SET lost his beam in a wind storm; K8RLZ has a new HA-4 keyer and K8TSG worked his first W6 on 160 meters. Ashtabula RC's officers are W8SHE, pres.; K8EUR, vice-pres.; K8TUO, secy.; K8SCF, treas.; W8AMI and K8LXA, trustees. Canton ARC's *Feedline* has for its cover page a picture of W8IOZ seated in his station; W8NAL and K8DRS have new HQ-170s, WA8BJU and WA8BKC are new hams; K8MZS discussed modulation and methods of monitoring along with slides pictures; K8BYC is in the hospital for surgery. Toledo's *Ham Shack Gossip* names W8MIBI as its Ham of the Month. W8DAE and K8KSN made BPL in January. New appointment in January was K8NVQ as OBS. Trumbull County ARC was newly formed with W8KCE, pres.; K8NCV, secy.; W8HSP, program coordinator; W8QI, Radio Officer; W8HLA, K8BXT, K8DTA, asst. ROs. Springfield ARC's *Q-5* tells us W8IIP discussed and demonstrated The New Look in High Power Finals. See *QST* Hamfest Calendar. Traffic: (Jan.) W8DAE 785, W8UPH 484, K8SQK 356, W8CHT 318, K8KSN 207, K8ONQ 128, W8BZX 110, K8RYU 37, W8AL 19, K8MTI 18, W8GQD 16, W8HQK 10, K8KXS 10, W8LZE 8, W8WYS 7, W8NCF 6, K8DDG 4, W8OUU 4, W8HZJ/4 3, K8PBE 1. (Dec.) K8AAG 117, W8ZYU 93, K8PFW 44, W8LZE 34, W8PMJ 22, WA8ABF 7, K8PBE 6, K8PBZ 6, W8HZJ 4, K8JSQ 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy.

(Continued on page 106)

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W2EFU—SEC: W2KGC. RMs: W2PHX and K2QJL. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 0000 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; MHT (Novice) on 3716 kc. Sat. at 1800 GMT; Inter-Club on 28.690 Mc. Mon. at 0130 GMT. Appointment: K2PEF as OBS. Endorsement: WA2AUC as OO. Welcome to W2APF to the select ranks of the BPL for 1500 originations during "Operation Good Will" over the holidays. New officers of the Albany Club (W2HCS) include K2OTQ, pres.; WA2BLC, vice-pres.; K2HUC, secy.; W2KZN, treas. Over at the Albany H.S. Club (WA2NGO) new officers are WA2BAH, pres.; WA2LEH, vice-pres.; WA2MFC, secy.; WA2EFD, treas.; W2KSH, trustee. "Listening and Looking in Space" was the topic at the Schenectady Club give by W2VXD, manager of General Electric's satellite tracking station. WA2SFP received his DXCC certificate. WA2MHU is on 6 meters with a Gonset IV from Verbank, N.Y. Among the newcomers on 6 meters are K2QQB and W2TNG with new tower and five-element beam. K2BGU has a new twelve-element colinear for 432 Mc. WA2QEQ is the new RACES Deputy Communications Officer in Westchester. New officers of the Mid-Hudson V.H.F. Society are W2ROE, pres.; W2ZVB, vice-pres.; K2BGU, secy.; K2CVG, treas. WA2SAO, of the N.Y.C. office of the FCC, was guest speaker at the annual meeting of the New Rochelle Club. The club's new officers are K2SJN, pres.; K2IES, vice-pres.; WA2QEQ, secy.; WA2DST, treas.; K2BVC, WA2FCR and WA2JZA, directors. WA2JWK was guest speaker at the Albany Club. Traffic: (Jan.) W2APF 1500, W2THE 146, W2EFU 138, WA2HGB 58, K2TXP 46, K2SJN 38, W2URP 27, WA2TDE 21, K2HNW 15, W2PKY 12, W2DQW 10, K2EIU 2, WA2MID 2. (Dec.) W2PHX 30, K2EIU 16, K2MPS 3.

NEW YORK CITY AND LONG ISLAND—SCM, George V. Cooke, jr., W2OBU—SEC: W2ADO. RM: K2UFT. PAM: W2UGF, V.H.F. PAM: W2EW. Section nets: NLI, 3630 kc. at 0015 GMT nightly; NYC-LIPN, 3908 kc. at 2230 GMT nightly; V.H.F. Traffic Net, 146.25 Mc. at 0100 GMT nightly. Traffic honors go to K2UAT, WA2GPT, K2UBG, W2EW, W2GKZ and WA2TQT for the month of January with the issuance of BPL cards and to WA2CSE, who received his card for December traffic-handling. This is the 22nd consecutive BPL certificate earned by W2EW! The 2-Meter Traffic net, under W2EW's guidance, racked up a total of 499 messages handled during the month of January as against a message total of 684 during busy December; a mighty impressive net operation with 30 sessions and 250 stations reporting in each month. A Section Net certificate has been given to WA2QAT, now an OBS, for good attendance and participation in the V.H.F. Traffic Net. WA2UCP originated 109 messages, which were handled via the V.H.F. Net, from Brooklyn amateurs to aid in the campaign at Albany for issuance of call letter amateur license plates. Plans are moving along at a fast pace toward the next HARC Convention to be held Oct. 13, according to W2TUK, HARC president, and many committees are hard at work. A new club called the East Meadow HSRC using the call WA2UZL, has been formed with WA2ONO, pres.; WV2RSW, treas.; WA2PIX, secy.; W2CDO, trustee. New officers of the Radio Club of Brooklyn are K2IWC, pres.; WA2HDO, 1st. vice-pres.; WA2HIQ ,2nd vice-pres.; W2ISF, treas. K2JFL, secy. The Mid-Island 6-Meter RC elected WA2NHL, net control; WA2HCP, alt. net control; K2YMV, secy.-treas.; WA2DUZ, act. mgr. The net meets on the air on 50.9 Mc. at 1930 every Tue. The Brooklyn Polytechnic RC changed over from 100THs to a new 813 kw. final and reports excellent results. The club also is on 6 meters with a 4-400. The Jamaica U.H.F. Society has acquired a pair of APX-6s and experimentation into 1296-Mc. antennas is on the club's program. A new net in Huntington, the Modulation Busters and Experimenters of Huntington, operates at 2130 GMT on 50.476 every night. Brooklyn College RC, K2APZ, has the following officers for 1962: WA2QMQ, pres.; WA2OSJ, vice-pres.; WA2SJW, treas.; K2QNR and W2PEG, advisors. WV2YTV is a new call in Ridgewood; he is the father of WA2BWM. Congratulations to W2MES; DXCC is mighty hard to come by. W2LGK, Queens Boro EC, says more activity is needed on 145.8 Mc. Wed. at 0100Z and 50.25 Mc. on Thurs. at 0130. Your AREC should always be supported. 1962 officers of the Tu-Boro RC are W2YSM, pres.; K2BVQ, vice-pres.; K2FYX, secy.-treas. It is with deep regret that the passing of K2OKX is recorded in Silent Keys. The Lake Success RC elected K2IDB, pres.; W2TUK, vice-pres.; W2NBI, secy.-treas. K2OXK is running 700 watts to a pair of 813s. W2VLQ and W2JU, new ECs, cover two large areas of Nassau. The Jamaica Amateur U.H.F. Club's officers for 1962 are W2MNX; pres.; WA2JES, vice-pres.; W2QPQ, secy.; K2BBO, treas. Traffic: (Jan.) K2UAT 871, WA2GPT 612, K2UBG 528, W2EW 381, W2GKZ 354, WA2TQT 167, WA2QAT 110, WA2BWO

(Continued on page 108)

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Maximum power input	500 watts
Omnidirectional gain	3 db
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Termination	Type N male with Neoprene housing
VSWR	1.5:1
Bandwidth	±1%
Lightning protection	Star gap

Mechanical:

Skirt	2" dia. red brass
Whip rod	6061-T6 aluminum
Support pipe	1-5/16" dia. hot-galvanized steel, 24" minimum length exposed available for mounting
Rated wind velocity	100 MPH at 150 Mc
Lateral thrust at rated wind	19 lbs. at 150 Mc
Bending moment 6" below skirt	55 lbs. at 150 Mc
Weight	30 lbs. at 150 Mc

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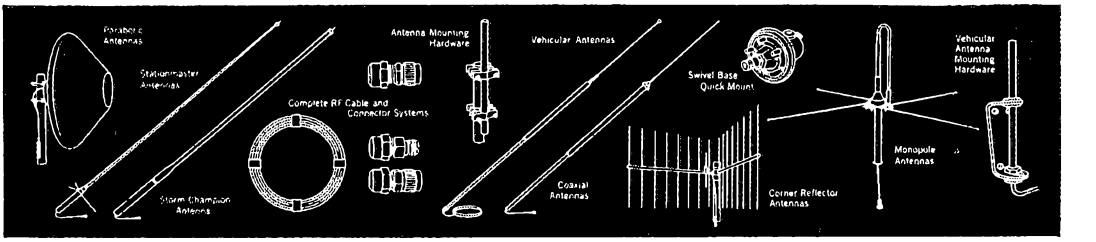

94, W2GP 65, K2KYS 61, W2OME 50, WV2VKK 50, K2UFT 44, WA2RMP 43, WV2RVU 26, K2THY 25, W2EC 19, WA2LJS 15, WA2FRW 14, WA2OOY 12, K2YQK 10, WA2FIT 8, WA2FUL 7, W2PF 7, W2JGY 4, WA2KER 4, K2SPG 4, WA2WEA 4, WA2RAQ 3, WA2-QJU 2, WV2TKS 1, W2TUK 1, W2YKQ 1. (Dec.) WA2CSE 209, WA2TQT 28, W2DBQ 21.

NORTHERN NEW JERSEY—SCM, Daniel H. Farley, WA2APY—Sec: WA2APY. RM: WA2GQZ. PAM: K2SLG. V.H.F. PAM: K2KVR. The section nets are: NJN, 3695 kc. daily at 0000. NJPN, 3900 kc. 2300 Mon. through Sat., Sun. 1400. NJ 6&2, 51.15 Mc. at 0400 Thurs. and Sun., 147.75 Mc. Wed. and Sun. at 0300. Sessions, attendance and traffic, respectively: NJN 31-465-257; NJPN 31-538-106; NJ 6&2 22-165-38. New appointments: WA2UAK and WA2DPT, both OES. Renewals: W2VMX as OPS. There are now 103 appointments in N.N.J. and only 47 reports were received. The appointments say you promised to send in reports. W2CWK is active again in Jamesburg. Congrats to WA2UPZ on getting his General Class license. WA2ONH says the Union Co. ARA is trying to change its club call. WA2EJZ: To get on 80 you need an 80-meter antenna. WA2DPT still is trying for 2 meters. WA2QPV reports that WA2JHR is for high power on 2 meters. The ARC of Belleville elected WA2BNF, pres.; WA2-DCZ, vice-pres.; and treas. K2UCY, the "Bearded Bandit of Belleville," remained as secy. K2UKQ, of 79 Stillwell Rd., Franklin Pk, NJ, is district chairman of the *YLRL Harmonics* and would like items of interest from W/K2 YLs. She also made DXCC. Now W2CVW wants to go to 160 meters. Looks like W2EWZ needs a small 80-meter full-wave, too. I didn't know that W2NIY was a grandfather either. K2AGJ has a new v.f.o. WA2CCF got his radar endorsement. WA2BNF is doing a good job as EC of Belleville. WA2OLZ says that the W2MZS club members are all building 2-meter rigs for a project. I'm glad to hear that K2TWY is back on the air from Freehold. Anyone who wants one swell bulletin just has to check into the NJN C.W. Net long enough to be a member and WA2GQZ, our RM, will put him on the mailing list. We know what we're doing when we elect somebody. (He's a printer, you know.) By now we know the results of the recent election for SCM and can see just how interested in the goings on of the ARRL the members were. WA2CCF and myself, WA2APY, wish to thank you all for your votes. K2UCY, WA2CCF and WA2BNF made BPL for January. Traffic: (Jan.) K2UCY 533, WA2GQZ 270, WA2BNF 177, WA2JHQ 159, K2VNL 157, WA2APY 151, WA2CCF 130, WA2SRK 39, WA2OQV 29, W2CVW 24, K2SLG 11, WA2OLZ 8, K2EQP 7, W2ABL 6, W2EWZ 6, W2DRV 5, WA2JTZ 5, WA2UZH 4, W2NIY 3, W2OXL 3, K2UKQ 2, WA2EJZ 1, K2QGD 1. (Dec.) W2CVW 55, K2PQR 1.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM:—Russell B. Marquis, WØBDR. SEC: KØEXN. PAM: WØPZO. RMs: WØDUA, WØBDR. OO: KØAZJ. Other OOs: Please become active. With the slow death of 10, 15 and 20 meters we need more space on the lower frequencies or fewer hams. Do you have an answer? Please write to me if you have. K6SXA/Ø is now WØFSV. New Tailcorn members: WØMCI, KØVSV, KØGBL and WØJMX. Tailcorn reports QNF 198 in 27 sessions, QTC 123. The 75-Meter Phone Net reports QNI 1622, QTC 138, 26 sessions. The 160-Meter Net reports QNI 1124, QTC 16, in 31 sessions. The Ames RC performed outstanding work in building tracking antennas for Project Oscar and in observing and recording all passes within range of its receivers until transmissions stopped. New officers of the AMES Radio Club are KØKPG, pres.; KØYKA, vice-pres.; KØUAA, secy.; WØUGR, treas.; WØIH, act. mgr. New officers of the Central Iowa U.H.F. and V.H.F. Amateur Radio Club are WØQHB, pres.; KØHPQ, secy.; KØZCA, act. mgr. This group is the most active of its kind in the section. Traffic: WØLGG 1490, WØSCA 675, WØBDR 361, WØCZ 197, WØNTB 110, KØMMS 101, WØPZO 76, WØTEV 61, WØBLH 31, KØHBD 20, KØZCQ 18, WØ JPJ 10, KØYLN 10, WØGQ 9, WØREM 9, WØFSV (ex-K6-SXA/Ø) 8, KØUAA 8, KØYDV 8, KØQKD 7, WØFMZ 6, KØGHH 6, KØKAQ 6, KØGOT 5, WØIO 5, KØEVC 4, KØOTV 3.

KANSAS—SCM, Raymond E. Baker, WØFNS—SEC: KØBXF. Asst. SEC: KØEMB. RM: WØQGG. PAM: KØEFL. V.H.F. PAM: WØHAJ. Nets: KPN, 3920 kc. Mon.-Wed.-Fri. 1245Z. Sun. 1400Z; NCSs KØQKS, WØFHU. IFR, ORB; 12 sessions reported QNI 325, high 54, low 6, average 19.6; QTC 58, high 14, low 0, average 4.8. QKS, 3610 kc, daily 0030Z; NCSs KØBXF, IRL. WØBYV. SAF; 31 sessions, QNI 252, high 13, low 5, average 8.13; QTC 175, high 21, low 0, average 5.64. Kansas Weather Net, KØEMB mgr., 3840 kc. Mon. through Sat. at 0001Z. Kansas Jayhawker YL

(Continued on page 110)

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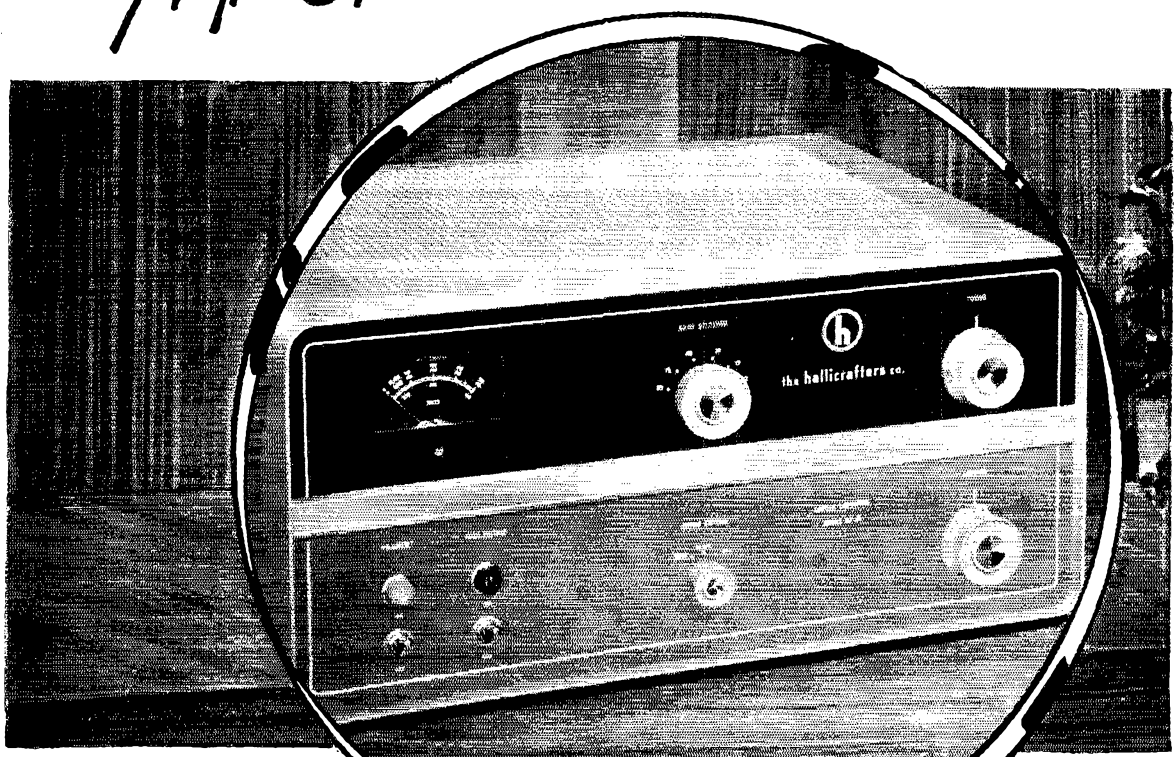

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Net, 3940 kc. Tue. 1530Z, Sun. 2200Z, KØHEU mgr. The Lawrence Amateur Radio Club elected WØVBQ, pres.; KØTLQ, vice-pres.; WØJUV, secy.; WØFSC, treas.; WØNSB, act. The Tri-County Amateur Radio Club elected KØOCY, pres.; KØODA, vice-pres.; KØSQT, treas.; KØDAS, secy. The club represents the 5 towns of Ransom, Utica, LaCrosse, Quinter and Hill City and meets the 1st Wed. of each month. The Emporia Amateur Radio Club elected WØMDI, pres.; WØQLD, vice-pres.; KØBJO, act.; KØLHF, secy.-treas.; KØCPK, comm. The KVRC of Topeka elected WØKKR, pres.; KØTMO, vice-pres.; KØPSD, treas.; On Jan. 27 the Emporia Radio Club held a sideband meeting and banquet attended by 62 members and their XYLs. The meeting was conducted by WØMDI with WØUPR and WØFNS. The FCC was represented by Harold Bourell. Home-built items of sideband gear were shown by WØVBQ, WØUUH and WØITX. Traffic: (Jan.) WØOHJ 716, WØBYV 230, KØHGI 226, WØSAF 173, WØFNS 103, WØBLI 79, WØABJ 74, KØYTA 74, WØQGG 73, KØHVG 41, WØIFR 39, KØBXF 36, WØORB 31, WØALA 28, KØQKS 12, KØEFL 10, KØGII 10, KØEMB 7, WØWFD 6, WØDFD 5, KØYBV 5, KØJID 3, WØFDJ 2, KØVQC 2. (Dec.) WØORB 17.

MISSOURI—SCM, C. O. Gosch, WØBUL—Net reports: HBN (7280 kc., 1805 GMT, M-F) 22 sessions; QNI 551; QTC 418; NCSs WØANT 5, KØLTP 1, KØLTJ 3, KØYWT 5, KØWNZ 2, KØVFV 1, WØQJU 2, KØUHF 1, WØTWJ 1, KØHGI 1. MEN (3885 kc., 2400 GMT, MWF) 13 sessions; QNI 387; QTC 126; NCSs KØMMR 5, KØONK 5, KØIHA 3. MSN: (3715 kc. 2200 GMT, M-F) 25 sessions; QNI 87; QTC 54; NCSs KØONK 10; KØFPC 4, KØGOB 5, KØVPH 6. Mo. SSN (3885 kc., 2400 GMT, Tu-Th) 9 sessions; QNI 151; QTC 59; NCSs WØOMM 5, WØPXE 4. MON (3580 kc., 0100 GMT, Tu-Su) 27 sessions; QNI 195; QTC 179; NCSs WØOUD 11, KØVPH 8, WØKIK 5, WØRTW 2, WØWAP 1. SMN (3580 kc., 2200 GMT, Su) 4 sessions; QNI 19; QTC 17; NCS WØOUD 4. PON (3810 kc., 2100 GMT, M-F) QTC 59; NCSs WØHVW, TXC, KØPIQ. A Saturday morning session of MSN is now being held at 1400 GMT. The Missouri Two-Meter Net meets on 144.750 Mc. at 0200 GMT Thurs. with WØLFE as NCS. Appointments: KØFPC and KØHIM as OESs. Endorsements: KØJPL as OO (III & IV); WØEPI, KØVNB, KØWNZ as OPSs; KØHIM, KØOJC, KØQCQ as ORSs. Cancellations: WØKMV and WØTOD as OBSs; KØHHG as EC. WØFHM is the Green Co. ARS call. WØFLZ has been assigned to the MARS station on the old O'Reilly General Hospital grounds. Newly-elected officers: Tri-State RC (Joplin)—WØPKI, pres.; WØWEB, vice-pres.; WØAIM, secy.; WØDE, treas. Mid-Missouri (Jeff City)—KØUWM, pres.; KØZGR, vice-pres.; KØETY, secy.-treas. S.W. Mo. ARC, Inc. (Springfield)—WØHUI pres.; WØBVG, vice-pres.; KØFZT, secy.; WØCXF, treas. WØHUI promises regular publication of the Hillbilly Bulletin. Traffic: (Jan.) KØONK 1168, KØLTJ 416, WØANT 393, KØVPH 153, WØOMM 92, WØOUD 91, WØKIK 90, WØEEE 89, WØZVS 74, WØBUL 57, WØBVL 51, WØTPK 37, KØVNB 35, WØWAP 34, WØZLN 34, KØMMR 28, WØEPI 23, WØAYB 22, WØMKJ 22, KØWNZ 19, WØPXE 18, KØIHY 15, WØKCG 7, KØJPJ 3, WØOVV 2, KØOJC 1. (Dec.) WØEEE 101, WØZLN 35, KØIHY 4. (Nov.) KØFPC 29.

NEBRASKA—SCM, Charles E. McNeel, WØEXP—SEC: KØTSU. KØDGW reports the Nebraska Morning Phone Net had QNI 534, QTC 167. WØNIK reports the Western Nebraska Phone Net had QNI 715, QTC 559, 100 per cent reporting. WØDVB, WØFJZ, KØGAT, WØGGP, WØLDO, WØNIK, WØVEA and WØWUV. WØHXH reports the Nebraska Emergency Phone Net had QNI 763, QTC 51. KØINZ is a new member. New officers of the North Platte Radio Club are WØVEA, pres.; WØYYV, secy.-treas. Traffic: (Jan.) WØGGP 513, KØELU 89, WØZJF 82, KØRRL 58, KØDGW 54, WØNYU 50, KØYAL 39, WØYFR 37, WØNIK 36, WØEGQ 35, KØUWK 32, WØWUV 31, KØFRU 30, KØCYN 28, KØKJP 28, KØMSS 24, WØLOD 23, WØAHB 20, KØFBD 17, KØODF 15, KØOAL 11, KØYZP 9, WØCIW 7, KØSCN 6, WØVEA 6, WØZEO 5, WØBOQ 2, WØHOP 2, WØWKP 2, WØDDT 1. (Dec.) KØGAT 29.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Henry B. Sprague, jr., W1-CHR—SEC: EOR, RM: KYQ. H. F. PAM: YBH. V.H.F. PAM: FHP. See March issue for traffic nets and skeds. K1QPN switched from coax to open line feed for his antenna. K1QPM hopes to have a v.f.o. soon. K1TVA is having TVI troubles ADW is now on 144 Mc. with a 522. K1RTS was elected act. mgr. of the Waterbury ARC with KN1RWH as his asst. BNB has been troubled with QRM during CN sessions. K1JKJ, Asst. EC for Bridgeport, reports 4 test runs in January. QV attended the North-South DX Club annual affair in Fresno, Calif.

(Continued on page 112)

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CONNECTICUT QSO PARTY

May 5-7, 1962

The Candlewood Amateur Radio Club invites all amateurs throughout the world to participate in the *New* Connecticut QSO Party.

Rules: (1) The contest begins at 2300 GMT May 5 and ends at 0400 GMT May 7. (2) Phone and c.w. are considered the same contest, but a station may work another station twice on each band, once on phone and once on c.w. (3) Call "CQ CONN" on c.w., "CQ the Connecticut QSO Party" on phone. Conn. stations sign "DE W1XYZ CN" on c.w., "this is Conn. calling" on phone. (4) All bands may be used. The bottom 40 kc. on each band are suggested. (5) *Exchanges:* Outside stations give QSO number, RS(T), and state, province, or country. Conn. stations send QSO number, RS(T), and county. (6) *Scoring:* Each complete contact counts 5 points. Outside stations multiply QSO-points by Conn. counties worked. Conn. stations multiply by the total of states, provinces, and countries worked. Conn.-to-Conn. contacts count but only counts as a contact with the state of Conn.; counties are not exchanged. (7) *Awards:* A certificate to the highest scorer in each state, province, and country and to the *two* highest scorers in each Conn. county; CARA members are ineligible. A certificate to the highest scoring Novice and Technician in Conn. and outside of Conn. (8) *Logs:* Logs must show dates, times, band, mode, and contact exchanges. Give your address, class license, and score computations. Send logs to: Conn. QSO Party, Candlewood ARA, c/o Jack Sanders K1IFJ, 16 Ridge Road, Danbury, Conn. before June 6, 1962.

HHR reports that K1VEK has his Tech. Class license and has been appointed Asst. EC and an officer in Columbia's RACES. OJR worked TT8AA for a new one making him 266/258. K1TKJ is on 144 Mc. with a nuvisitor preamplifier and a new halo in the attic. K1PKQ and K1NRT combined for a good time in the V.H.F. Sweepstakes. ZGO is working on power line filtering to reduce severe 2-meter interference with local hi-fis, etc. AGS is active on 144 Mc. with a 6N2, an Ameco converter and an eight-element yagi. K1IFJ topped Connecticut in the New England QSO Party with 12,000 points and 80 QSOs. TS was next with 8689 points. Other scores: DDJ 8052, K1LBH 7314, ASO 5676, RFJ 2016, BIH and BDI, ineligible as CWA members, scored 10,902 and 5985, respectively. YBH says the CPN had 31 sessions handling 173 messages for a 6 average. Attendance averaged 20 per session with the leaders being VQH, DAV, YBH, THN, K1s PUG, DGK, PPF, AQE; also W1FXS of *Stamford*, where net representation has been lacking. The CQRC's 220-Mc. transceiver project shows ten rigs under construction with JJL, who designed the gear, coaching. K1RJK is promoting interest above 146 Mc. with Tues. eve sessions on 146.7 Mc. The CVN had 12 sessions with FHP, JUV, K1s PKQ, PUG, NKT having high attendance. LIG is recovering from an auto accident. SXR is taking an engineering course. The CN had 31 early sessions handling 555 messages for a 17.9 average; 19 late sessions handling 19 messages. High QNI: RFJ, K1s 1FJ, GGG. Reports received: OO from ZGO, OJR, K1s, ILJ, JVR; OES from ZGO, K1s TKJ, PKQ. Traffic: (Jan.) W1AW 295, K1IFJ 232, GGG 210, W1OBR 134, BDI 104, YBH 102, K1JAD 96, PUG 85, QPN 75, W1RZG 68, K1-PPF 67, AQE 64, PQS 45, W1RFJ 38, FHP 28, K1MBA 28, W1CHR 23, K1EIC 18, DGK 16, W1KUO 16, QV 12, FXS 10, NTH 10, BNB 8, K1EIR 4, PKQ 4, K4MUT/1 3. (Dec.) W1RZG 102, K1QCR 17, W1CUH 2.

MAINE—SCM, Albert C. Hodson, W1BCB—SEC: GRG. PAM: K1ADY. RM: K1KSG. General poor conditions and early long-skip made net operations difficult and the patience of NCS operators should receive our thanks. New England QSO Party results show the following leaders in the Maine section: GKJ, 5160 and EQ, 1377 points. LWV reports that the Maggot City Phone Net in Millinocket meets Mon. at 1800 EST on 3975 kc. STW is getting his ART-13 on the air. LWV is on RTTY with 200 watts. DAW, KFZ and K1NMP are on 2 meters. K1BUC has a Hornet tribander. KN1UEH now is on in Brewer. KN1VEB, the XYL of K1SHQ, is a new YL operator. ECM and MBR are building Nuvistor 2-meter converters. UZX is experimenting with the "Big Wheel" antenna. Our Maine Secretary of State has acknowledged letters from several amateurs and has recognized that the numeral "1" should have been provided with a flag at the left of the top to distinguish

(Continued on page 114)

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from the letter "L." Correction will not be made until new plates are issued in 1968. BPM has made WAS *five* ways, 48-staters on 75, 40 and 10 meters in '57-'58, and endorsed for 20- and 15-meter phone in '61-'62! He would like to hear from others with WAS and as many as five endorsements! Congrats, Dick. Traffic: K4BSS/1 152, K1BZD 31, MDM 31, W1GRG 28, EPN 14, ISO 14.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—SEC: AOG. New appointments: PEX as ORS, ACB as OO HGT and K1MEM as OESs. Don't forget the New England Division Convention at Swampscott Apr. 7-8. On 75 meters: K1s NBG, TXF. On 2 meters: ETZ, MB, MEG, JBY, GKE, AIR, RKS, KJ, DDI, FR, K1s DIR, HDY, JCU, EET, KN1s VAD, VAK, VAK, VKA, HSP is a Silent Key. The 6-Meter Mobiler Club meets the 3rd Sun. afternoon of each month at the So. Congregational Church in Braintree. BB spoke at the QRA on 160 meters. K1BIF is active on all bands. ALP spoke at the Milton Club. KN1UAB has an SX-17 and an Eico 720 transmitter. KN1VBS has a DX-20 and an S38E on 80- and 15-meter c.w. TJP writes from Florida. The T9 Club met at MNK's QTH. K1OJQ has a Valiant kit. PTR is changing his receiver. We need an EC for the City of Boston. AOG is on 40-meter c.w. K1CMS, ILA, KCN and KCO are going to Alaska by car in July. HGT is working out well on 6-meter DX. K1ROA has his General. K1MEM is building an 813 kw. rig. KN1TTL has an NC-109 and a Globe 90A on the air. The Framingham Club held two meetings. K1KUY is busy at school. AQE has a new shack. KN1TKI has a TBS-50 and an SX-110 on 80 meter c.w. K1UEA is the call of the Maria Immaculata Radio Club in Natick. K1QAG is wintering in Tucson, Ariz. AWA and K1DGI are in California. ORV helped a boy to contact his folks from the South Pole. K1AQI has been on 6 meters. K1KKS built a crystal 4-tube converter for 2 meters. DGY is moving. A new club in No. Attleboro will be named after the late R. O. Earl Batchelder, W1LL. Nat Hallenstein spoke to the group. BB was busy with the 160-meter DX Test. K1TOO is on 6 meters. K1MVN is building a rig for 50 Mc. EM2-MN held 23 sessions, 329 stations and handled 164 pieces of traffic. K1GYM is going on 20-meter s.s.b. ELP has ordered an s.s.b. TZ is moving to a new QTH. FMW is working DX. The Yankee Club held an Old Timers Nite. K1MDI has an HT-40 and an SX-140. ULJ has a DX-40 and an SX-110 on 10 and 40 meters. K1DYA has a Viking II and a Gonset on 2 meters and an SX-71 and an S-40A on all bands. The Bay State ARC has changed its name to the Middlesex ARC and meets the 2nd and 4th Fri. in the Waban Library, Newton. K1OGA is secy. New hams going on 6 meters: K1s OGA, OLQ, NFD, OQX and W1LJO. The Mass. V.H.F. Society met at QXX's. Appointments endorsed: AOG, MRQ, AQE.

(Continued on page 116)

MASSACHUSETTS QSO PARTY

April 7-9

The Northeastern University Amateur Radio Club announces a Massachusetts QSO party in which all amateurs are invited to participate. Details follow.

1) The contest begins at 2300 GMT April 7 and ends at 0459 GMT April 9. 2) Suggested congregating frequencies are 3660, 3870, 7080, 7260, 14,100 kc., 21100, 28100, and 50 and 144 Mc. 3) The same station may be worked for additional credit on more than one band. Phone and c.w. are considered separate contests. Stations may enter both but must submit separate entries. 4) General calls: "CQ MASS." Massachusetts c.w. stations identify themselves by signing "de (call) MASS K." Phones say "Massachusetts calling." 5) Contact information: Mass. stations send QSO number, RS(T) and county. Others send number of QSO, RS(T) and state, province or country. 6) Scoring: Each completed contact counts five points. Non-Mass. amateurs will multiply by the number of Mass. counties worked; Mass. stations will multiply by total number of states, provinces and countries worked. Multiply this total by 1.5 if input power remains under 150 watts at all times. 7) Certificates will be issued to the highest-scoring station in each state, province, country and county in Massachusetts. 8) Logs must show the date, time, emission, and power input as well as the required contact information. 9) Contest logs should be submitted to Northeastern University Amateur Radio Club, 360 Huntington Ave., Boston 15, Mass. postmarked not later than May 5, 1962.

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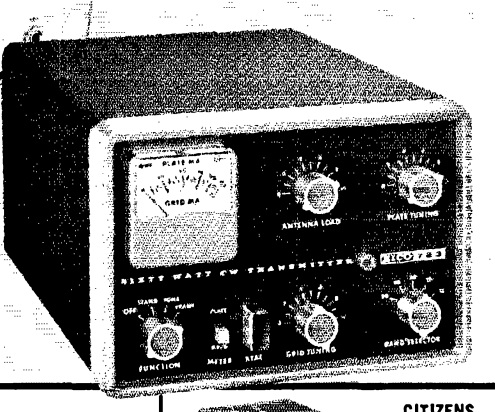
Perfect for novice or advanced ham needing low-power standby rig. "Clean" 60W CW, 50W AM-phone with EXT plate modulation. 80 through 10 meters.



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Complete with battery Select variable tone, flashing light, *or both together.* Phone jack for private use. Efficient speaker: clean loud signals.
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Includes complete set of coils for full band coverage. Continuous coverage 400 kc to 250 mc. 500 ua meter.

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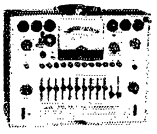

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BB, TY, K1BYV as ORSs; AOG, BHD, K1KUY as OESs; AWA as PAM for 6; AQE as RM for 15; BHD, TZ, VMD, OFK as OBSs; DFS, TZ, OFK as OOs; MRQ, OFK, BB, AAR, DOM as OPSs; BHD Everett, MRQ Groveland, MMQ Milton, KWD Weymouth, K1-AQI Burlington as ECs. HIL is QRA treas. BGW has an A-1 Operator certificate. The 6-Meter Cross Band Net had 22 sessions, 393 stations handled 78 pieces of traffic, reports K1BGK, act. net mgr. GHZ has a Globe Scout and an HG-129X on 80 and 40 meters. K1UAU passed his final exams. Congrats to SAD on winning the Edison Award. Traffic: (Jan.) W1PEX 417, EMG 321, OFK 167, K1OCD 52, W1ZSS 52, DOM 51, K1LFA 29, BGK 27, W1AOG 23, K1QOJ 20, QNQ 19, ROA 18, W1HGN 17, HGO 16, K1MYN 16, W1SIV 15, AUQ 14, K1GKA 14, W1VYS 14, K1CMS 12, QOG 12, W1LFA 11, GEK 8, K1QNZ 6, W1HGT 5. (Dec.) W1AWA 576, DFS 296, K1MEM 271, DGI 85, BYV 50, QNZ 26, CMS 20, W1-RQL 8. (Nov.) K1BYV 4. (Oct.) K1BYV 58. (Sept.) K1BYV 7.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. RM: K1IJV. PAM: DXS. VNH is running 20 watts on 1296 Mc. KUE is now on s.s.b. with his homebrew exciter. WFL has a new Drake 2B and tribander antenna. LRE has a new 2-meter converter. The following are on AFSK-RTTY in the 2-meter band: EVZ, IDJ, YMZ and K1DZI (plus about 20 more up and down the Connecticut Valley). K1JRX has a Gonset II. K1LBB has just made WAS, all on 80 meters. Pittsfield C.D., under the direction of BKG, held a mock disaster program Jan. 20. KZS demonstrated his version of the Nuvistor preamplifier at the BCARA. Others taking part at the meeting were K1-DGA and AZW. Coming meetings of the Montachusett Amateur Radio Club: Apr. 13 at WFGM in Fitchburg; May 11 the annual club auction at Kendall Hall, N. Leominster; June 16 the Annual Barbecue and election of officers. MDS is working 10- and 20-meter s.s.b. with a new HT-32B. K1JNC has built an electronic keyer. JTL and BYH have APX-6s. WMN again maintained 100 per cent representation on 1RN and cleared 107 messages during its 27 sessions in January. Attendance is up somewhat over previous months. KITXA is now operating 20-meter s.s.b. daily from KA7TB on Kyushu Island, Japan, on frequencies between 14,310 and 14,320 from 2100 to 0300 GMT. He may be reached by mail at the following: Sp5 Richard F. Tassone, KA7TB/KITXA, CMR#3, Box 7370, APO 929, San Francisco, California. Traffic: K1IJV 139, LBB 94, W1BVR 83, MNG 23.

NEW HAMPSHIRE—SCM, Ellis F. Miller, W1IIQ—SEC: K1GQK. PAM: K1JDN. RM: K1ITS. GSPN meets Mon. through Fri. at 2400 and Sun. at 1430 on 3842 kc.; CNEN Mon. through Sat. at 1145 on 3842 kc.; NHN Mon. through Sat. at 2330 on 3685 kc. Appointments: SWX as OO and K1PDA as OES. Endorsements: K1CIG as OBS and K1KOB as OES. On Jan. 20 the writer journeyed to Nashua to attend the Annual Banquet and Installation of Officers of the Nashua Mike and Key Club. The meeting held at Howard Johnson's was enthusiastically attended by more than sixty members, XYLs and friends. Among the topics discussed were propagation conditions, League policy on CB operators and groups, and club plans for League activities in the forthcoming year. Please accept my sincere thanks for an FB turnout and the splendid hospitality shown me on this occasion. New officers: K1RTB, pres.; TA, vice-pres.; K1KXP, secy. K1MNK, treas.; MLW, act. mgr. Sincere congratulations to the new officers and our very best wishes for a successful year. Our section OOs are doing a fine job. Your reports are appreciated, fellows. Traffic: W1TA 63, K4UGL/1 37. K1JDN 24, W1YMJ 14, K1GQH 7, W1IIQ 7.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: PAZ. RM: SMU. PAM: TXL. Endorsements: SMU as OBS, ORS and RM. RISPN report: 31 sessions. 583 QNI, 68 traffic. Winners in the Rhode Island section of the New England QSO Party were K1LPL 14,220 and QLT 704. The R. I. Mobileers are building a master station to cover all bands. The station will be located in North Kingston. The NCRC of Newport will hold an auction Apr. 30 at club headquarters. NCRC certificate requirements have been changed to 5 QSOs with club members. The CRA of Cranston elected K1KCA, pres.; K1EGD, secy.; K1EBM, treas. New antennas are being built by K1KCA and EGD. A new call of s.s.b. is HZE. The Exhibit at the Old Slater Mill Museum in Pawtucket of "Radio Amateurs in Action" and station K1-RI opened Feb. 1. Committee members are K1AAV chairman, JPK, KBD, IAP, LII, DWH, GRC, W1TXL and SMU. The AQ Club of Rumford elected K1LXQ, pres.; CZD, vice-pres.; WAC, treas.; K1NSY, secy. WRI Cert. No. 14 was issued to HOO and No. 15 to K4JIG. The club has a new HQ-170. Traffic: W1SMU 671, TXL 360, K1DZX 36, GRC 30, PZY 25, LSA 10, PNI 9, W1WED 6, K1KAZ 4, JOD 4, GRA 3, KDI 1.

(*Continued on page 118*)

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for 27, 28, 50, 144 or 220 MC.
Lower noise figure
Over 20 db gain.

Model PV—Uses 6CW4 Nuvistor. Improves gain and noise figure of present converter or receiver. Specify frequency.

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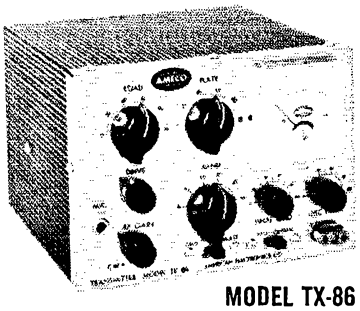
A combination squelch & noise limiter. Requires only 12V B+. Model . . . SNL-12, for 12V or SNL-6, for 6V, **$17.95.** Noise Limiter alone, Model ANL-6 or ANL-12, **$7.95**



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SCOPE PATTERN SHOWING 100% MODULATION OF TX-86

The TX-86 is an attractive, compact (only 5" x 7" x 7") transmitter that can handle 90 watts input on CW and 90 watts peak input on phone on all bands. It is ideal as a fixed or mobile unit. The new modulator circuit produces modulation that cannot be distinguished (with a scope) from push-pull plate modulation (see photo above).

Tube lineup:—12BY7 oscillator, a 6BQ5 buffer, a 6146 final modulated by a 12AX7 and a 6AQ5. Power requirements of 6 V at 3.2A or 12 V at 1.6A and 300 V at 75 ma. plus 600 V at 150 can be supplied by PS-3 for fixed use or W612A for mobile. Smaller power supplies can also be used. Other features include: Final operates STRAIGHT-THRU on all bands, push-to-talk mike jack; Pi-net output ckt., true potentiometer drive control (no detuning of circuits), can take crystal or VFO.

Model TX-86K Kit (specify 6 or 12 V)..... **89.95**
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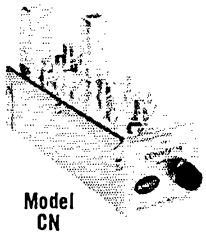
For 50, 144 & 220 MC
High Gain, Low Noise



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$49.95 wired **$34.95 kit**

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Model PS-1 — Matching Power Supply—plugs directly into CB-6, CB-2 and all CN units. **PS-1K—Kit** .....**only $10.50**
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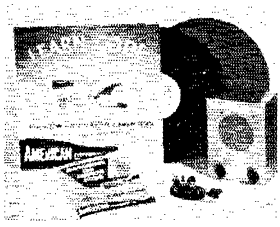
Radio Electronics Made Simple	1.95



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VERMONT—SCM, Miss Harriet Proctor, W1EIB—SEC: K1DQB. PAM: HRG. RM: KRV. The CVARC has affiliated with ARRL. UCL is working with St. Albans Area amateurs to build a radio club. FPS was top Vermonter in the N. E. QSO Party. Others were active but sent in no reports. CBW is moving from Waterford to Barre. A warm welcome to KN1VNA, KN1VBN, KN1VNC, KN1VND, KN1VNE and KN1VNF in the Bellows Falls Area! Work is progressing on amateur radio communications for the Girl Scout Jamboree at Button Bay. VTN is meeting six nights a week on 3520 kc. at 1800 hours. SCE has been active from Belmont. New certificates have gone to K1HKI and K1GYT. All contacts by K1GYT were on 6 meters. Traffic: W1KJG 2.

NORTHWESTERN DIVISION

ALASKA—SCM, John P. Trent, KL7DG. BZO sent in the following for the SCM: The Anchorage Radio Club has a lot of new rules now and many of the old members are coming back. There's a new committee, the TVI and RFI, with PJ as chairman. Members are AUV, APV, BDG, BGH, BZO, CUK, CNR, CLY, CDG, CLA, DGA, DFE and DZH. W5CAA/KL7 will be on 14.270 kc. for anyone in the Lower 48 wishing to contact Anchorage or vicinity. CLA and his 180 are back from California. Doc Walt and Wanda have left for a new station in the Lower 48. DDM and DMV now have a new tower rotator and beam. IS has a different 2-meter beam now and many Anchorage amateurs copy Dick real well. AEQ and CUH are trying to work Anchorage as the Anchorage amateurs are trying to work Fairbanks. Lots of new appointments will be made when your new SCM is elected. Many amateurs have the background for this and like to work with others. Take an appointment and be an active amateur.

IDAHO—SCM, Mrs. Helen M. Maillet, W7GGV—The FARM Net changed its meeting time to 0100Z on 3935 kc. for more favorable band conditions. Magic Valley hams meet on 3910 kc. at 1600Z Sun. for the AREC net called by EC SGS. 9WSR, formerly of Joliet and a pioneer in broadcast radio in the Chicago Area, became a Silent Key while visiting his son in Grandview, Idaho, early in January. New officers of the Pocatello club are UA, prexy; ex-KN7LGW, veep; K7GCE, secy.; K7-KVS, treas. Officers of the Magic Valley Club are K7-DMY, prexy; SGS, veep; GCX, secy.; K7DMZ, treas.; KN7PZD, publicity. K7HLR, editor of *Hambone News*, got a new Spirit Duplicator and hopes to issue the publication monthly if *you* will send him news and pictures. K7GHF sends greetings from the Coast Guard station in Connecticut and K7GTK from Castle AFB in California. FARM Net traffic: 15. GEM Net Traffic: 17. Traffic: K7KBY 84, W7EMT 35, VQC 22, K7HLR 5, W7-GGV 1.

MONTANA—SCM, Ray Woods, W7SFK—SEC: BOZ. PAM: YHS. RM: K7AEZ. The MPN meets on 3910 kc. at 1800 hours M-W-F, the MSN meets at 1830 hours on 3530 kc. T-T-S. TSN meets M through F on 7230 kc. at 1200 hours. The Helena Radio Club's officers are KN7-PFQ, pres.; K7KLF, vice-pres.; K7KME, secy. NPV has all the cards from all the Montana countries. NME moved to Seattle. CJB and DVK are working RTTY out of Missoula. A tri-state net is operating on 3855 kc. at 1900 hours T-T-S. K7EWZ is on with a Ranger 2. K7NHV is coming along with his 2-meter gear. Montana hams were saddened by the passing of OIP. LUT and UWY lived it up at Phoenix for a few days. If any Montana hams belong to the Montana Historical Society, please drop a card to GSV at Big Sandy. K7MFV is editor of a nice paper called *The Technician* out of Billings. YQZ celebrated his 92nd birthday with an open house at the home of his daughter, ZJZ. JLL and JLM are heard on 6 meters around Forsyth. Sympathy to YHB on the loss of her mother. The Lewistown Radio Club's officers are FTO, pres.; GZA, 1st vice-pres.; UYP, 2nd vice-pres.; WSE, secy.-treas. Traffic: (Jan.) K7EWZ 352, NHV 75, BKH 48, W7TVX 47. (Dec.) K7-NHV 299, W7BKH 78, TVX 33, K7GHK 32.

OREGON—SCM, Everett H. France, W7AJN—SEC: WKP. RM: MTW. PAM: NJS. New appointments RVN as Multnomah County EC. Certificate endorsements: WKP, DIC and RVN as OPSs. Active nets making monthly reports: AREC Phone Net, 3875 kc. 0300 GMT Tue. through Sat.; OAREC C.W. Net, 3585 kc. 0330 GMT Wed. and Thurs.; Oregon State Net (OSN), 3585 kc. 0230 GMT Tue. through Sat. ZFH, OSN manager, reports January activity: Sessions 22, attendance 192, traffic 44. BRAT awards went to AJN, ZFH, MTW and K7IWD. This net is part of the National Traffic System. CVL, Clackamas Amateur Radio Society president, reports classes are conducted as follows: C.w. by PFA, electronic by MYG. UQI is C.D. Radio Officer for

(Continued on page 120)

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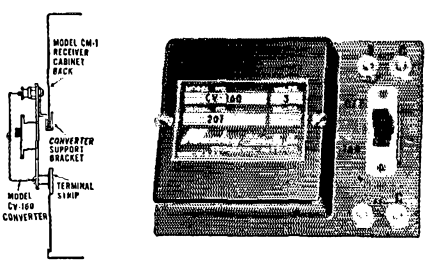
Rear chassis accessory facilities: Transmitter relay terminals, accessory power socket, external speaker/VOX terminals.
Power consumption: 33 watts. (115 volts a.c., 50 to 60 c.p.s.)
Write for complete descriptive brochure and the name of the dealer handling the CM-1 in your area.

Amateur Net, $182.70 * (All crystals included)
Matching Speaker, Model CMS-1. Amateur Net, $16.95 *



New! MOSLEY 160 METER CONVERTER
Model CV-160

Converts the 160 meter band, 1750-2000 kc. to 3700-3950 kc. for reception on most 80 meter band receivers.

Designed to attach directly to rear of the Mosley CM-1 and adaptable to most other amateur band receivers.

Connects only to antenna and ground terminals of receiver. No other connections are required. Transistorized, crystal controlled, printed circuit, self powered by two penlite cells (not included).

*Amateur Net, $14.95 **

* *Slightly higher west of Rockies and outside U.S.A.*

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Clackamas County. K7IMH, OES, now has 160 watts PEP s.s.b. on 6 meters and is looking for skeds on 50.125 or 50.184 Mc. ADR, OES, is on 2 meters with 90 watts, a Tape Tone converter 417-A and an eight-element beam. K7IWD and K7KTP have been busy checking the bands for bad c.w. signals and send in good reports on their OO activities. BUD is president of Southern Oregon Radio Club in Grants Pass. ZQM is back on the air after a long absence. If you are not listed in the traffic lineup this month, it means that your report was received too late. Any news and traffic listings should reach me not later than the fifth. Traffic: W7ZFH 58, K7JVN 24, W7BVH 22, K7IWD 22, W7DEM 20, AJN 16, EUG 10, K7CJB 6, W7MTW 6.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—SEC: HMQ. RM: AIB. PAM: LFA. Nets in the section are as follows: CBN, 3960 kc. at 0230Z; NSN, 3700 kc. at 0400Z; WARTS, 3970 kc. at 0130Z; WSN, 3535 kc. at 0200Z. The last two are members of the NTS group. The members of the Northeast Washington 7s are in the process of having a new special design QSL card printed by OPR. KN7RBT uses a Johnson Adventurer and an SX-40A for his contacts. K7HFN is QRL building a high-power linear for 6 meters. BTB says increased activity is due soon on 2 meters in the area around Bremerton. ZAS received WAZ certificate No. 124 for all phone and WAZ certificate No. 57 for all s.s.b. AGN joined the ranks of Silent Keys Jan. 28. New appointments are BJW and RPZ as ECs; K7s ASX, CHH and QOG as OESs. Renewals: BA as ORS, OPS and OBS; W7s ANL, AXH, CTS, DJA, GUJ HMQ, IGF, OZY, PSD, SEC, SRU, UJA, UWT, VNC, ZCE, K7s BIV, COD, EHP, EYM, IGW, KFT and LZA as ECs. Local activity on the 2-meter band in the Spokane Area is going very well with RTTY increasing rapidly in the area. ACA reports net skeds erratic because of poor band conditions. The Skagit Club Banquet will be held Apr. 14 near the Arlington cut-off. IEU is active again on 40 and 80 meters. K7CWO has a new Heath KL-1 linear. CBE is waiting to pour a concrete base for the new high-gain vertical. The NSN had 196 QNIs and 64 QTCs for January. GVC demonstrated a fancy receiver. DTK is building a new v.f.o. NDC is QRL installing new shelving in the shack. KN7RC is a new Novice in the Seattle Area. In the Richland Area we have KNs RMS, RRM and RSM. K7QOM is awaiting an SB-10 for his Apache. K7OFW is waiting for a new s.s.b. exciter/transmitter from Heath. K7s KSE and KSF are new grandparents. CXJ, YFO and K7ILQ are building low-power gear for 10 meters. OIH has completed his 9TO tube type keyer. PTH has a new DX-60. NNH built a crystal convertor and a.v.c. squelch system for 29.51 Mc. K7PIY is in a new QTH. K7AFU vacationed in New Mexico and mobiled on 75 meters. W7s GJL, HMJ and K7s IGW, IEI and QNC assisted the Salvation Army in Thurston County delivering food and toys to the needy during the holiday season. All ECs are asked to forward complete annual report of Emergency Coordinators immediately to ARRL and your SEC. HRC is undergoing medical checks. KX has procured a 32-V series transmitter for squirking that new signal from the north end of Seattle. BA is on his eleventh year of BPL without a break. Congratulations to a very outstanding traffic man. See *QST* Hamfest Calendar. Traffic: W7BA 814, DZX 571, GIP 116, APS 51, OEB 17, AIB 14, BTB 13, K7PXV 12, W7IEU 7, ACA 6, K7CWO 6, W7LFA 4, UOJ 4.

PACIFIC DIVISION

NEVADA—SCM, Charles A. Rhines, W7VIU—The Las Vegas AREC Net meets at 0400 GMT Tue. on 7255 kc. PBV still is checking in on the Golden Bear Net. K7KBN is a new Nevada OBS. KBN and KN7PSK and RBM play chess on 40 meters. ICW is the new AEC for Las Vegas for 6 and 2 meters. 6- and 2-meter AREC nets in Las Vegas are getting a good attendance. ICW worked KH6IJ on 160 meters. We now have 51 AREC members in the section. We would like more news from around the section. Traffic: (Jan.) W7KHU 231, K7KBN 10, W7PBV 4. (Dec.) W7KHU 104.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K6DYX—Sequoia High School, Redwood City, was host to the 7th Annual Inst. of the Bay Section of the Calif. Industrial Education Assn. Those assisting and manning club station WA6TDI were WA6NQV, WA6RCJ, WA6UWZ and WV6UCZ. W6NVO recently installed the following new officers of the NPEC: W6BEE, pres.; WV6UAO, vice-pres.; WA6GRL, secy.; K6EQE, treas.; W6QIE, liaison officer; WA6JCL, WA6QOQ and WV6-VAV, standing committee chairmen. The new MARS Club of the Presidio of Monterey elected K6DYX, pres.; WA6BZE, vice-pres.; W6ZLO, secy. Cabrillo College Communicators (Tri-C), WA6TST, recently was formed at the college in Watsonville. W6KHS, electronics in-

(*Continued on page 122*)

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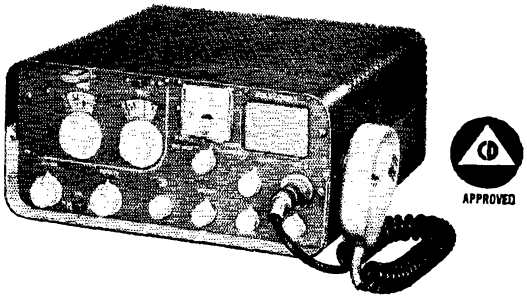

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UNEQUALLED BUILT-IN FEATURES • 10 WATT RF OUTPUT • ULTRA SENSITIVE SQUELCH AND NOISE LIMITER • ILLUMINATED RF OUTPUT AND S METER

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structor, is in charge of planning new club gear. WA6OLQ is now president of PAARA as WA6KSK was forced to resign. W6KRS is now chairman of the Communications Committee for the Golden Gate Chapter, ARC, San Mateo and Sequoia Regions. W6QIE is chairman of a committee to organize a communications group within the incorporated cities of San Mateo County. K6SMH's mobile transmitter won first place at San Jose City College. K6VQK and W6SHK shared the awards at the MBRC annual construction contest. WA6HRS, W6CUF and K6BPB operated from the Lockheed Club station, WA6GFY, in the January CD. W6WNI is back from Oklahoma and again an ORS. Traffic: (Jan.) K6KCB 564, K6DYX 293, K6GZ 157, WA6OLQ 126, WA6EIC 101, W6AUC 66, W6FON 52, W6DEF 46, W6ASH 42, K6ZCR 36, W6AIT 21, W6OII 21, WA6HRS 16, K6YKG 16, W6WX 14, K6BBF 13, W6UW 13, W6RFF 10, W6UVP 7, K6TEH 3, K6EQE 2. (Dec.) W6AIT 101, K6TEH 2.

EAST BAY—SCM, B. W. Southwell, W6OJW—The LARK has instructographs available for those in the vicinity of Livermore interested in obtaining a ham ticket. Write Box 488. WA6KLL is putting up a new tower. K6GK is the main-stay on UTL. WA6GXC is on 144 Mc. homebrew with an 829B final. The SAC'EN Net is moving from 50.250 Mc. to 50.390 Mc. but will remain on Thurs. at 2015 PST. K6KLY is running 300 watts on 144.45-Mc. n.f.m. K6GK still is traveling around California between traffic skeds. WA6FLD was BT'd at Point Arena with a Ranger and an HQ-129, and lost his antenna in a storm. W6JI visited W6BGU and W6BZ and is looking for a new rig. New officers of the SARO are W6FDJ, pres.; K6KVZ, vice-pres.; W6IJY, secy.; W6RCE, treas.; W6QWX, comm. mgr. WA6ECF has gathered 7 new awards, and is nearing DXCC. W6QMO is acting mgr. of NCN because of the resignation of WA6LVX, who is QRL college. WA6JCS is the first YL president of the HARC. WA6JYB has a new DX-60. WA6KUN is in KH6-Land with the USN. WA6ONO has a new Heath "Tenner." WV6RQS has a new NC-105. WA6NOC has been hearing plenty of DX on 7-Mc. a.m. WA6KUU is building a 500-watt linear. The HARC is looking for reporters for the club newspaper. Contact WA6JCS if interested. W6TDH and WA6HYS are new members of the ORC. WA6DJD has a new 250-watt rig. Get that 145-Mc. receiver perking for the next Oscar package. Traffic: (Jan.) K6GK 130, K6ZYZ 29, WA6FLD 2. (Dec.) K6GK 220, WA6ECF 30. (Nov.) K6ZYZ 114, WA6ECF 20.

SAN FRANCISCO—SCM, Wilbur E. Bachman, W6BIP —K6SEX and W6JXK were guest speakers at the Feb. S.F. Radio Club meeting. They brought along printers, converters, etc., and spoke on RTTY. K6SEX also was guest speaker for the HAMS club and brought out quite a crowd to listen to his subject—teletype and the part it plays in amateur radio. The BAYLARC group is busily mailing out data on the YL get-together to be held in San Francisco Mar. 30, 31 and Apr. 1. SEC Bill Ray reports, "The AREC Net celebrated its 10th anniversary Feb. 4. You are urged to check in each Sun. at 10.30 A.M. to discuss emergency plans and problems. Keep your local nets in constant training. Teach members to handle messages traffic, proper ARRL message form and procedure, etc. This is important in time of emergency or disaster. All messages should have proper direction and authorized signature as well as a serial number for file reference. The Mission Trail Net, Inc., celebrated its 25th anniversary Jan. 20. It is the first phone traffic net in existence. AF MARS is trying to get members on 6 and 2 meters because atomic tests have proven to disrupt the ionosphere for hours even days and h.f. frequencies could be knocked out, so the move to v.h.f., which is not controlled by ionosphere conditions. MARS is considering repeaters and strategic relays, etc. W6GGC and W6WJF attended the "EC" AF MARS Meeting and Banquet held at Fresno. W6GQA and K6JFY worked in the Jan. C.D. Parties. K6OHJ participated in the C.W. DX Test. OHJ helped K6ANP put up a five-element Telrex 2-meter beam—about 55 ft. high. Len hopes to get a pole set in the yard so he can get back on DX soon. With over 300 at the wedding reception for K6ANP and Rae, the YL of W6GGC, on Jan. 13 many old-timers in amateur ham ranks got a chance to ragchew and as W6AHH says, "It was the best ham convention I ever attended." W6UDL, SF Club pres., and his XYL, WA6ALK, BAYLARC pres., are both busy at their new assignments. Two lucky clubs to have such fine workers. Congratulations to "Zack" on his new store "Zackit" located at 2751 Mission St., S.F. W6QMO, NCN manager, attended the NC Traffic and Emergency Assn. Breakfast held in San Jose Jan. 28. W6FDU and WA6ADX are working on a new superhet. K6JFY's XYL, WA6HSF, has been in the hospital but is now home recuperating nicely. Anyone interested in "Oscar Program" is invited to write in to "Oscar Assn., P. O. Box 183, Sunnyvale, Calif., for data.

(Continued on page 124)

great response

Naturally. This smart ham is using a University Model 70. It's dynamic! Now his QSO's are more frequent with better quality. You'd be surprised at the compliments he gets. He's also improved his SSB transmissions . . . found the perfect budget-minded way to increase peak power and intelligibility. And he doesn't have to swallow this microphone to be heard. All he does is sit back, relax and speak normally. The Model 70 does the rest. Why not let it do the same for you. Comes complete with integral 15-foot 3-conductor shielded cable, Model SA10 slide-on stand adapter and cloth carrying bag. Check the 'specs'. No other dynamic of its type can match the great Model 70! Only $29.95*

SPECIFICATIONS

Frequency Response: 50-14,000 cps (which extends to a usable limit in the 18,000 cycle region). *Impedance:* 30/50; 20,000 ohms. *Output Level:* 30/50 ohms: —50 db/1 mw/10 dynes/cm^2; —143 db EIA sensitivity rating; 20,000 ohms into high impedance input; 28 mv/10 dynes/cm^2. *Hum Reference:* —120 db/.001 gauss. *Dimensions:* 1-5/32" maximum diameter, 6" maximum length. *Shipping Weight:* 2¼ lbs. *Finish:* Acrylic silver-gray and non-reflecting black.

*Model 71 also available with on-off slide switch $34.95.

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Frank Curtis is the proud owner of a new call, WV6VIO, and has his station and teletype all set up and ready as soon as he receives his official "ticket" from the FCC. W6UDL's call has been added to the membership listing of the Old Timers Club. W6OKR has raised his tower to 48 feet. W6WQI has a new rotating 20-meter beam. WA6ELC's v.h.f. activities have been curtailed because of studies at UC. Congratulations to W6OKR on the birth of a jr. operator. Treasure Island station K6NCG was active from S.F. Area "Operation 88" for an orphanage in Texas. Traffic: K6QJB 181, K6JFY 130, WA6MDL 102, W6QMO 94, K6JFY 48, WA6BXV 24, K6SAA 24, W6FDU 10, W6GGC 6, WA6JGR 6, W6JWF 4.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The Northern and Southern California DX Clubs held their Annual Convention in Fresno on Jan. 21 at the Hacienda Motel. The Southern California DX Club was host, with Henry Radio of Anaheim doing the honors. W6PXP worked the submarine USS *Darter* while it was submerged with its whip around 20 feet above the water. K6SHO and W6TZP are experimenting with poliplexers on 420 Mc. WA6AFW is heard on 20-meter s.s.b. with 811s in the final. W6TKF is running a pair of 811s in the final on s.s.b. W6SGH is heard on 75-meter s.s.b. W6NKZ is thinking of a new mobile rig using more rugged tubes than 6BQ6. W6TOT is now located in Fresno and is chasing DX. W6SRU put up an antenna and is getting ready for DX. K6PJN has a Leece-Neville alternator in his pickup. W6KJS is chasing DX. W6FYM was a recent visitor in Fresno, and is now semi-retired. K6SWW is recuperating from a ruptured appendix. W6AXI, K6ODA and WA6GJA supplied communications for a special election in Stanislaus County using 3995 kc. K6MIDH is teaching code at Modesto Jr. College. WA6FFJ has been appointed program chairman for the Fresno Amateur Radio Club. Traffic: (Jan.) W6ARE 36. (Dec.) W6EFB 18, W6ADB 16.

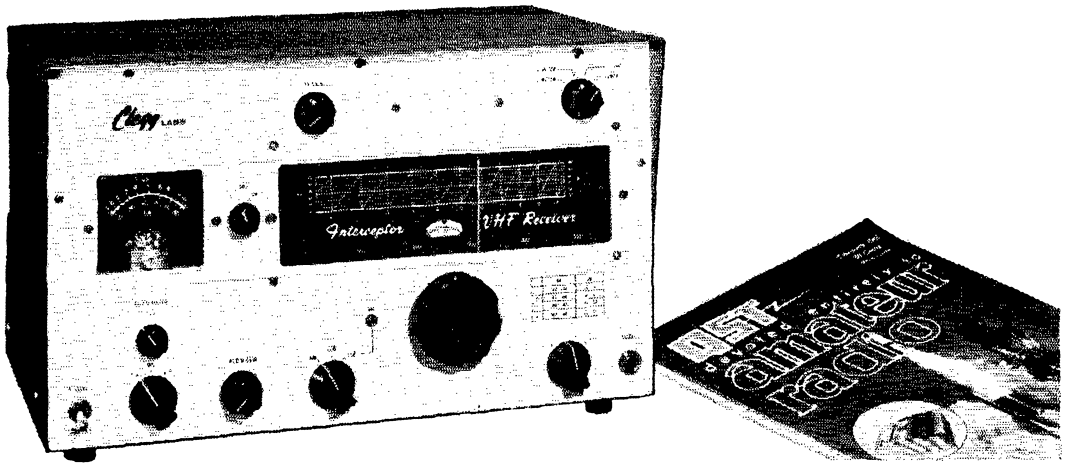
ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH—SEC: W4YMI. PAM: W4DRC. V.H.F. PAM: W4ACY. RM: K4CPX. Congratulations to the N.C. C.W. Net, which meets daily at 2330Z on 3547 kc. These boys publish an excellent bulletin edited by W8EXZ/4. They also have a slow-speed net that meets on 3610 kc. at 10:00 p.m. EST. I sincerely wish that every net published a net bulletin and kept as good records as the NCN. Robert C. O'Bryan, of Pollocksville, has been appointed as SEC. He needs and deserves the cooperation of every amateur in North Carolina. As I have pointed out many times we need good Emergency Coordinators in many cities and districts. How about sending along a name of some good amateur to act as EC in your area. Many clubs in the state should name someone to this post. The following are active ORSs: W8EXZ/4, K4YEP, K4FUN, K4TPZ, K4YCL, W4PNM, K4MPE. Congratulations to these ORSs, who are doing a good job. Anyone interested in an ORS appointment, contact RM K4CPX. Have received two excellent reports from Activity Manager W4CGO of the Cherry Point ARC. Wish we had more club reporters like Syd. Would like to have reports from all other clubs. Traffic: (Jan.) K4CPX 213, W8EXZ/4 118, K4BUJ 48, K4FUN 6. (Dec.) W4PCN 26, K4TPZ 26, W8EXZ/4 23, K4YCL 22, K4QFV 19, K4GNX 15, K4VQR 15, W4CH 13, W4PNM 13, K4MPE 11, K4EOF 10, K4YNW 10.

SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4GQV—SEC: K4PJE. PAM: K4KCO. RM: W4PED. The Spartanburg ARC had an excellent meeting Feb. 6 which was well attended. W4NTO presented the SCM, W4GQV, and the Vice-Director, W4AKC, who discussed current League affairs and the formation of a State Council of Radio Clubs in S.C. The club was presented the trophy for the best FD operation. The Charleston ARC is planning a big renewal of activity. New officers are K4RJZ, pres.; W4FFH, vice-pres.; W4UEV, secy.-treas. The newly-formed Citadel RC has been invited to participate in club programs. W4TLC gave a report and recordings of Oscar I at the July 26 meeting of the Greenville Mike & Key Club. K4WOI and K4OCU have been issued their well-deserved Section Net certificates. All Official Bulletin Stations who have not filed a "schedule of operations" should do so at once with the ARRL or the SCM. A meeting of the State Council of Radio Clubs has been called. Traffic: W4PED 81, W4AKC 44, K4WOI 36, K4OCU 28, K4PJW 23, K4WJR 18, K4KCO 7.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM: H. J. Hopkins, W4SHJ. SEC: W4VMA. RMs: W4LK, K4MXF. K4KNP, W4SHJ, W4QDY. PAMs: W4BGP, K4JQO, K4PQV. W4FOR made BPL again and reports that the Princess Anne Club is being reorganized. W4DWZ is going overseas for 60 days. Other club notes:

(Continued on page 126)



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- ★ **Extremely low cross modulation.**
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- ★ **Input provision for 220 Mc, 432 and other UHF converters.**
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W4JXD reports lots of interest in the Alexandria outfit with code classes and training films. W4PRO says the club in Hampton still is sponsoring Cradle of Democracy certificates. K4CHA, in Buena Vista, has a nice code class going. W4DLA, from Lynchburg, reports that the club there is going to sponsor the V.H.F. Forum at the Roanoke Division Convention in May. K4YNW is running a half-gallon from a homebrew 813. K4MJZ, our former SEC, is back home after extensive travels. K4MLD is busy with school at Military Academy. K4BAV is busy at college, says W4JXD. W4TE is plagued with equipment troubles of all kinds. W4CVO keeps hopping around all over the world. Ye SCM never knows from where he will receive his next report. W4CWT has been appointed EC of the Bristol and Washington Co. Area. K4ARO is back on the air with new gear and antennas. K4ASU departed for a long tour in Europe. W4JUJ wants to see a Virginia QSO Party. Any volunteers to run this party? Let the SCM know. K4IKF says that band conditions have forced the group to desert from 40 to 80 meters. Traffic: (Jan.) W4FOR 467. W4WDZ 165. W4JXD 154. W4DLA 139. W4LK 138. K4MXF 111. K4EVY 77. W4RHA 66. K4TSJ 63. W4IA 48. K4YNW 45. K4RNH 43. K4QIX 41. K4FSS 36. W4CWT 33. K4NNP 30. W4SHJ 28. W4QDY 25. K4YZT 24. K4AL 22. K4ITV 16. W4KX 12. K4JQO 11. K4SGQ 10. K4IAN 7. K4ARO 6. K4BAV 6. W4JUJ 6. K4LTK 6. W4NVX 6. W4BZE 5. W4CVO 5. K4TFL 5. WN4DUW 4. W4OWV 4. W4PRO 4. W4TE 3. W1HMQ/4 2. K4MLD 1. (Dec.) W4JXD 390. K4PQV 53. W4WRG 38. W4CWT 24. K4LTK 15. K4JQO 14. K4TZF 14. K4BAV 8. K4CHA 8. K4ORQ 6. W4WBC 2. (Oct.) W4CVO 8.

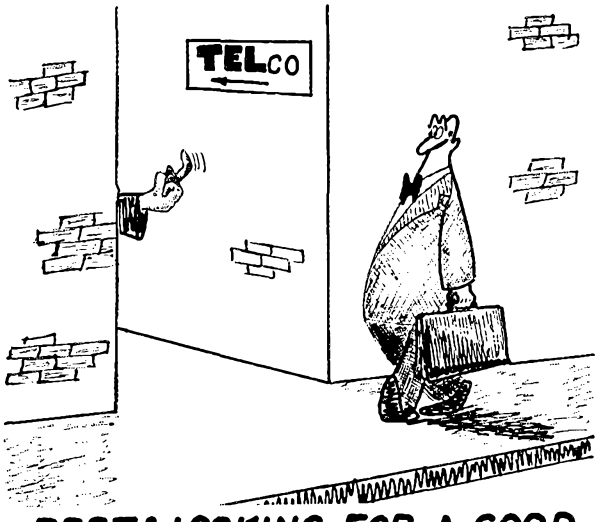
WEST VIRGINIA—SCM, Donald B. Morris, W8JM—Circle your calendar for the West Virginia QSO Party May 4 to 6, the Roanoke Division Convention May 19-20 and the West Virginia State Convention, Jackson Mills July 7 and 8. K8MYU returned to AB College at Philippi. K8TSB is a new OES in Charleston. W8NYH is QRT until after 7 P.M. because of a work change. K8MMZ now is using a DX-35 since the family moved to Columbus. New officers of the Opequon Radio Society of Martinsburg are K8WMX, pres.; W8AEC, vice-pres.; K8SDG, secy.-treas. 2-Meter Net meets on 145.8 Mc. at 0130 GMT Tue. with W8AEC, K8KML, K8SDG, W8UDJ, K8UXP, K8WMX and K8WXB active. K8LOU reports on the WVN for Jan.: 16 sessions, 101 stations, and 38 messages. K8RPB now has 205 v.h.f. contacts at his new QTH. K8HID is active working with the Centennial Commission for amateur participation during the Centennial year. The s.s.b. gang held a dinner meeting in Charleston with W8NLT as the main speaker. State Radio Council and the West Va. State Convention groups held a joint meeting at South Charleston. Traffic: K8MYU 104. W8NYH 38. K8LOU 27, K8CNB 18. K8CSG 16. W8JM 15. K8RPB 14.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald S. Middleton, WØNIT—SEC: WØSIN. PAMs: WØCXW, WØLJR and WØGNK. RM: WØFEO. OBSs: KØDCC and KØEPD. Two Western Slope nets are now in operation. The Western Colorado Net was organized a year ago under RACES and local e.d. official prompting. The Delta County Net has just come into being for local work in emergency or civil defense. A new chapter in Colorado 2-meter history was written Jan. 25 when KØKZI and WØISL made a two-way contact between Pueblo and Denver on 146 Mc. Pete was received in Denver Q5 S9 plus 10 db. Pueblo amateurs who copied Bob include WØUXN, WØFHW, WØAGU and WØDWI. The contact lasted from 2030 to 2050 MST. Twenty Wa-hington High School students in Denver are setting up a school station. A new slate of officers for the SCARC includes KØWRL, prexy; KØKDC, vice-pres.; KØWZX, secy.; KØSPR, treas. The club's new headquarters is at KPAI. The American Legion Post No. 2 is the QSL sponsor for the SCARC. The Western Slope Radio Club elected KØSJK, prexy; KØZRH, vice-pres.; KØZRI, secy. The Denver Radio Club station, WØOUI, is being moved to the new Red Cross Bldg. The United Air Lines has given the Red Cross a multi-channel kw. transmitter for station use. KØWWD made the BPL. Traffic: KØWWD 146. KØEDH 132, KØRTI 126, KØEDK 105, WØFEO 100. WØBWJ 65. WØETT 64, WØENA 32. KØWGC 26, WØCWD 16, KØEVG 16, KØLCZ 16, KØQGO 5, KØWWJ 3.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sumpson, 7OCX. SEC: BLR. Hercules employees have organized a radio club and have elected KN7RGW, pres.; K7PFF, act. mgr.; Eldon Bates, vice-pres.; Clyde Marrinan, secy.-treas. Twenty-four amateurs turned out for an organization meeting in the Kearns-Granger-Magna Area. The SCM and SEC attended the Annual Installation Banquet of the Ogden ARC. ØBWJ was the main speaker and OCX was awarded

(Continued on page 128)



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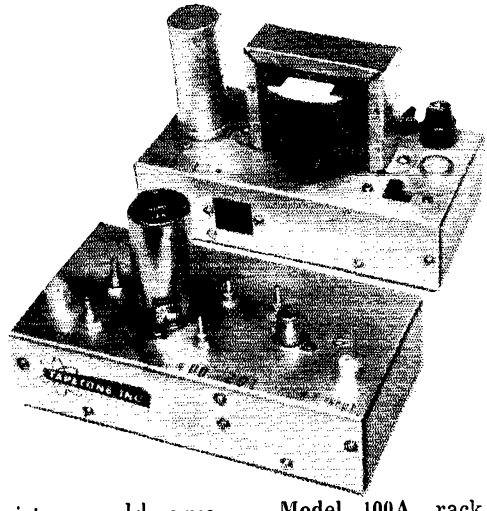

If two or three more nuvistors could serve any useful function we would have used them.

In short, the 201 was designed for performance, not price.

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the PICON Award. The Utah ARC in Salt Lake had an interesting and well-attended meeting. The main speaker was Dr. C. C. Johnson, of the University of Utah Microwave Research Laboratory. Nearly 30 amateurs from the Salt Lake Area helped the Salt Lake County AREC and the March of Dimes in the kickoff campaign. OCX, QWH, MPQ and VTJ earned BRAT awards on BUN. OCX also made it again on TWN. Traffic: W7OCX 121, QWH 30.

NEW MEXICO—SCM, Carl W. Franz, W5ZHN—We all join in extending to K5IQL our appreciation and thanks for his service to us over the past two years. K5UYF reports that the 3rd N.M. QSO Party was a success. Twenty-three Sandia Base Friendship Awards were granted in 1961. K5GOJ is a new RM, Los Alamos ARC's new officers are W5MYQ, pres.; W5HWF, vice-pres.; WN5ANZ, secy.; W5DWB, trustee. New calls there are WN5BCR, WN5BCT and W5IUK. K7CUY/5 says ham radio is ruled out at the NNWC Campus. The 50-Mc. Net is going strong in Albuquerque. K5FMF is often heard on TWN doing a nice job with traffic. How about a traffic report? CHC Chapter No. 1 goes to the four corners area the last week end of the C.W. DX Contest. W5JXN is a new AREC member in Gallup. W5PDO is back on the air at a new location. K5VQU has a TCC slot. NCSs TWN. How about that traffic report, Bob? K5IQL trained the new SCM early. Hi. Traffic: W5ZHN 252, W5UBW 54.

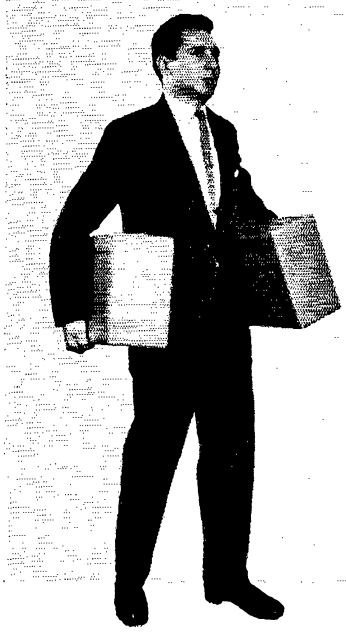
WYOMING—SCM, Lial D. Branson, W7AMU—The Pony Express Net meets Sun. at 0830 MST on 3920 kc.; the YO Net is a c.w. net on Mon., Wed. and Fri. at 1800 MST on 3160 kc. K7ONK has a new s.s.b. rig with a nice signal. CQL Pony Express Net manager, is busy sending out net certificates. CQL has a new 170 receiver. HDS, new RACES assistant radio station, is doing a very nice job. Seven Wyoming RACES stations took part in Operation Headline Jan. 26. The Casper V.H.F. Society has a lecture every meeting night. High winds have taken a large number of Wyoming hams' antennas. W7BHH has completed a tour of duty in the northwestern and western part of the state. PVN is busy chasing sheepherders. K7LAY is sporting a new 115 Hallicrafters receiver. NNXs XYL is on a trip to Salt Lake City. K7SAR left for Omaha, Nebr., for 3-months schooling. K7CSW and his XYL have a new s.s.b. rig. Traffic: W7BHH 47, K7ONK 39, KLE 34, W7HDS 22, GBX 20, AMU 12, HH 11, AEC 8, K7MAT 4, W7CQL 3, K7HAW 2, W7RKI 2, K7SAR 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Harvell V. Tilley, K4PHH—SEC: W4FQQ. RM: K4YUD. PAMs: K4BTO, K4PFM. S.S.B: K4KJD. New appointments: ECs—K4SUY, Golbert County; W4SX, RACES EC; W4DS, Sumter County; W4CWF, Etowah County; K4WHW, Morgan County; W4GKO, Winston and Marion Counties, K4MUR, Jackson County; K4YTR, Tallapoosa County; W4VWG, Lauderdale County. OESs—K4SFH and W4ZDZ. OPSs—K4PBY, WA4BDW, K4WHW, K4FQG and K4ROR. New officers of the Mobile ARC are W4NGL, pres.; W4VDC, secy.; K4OEI, treas. Instructors of the K4ROR. New officers of the Mobile ARC are W4NGL, club's code class are K4OEI and W4WHW. K4ZYO has a new TA-33. The Decatur ARC started code and theory classes Feb. 6. WA4AWP and WA4BDZ received their General Class licenses. K4PHH and K4TDJ have a new HQ-170C. New officers of the Muscle Shoals ARC are W4VWG, pres.; K4ZBX, vice-pres.; K4RIL, secy.-treas. W4AYU is back in Alabama after a stay in Virginia. WA4AWP and his dad, WN4AWO, are using a TA-31 antenna. We're glad to welcome W4ZNI (ex-W3OYI) to our section. WA4BDZ is president of the Indian Springs School RC. Transmitter hunts are held the 2nd and 4th Sat. nights of each month in the Mobile Area. The following are now on 2 meters in the Mobile Area: W7JCW/4, K4TSK, K4GGV, W4PBF, K4SFH, W4LEL, also WN4EHK operates M/M between Mobile and Birmingham on a river tug. Congrats to WN4EEW on receiving his license. K4MNM was selected as "Ham of the Month" by the Huntsville ARC. W4MAM has a new Drake 2-B. K4IQU is manager of the new 2-meter net, the AENV, which meets on 145.350 Mc. at 2000 CST. W4DS is getting AREC/RACES plans set up in his country. See *QST* Hamfest Calendar. Traffic: (Jan.) K4ROR 85, W4HYI 74, K4PFM 72, W4FQQ 70, K4PHH 67, K4AOZ 64, K4WOP 56, W4RLG 41, W4WHW 40, K4YUD 39, K4TDJ 24, WA4BDW 23, K4UDK 22, K4ZYO 19, K4WWP 18, K4ZTT 15, K4YTT 13, K4JDA 12, K4FZQ 11, K4BTO 10, W4CWF 10, K4KJD 10, K4DJR 9, K4DSO 9, K4GXS 9, W4MI 9, K4ZNI 9, W4DS 5, W4WHW 5, W4ZNI 5, K4UMD 4, K4IQU 3, W4TOI 3, K4CTB 2, K4HVN 2, K4KDE 2, K4RIL 2, W4CIU 1, W4DFE 1, K4FTC 1. (Dec.) K4NUW 9, W4ZNI 5, WN4ADQ 3.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. RM: K4KDN. RTTY: W4EHU. PAMs: 40 W4SDR, 75 K4LCF. V.H.F.: W4RMU. S.S.B.:

(*Continued on page 130*)



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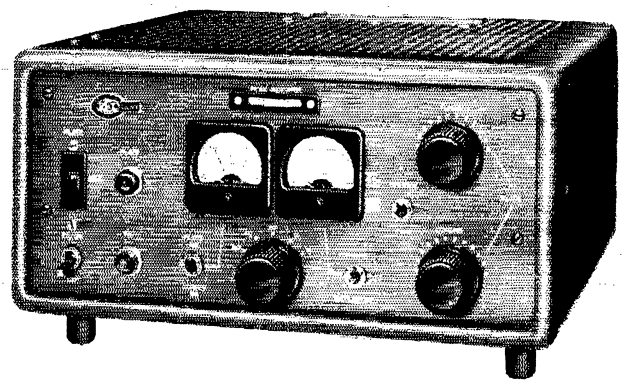

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W4CNZ. New net managers are K4DAX for FMTN and W4CWD for TPTN. Congrats to W4MLE for his citation on the 1961 Edison Award. If you like ham radio join our efforts to utilize 10, 6 and 2 meters through *Florida Skip* sponsored All-County Relay program and Band-Saver activities. Details appear in the Jan. 1962 issue. Remember 11 meters and *act*. Appointees, check your activity and reporting requirements. Retain that appointment. K4UIZ now is secretary of the Orlando ARC and K4KRG is the new 1st vice-pres. Traffic: (Jan.) K4SJH 734, W4TUB 512, WA4BMC 504, W4WHK 342, W4UBS 314, K4ILB 232, K4RNG 209, K4KDN 185, W4-EFF 176, K4LCF 176, K4AHU 161, W4CNZ 139, W4TRU 105, W4AKB 94, W4LDM 94, K4RDX 94, K4BY 92, K4-YSN 87, WA4EDM 68, K4KGB 67, K4DBT 60, K4YOQ 66, K4FMA 65, W4TRS 64, WA4DMV 62, K4ENW 59, K4AX 53, W4WTO 51, K4BZ 50, WN4AME 44, W4VCX 41, W4AZK 36, W4VLH 35, K4COO 33, K4AKQ 31, W4-DDW 27, W4VPX 27, K4LVE 26, W4UHB 24, W4HFR 22, K4MTP 22, W4CWD 21, W4LMT 19, K4DAX 18, K4-PPX 18, K4NVD 17, K4QQE 17, W4LSA 14, W4SVB 13, W4AYD 12, W4BKC 11, WN4COR 11, K4DAD/4 9, K4-MXH 9, K4JJZ 8, K4ZIF 8, K4LML 7, WA4AZZ 6, W4-SMK 6, W4OHA 4, K4JWM 3, K4UKF 3, W4YOJ 3, K4-YPN 2. (Dec.) K4YSN 202, W4VGE 89, W4AZK 69, K4BZ 64, K4JZU 53, W4DFU 49, K4LLI 33, K4OTJ 33, W4DKJ 30, W4SVB 29, W4WPD 26, K4GUE 24, W4DDW 20, WN4BSH 17, K4JZX 16, W4OVE 14, WA4BGL 12, W4BWR 11, K4JJZ 9, K4RCV 6, W4SGY 6. (Nov.) W4-WPD 34, K4YLX 19, K4RCV 15, WN4BSH 8.

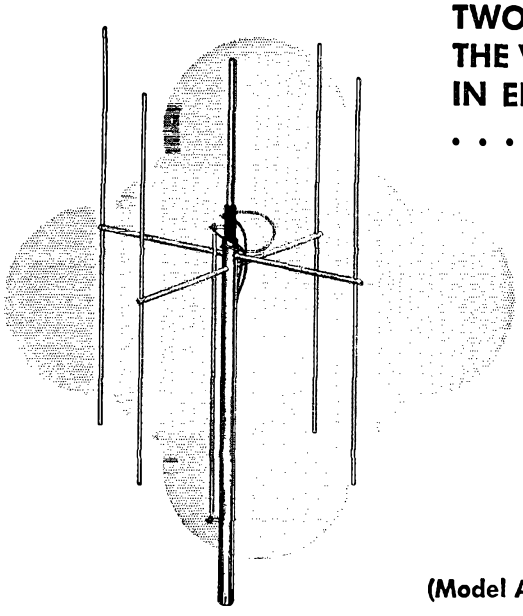
WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH—SEC: W4MLE. PAM: W4WEB. RM: K4UBR. Tallahassee: K4YPI is the new manager of the slow-speed c.w. net. Check in daily at 0100 GMT on 3650 kc. WA4AZR has joined the 10-meter gang. W4MLE was named associate winner of the Edison Award for his fine work with the Florida AREC. W4GAA renewed as OBS. W4CMG and K4OHR like 10-meter groundwave DX. W4CCA, in Wewahitchka, and W4SGG and K4-RZM, in Port St. Joe, are working up to 100 miles on 29,560 kc. with ground-plane antennas. W4JOZ finds s.s.b. does as well on 10 as on 75 meters. Fort Walton: WN4CVP and WA4FFU joined the growing 2-meter group on 145.2 Mc. W4ZGS and W4SKK are keeping 6- and 2-meter skeds with Panama City. K5VMF and WA6QLY are building 6-meter gear. W4PLK listens regularly on 432 Mc. EARS station W4SRX has a 10-20-meter beam installed, thanks to W4UEJ and K9SFI. Pensacola: K4KIF has a nuvistor converter on 6 meters. K4HYL is chasing DX on 20-meter s.s.b. K4SWQ. EC, publishes a county AREC bulletin. W4SHW received WAC and DXCC certificates. W4HIZ resigned as RACES Radio Officer. The Red Cross station, equipped with a Ranger and an HQ-140, will be a part of AREC. Traffic: (Jan.) W4BVE 113, W4CMG 50, K4BDF 37, K4-VND 26, K4LOL 15, W4GAA 11. (Dec.) K4CNY 194.

GEORGIA—SCM, William F. Kennedy, W4CFJ—SEC: W4PMJ. PAM: W4LXE. RM: W4DDY. GCEN meets on 3995 kc. at 1830 EST Tue. and Thurs., 0800 on Sun. GSN meets Mon. through Sun. on 3595 kc. at 1900 EST and 2200 EST. The 75-Meter Mobile Net meets each Sun. on 3995 kc. at 1700 EST with W4LG as NC. The GPYL Net meets each Thurs. on 7260 kc. at 0900 EST with K4KIH as NC. The Atlanta Ten-Meter Phone Net meets on 29.6 Mc. at 2200 EST each Sun. with W4BGE as net mgr. Ga. S.S.B. Net meets Mon. through Sun. on 3975 kc. at 2000 EST with K4RZL as net mgr. Those interested in joining a new Georgia c.w. net should contact WN4CEQ. Georgia emergency c.w. frequencies are 7125 kc. day and 3595 kc. night. W4HYW vacationed in Miami during Tropical Hamboree, and also participated in the January CD Party. W4LME still is working on the v.f.o. so he can work into 4RN. K4-WWY joined GSN and enjoys it. K4QIY/4, at Ga. Tech., reports the club station is moving to new quarters in the new E.E. Building. W4BZ is sending Official Bulletins regularly. The North Georgia Graveyard Net meets every Thurs. and Fri. at 2200 EST on 50.250 Mc. with K4UQM. Traffic: W4DDY 273, W4PIM 127, K4BAI 50, W4HYW 41, W4MLA 36, W4LME 30, K4QPL 25, K4TEA 21, K4WWY 18, K4UJS 12, K4RHU 9.

WEST INDIES—SCM, William Werner, KP4DJ—CD Radio Officer: MC, QSL Mgr.: YT, XE1TM of the famous Mexican musical family "Los Ruffinos" is in KP4-Land for a few weeks. BCQ joined the AREC. WA2-DEW/KV4CQ, vacationing at St. Thomas, is on 6 meters with a Polycom 6/2 and a G-50. The PRARC's radio transmitter, ID, has been moved from Red Cross to Civil Defense. BDS meets 4RN at 0045 and 0230Z on 3547 kc. for traffic. WT reports to the Antilles Weather Net at 1100 GMT daily on 7245 kc., the Mango Traffic Net at 2130 GMT on 3810 kc. and civil defense and MARS nets on 40 and 75 meters. AQQ is working s.s.b. DX on 40 and 75 meters. CL achieved DXCC on s.s.b. Jan. 18 with 125/105 and is the first KP4 to receive the "HI" Award certificate No. 4 from Radio Club Dominicana.

(*Continued on page 132*)

NEW from Master Mobile



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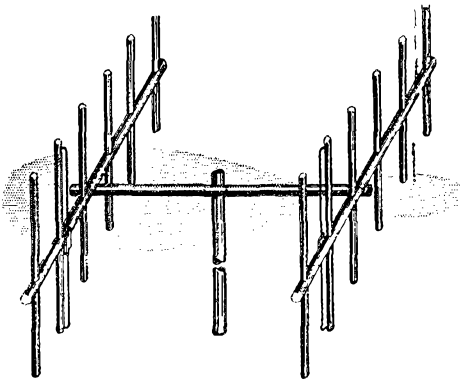

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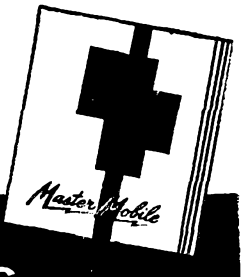

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the first KP4 to receive "AZ5" diploma for all 14-Mc. s.s.b. contacts awarded by Secane Radio Club and the first DX station to receive the "WASWA" Award from West Africa. CL, CC, WD and AQQ worked FO8AN on various bands. K1DTA and W2VCZ, covering Project Mercury from aircraft carrier *Randolph*, visited KP4s while en route back to the States. They said W9GBH/mm was aboard the carrier. AK, AZ, BJ, BL, BM, DJ, GX, LC, AAA, ANS, ATM, AYM and BCL are a few of the hams working at International Airport. CK coupled outputs of two 600-L linear amplifiers for increased output. CK was the first KP4 to earn a 6-meter Floridora Award certificate. CK and CL attended the Hamboree in Miami. WD now has a 20A and a 600L. YT is clearing shorts in the Valiant wiring harness. KP4*CH* worked W2*CH* and K4*CH* in January. NCS CK of the 50.5-Mc. C.D. Net advises Sun. net sessions have been resumed. W3HLM is looking for AMT on 28.8 Mc. CC, OC and ATA are sticking to 15-meter c.w. The "160 Meter" petition originated in Cleveland, Ohio, is making the rounds of KP4s for signatures. Traffic: KP4WT 79, BDS 7.

CANAL ZONE—SCM, Thomas B. DeMeis, KZ5TD—The Crossroads Amateur Radio Club has announced the issuance of a new certificate. Full details will be made available by the CRARC. Films sent down by ARRL Headquarters were enjoyed immensely at a recent CZARA meeting. KR has returned from several months schooling at Oklahoma City. CG had up his 3-band quad for a short time and went back to using his W3-DZZ antenna. LC is not as active during the dry season because of his interest in golfing. LE is having TVI troubles and with a KWM-2. Propagation has been poor to many areas in the U.S. All bands are folding early but there has been occasional 20-meter s.s.b. activity to Stateside around 0500 GMT. AQ has been active with an Apache and an NC-183 using a quad antenna. FM set up an all-band vertical. CW is awaiting the arrival of his new Invader transmitter. DS finished his converted BC-610 for use as a linear with his HT-37. TD once again is back to his QRP 35 watts while awaiting some new gear, naturally s.s.b. being included as necessary for contest work. Traffic: KZ5JW 60, OA 42, AD 30, TD 21, CD 18, OB 18, LW 16, SS 11, VF 6.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W6JQB—SEC: K6YCX. PAMs: W6ORS, K6PZM. RMs: W6BHG, WA6ROF, K6LVR. The following stations earned BPL for the month of January: W6GYH and K6EPT. Congrats, fellows! K6SIX bought a new home. Congrats, Leo! W6ORS is back on 2 meters with a vengeance. W6-GYH, K6OZJ, W6CG and many others are on RTTY with a large crowd forming in the 2-meter band! W6-VOZ has an SB-10 on the DX-100 for s.s.b. W6USY was snowed in at Big Bear during the snowstorm! WA6SLF is a new General. Congrats, Jeffrey! W6NKR worked G5WP and DL1FF on 80 meters! WA6HUO is the new EC for the Southern San Fernando Valley Area. W6-WAW received the 40-w.p.m. certificate from the CWA. Congrats, Jim! New officers of the Covina High School Amateur Radio Club are WA6KCL, pres.; WV6UIJ, secy.-treas. WA6GBZ, trustee. W6SRE is back from a business trip to Washington, D.C. WA6BFC has a new sixteen-element beam using loading coils for 6 meters. Our ex-PAM, W6BUK, has a new call for Arizona, K7-RUR. Listen for him on 75-meter phone. K6TVC has a new home-brew converter for 6 meters. K6EF is putting the Citrus Belt Amateur Radio Club station, W6JBT, on the air. New officers of the Douglas-Santa Monica Amateur Radio Club are K6HOK, pres.; WA6PEL, vice-pres.; WA6PJU, secy.; WV6UQF, treas. Support your section nets: On c.w., the Southern California Net (SCN) meeting at 0300 GMT on 3600 kc. daily; On phone, the Southern California Six Net (SoCal 6) meeting on 50.4 Mc. at 0300 GMT and 2000 GMT Daily. Traffic: (Jan.) W6GYH 673, K6EPT 584, K6OZJ 263, WA6-ROF 123, W6BHG 89, W6QAE 83, K6YVN 71, W6WPF 65, WA6KAW 55, K6SIX 49, WA6GRG 32, WA6CKR 30, WA6JDB 26, K6HOV 24, W6ORS 22, WA6SLF 17, W6CG 16, WA6KVA 5, W6NKR 5, W6WAW 4, W6LVQ 1, W6-VOZ 1. (Dec.) WA6DJB 320, WA6KQN 151, K6YVN 125, WA6QMC 31.

ARIZONA—SCM, Kenneth P. Cole, W7QZH—Asst. SCM/SEC: George Mezey, K7NIY. PAM: W7OIF. RM: LND. The Copper State Net meets at 1930 MST Mon. through Fri.; the Grand Canyon Net Sun. at 0800 on 7210 kc.; the Tucson AREC Net Wed. at 1900 on 3880 kc. It is with deepest regret we announce that on Feb. 3, 1962 our State RM, LND, was caught cheating at cards and hanged. This, of course, was all a part of the show put on by the Scottsdale Chamber of Commerce in their yearly Parada Del Sol Celebration and Rodeo. Control of the parade route and all vehicular traffic into Scottsdale was handled by the Phoenix V.H.F. Club on 6 meters. Those giving their time and services were WYY,

(Continued on page 134)

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HT-37	369.00
HT-40	79.95
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WA2PCZ/7, K7CIN, K7DHF, K7DHS, K7DVO, K7EXA, K7HJO K7LKL, K7LSM, K7LYD, K7NJS and K5UMJ/7. The amateur picnic held in Casa Grande was attended by approximately 200 amateurs. The baseball game was won by Phoenix 4 to 0. The game was ably umpired by your Arizona SCM, who received the boos and jeers of the crowd throughout the entire 7 innings. New calls: KN7SYB, who is on 40-meter c.w.

SAN DIEGO—SCM, Don Stansiter, W6LRU—Asst. SCM: Thomas H. Wells, W6EWU: SEC: none. RM: W6EOT. San Diego City EC: W6EWU. A new OO is K6GJM, in La Habra. K6EEL won the 10-meter hunt held in Orange County in January. W6ZE, Orange County Club station, is on the air each Sun. morning on 3975 kc. from 10 to 10:20 A.M. PST and from 10:30-10:50 on 7250 kc. to give Southern California amateurs information about the forthcoming ARRL Convention to be held at Disneyland in early June. K6KGR, in Garden Grove, who moved from Corona, is active on 2-meter traffic nets for the Orange County Area. Your SCM visited the Palomar Radio Club in January at Vista at the home of W6NAT, and he enjoyed meeting the North San Diego County gang. The new chairman of the San Diego Council of Amateur Radio Organizations is W6RCD. Active in the January CD Party from this section were WA6BUX, K6BHM, K6LKD and W6LRU. Both W6CAE and WV6SBO lost their 40-meter beams during recent high winds. W8SF was a San Diego visitor during February. Officers of the Anaheim Amateur Radio Assn. are WA6MUZ, pres.; and W6KTE, vice-pres. K6RCK, OES in Santa Ana, lost his antennas in January. The February meeting of the San Diego DX Club was held at the home of the new president, K6BHM. WA6BUX is up to 97 confirmed. Officers of the Helix Radio Club for 1962 are K6SSX, pres.; WA6EXN, vice-pres.; W6AUB, secy.-treas. The Feb. 9 meeting of the Newport Club featured a talk by K6IUM on "Two Meter F.M. Equipment." Traffic: W6YDK 2308, K6BPI 2146, W6EOT 355, K6LKD 191, WA6CDD 114, K6KGR 45, WA6BDW 31, K6TFT 15.

SANTA BARBARA—SCM, Robert A. Hemke, K6CVR—Ventura County ARC had WA6JBB, of Master Mobile, as the guest speaker and his subject was antennas. He stressed the importance of a good match if best results are to be expected. Ventura County named K6VBC as Field Day chairman 1962. K6EHK and the K6CST group will provide logistic support. WA6NXL is riding a new kind of bird these days—Falcon variety. New calls in the Oxnard Area are WV6VCK and WA6VEA. WA6JMD bought Mac's old-Twin-six antenna and the rotor for same. Looks like another antenna-raising party for her. New officers elected by the Santa Barbara ARC were K6JCR, pres.; K6TOD, vice-pres.; K6DXW, treas.; K6EAQ, secy.; K6CVR, sgt. at arms. Attention all club secretaries: News is needed from your clubs for this column. Mail your news to the SCM the first of each month.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: K5AEX. PAM: W5AYX. RM: W5LR. In Feb., 1961, the Terry County ARC sent representatives to meet with the Directors of Girlstown, U.S.A., with the idea of offering to help train some of the girls in code and theory to become amateurs. The offer was accepted and members of the club made several trips per week, a distance of 72 miles, for the purpose of instructing the girls. Their efforts were rewarded when seven of the girls received their Novice licenses, WN5ASZ, WN5AOG, WN5AUJ, WN5AUQ, WN5AUI, WN5APG and WN5APM. The General Telephone Co. has organized an amateur radio club for its employees in the Brownfield Area. K5QWR hopes to be s.s.b. with a KWM-2 by March. Ben says he needs more to check in on the Tex. Net. Residents of the southwest side of Ft. Worth have been wondering why the street lights go on and off about 7:30 A.M. Investigation proves it is caused by W5THI on his way to work with a new kw. mobile. W5EUY, club station of Arlington State College, was called on for communications assistance between the various points of the registration line and the administration building during spring semester registration. W5DTA has retired from the Air Force and is living in Ft. Worth. See *QST* Hamfest Calendar. Traffic: K5LPG 377, W5BKH 200, W5LR 112, W5GY 91, K5SXK 84, K5HTM 61, K5QWR 58, K5RAB 54, K5PXV 38, W5CF 26, W5GNF 26, K5WSF 6.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—OLZ and SSZ nets have had to change to summer schedule because of long skip; the time is 1900 CST. K5BNQ is very proud of the beautiful scroll received for her work as past president of the YLRL. New Novices in Cotten County are WN5DBK and WN5DBL. K5IXS now is sideband with an SB-10 to his Apache. Oklahoma City mobiles were asked to assist in the location of a missing mental patient. W5CEP and the Norman group are do-

(Continued on page 136)

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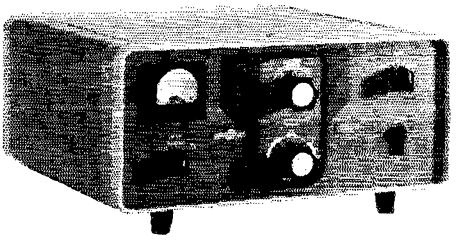

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ing a good job with AREC-RACES. The SCM lost the liar's contest at the recent ACARC party for all Oklahoma City amateurs and wives. Oklahoma has lost two more amateurs, W5EYL, of Tecumseh, and W4FYX/5, of Enid. New officers of the Lawton-Ft. Sill Amateur Radio Club are K5MBK, pres.; W5HFN, vice-pres.; W5ICQ, treas.; W5FKL, secy. New officers of the Aeronautical Center Amateur Radio Club are W5RRN, pres.; W5HXT, vice-pres.; W5EHC, secy.-treas. Assistant to the president for associate members is K5QNU. New ECs are W5BSQ, Tillman County; W5KEH, Delaware County; K5IBZ, Stephens County. A new OBS is K5CWR. New OPSs are K5ZCJ and W5FWW. Traffic: W5DRZ 124, K5MBK 73, K5JGZ 70, K5AUX 61, K5IBZ 56, K5OCX 42, W5JMQ 39, W5FWW 37, W5FKL 31, W5ICQ 23, K5JOA 18, K5SWW 18, W5UYQ 18, W5CCK 13, W5JCY 13, K5OOV 12, K5DMS 11, K5ELG 11, W5PNG 11, K5CWR 9, W5FFW 6, K5RWL 6, K5VNJ 6, W5WDD 6, K7JGY/5 6, K5BNQ 5, W5CCV 4, K5FKV 1.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A.E.W. Street, VE1EK and H. C. Hillyard, VO1CZ. We regret to announce that ZS has joined the ranks of Silent Keys. Deepest sympathy is extended to his XYL ZY and family in their loss. YC lost his 20-meter beam in recent high winds. It is understood that LZ has taken up skin diving. AEY has acquired a new 200V. PM and AEB have started their weekly game of chess, played each Sun. afternoon. ADH is now mobile on 6 meters in his new Volkswagon. 2CP and 2AFL were recent visitors to the Halifax Area. The NBARA announces the WNBC (Worked New Brunswick Counties) Award. Full details are available from AFA and other members of the North Shore Club. A late report advises that KC was successful in picking up signals from Satellite Oscar. Deepest sympathy is extended to the family of RU, who has joined the ranks of Silent Keys. Mick McWilliams, formerly MZ, is the radio operator aboard the ocean-going tug *Foundation Vigilant*, which has been in the news lately. Traffic: VE1ADH 24, OM 12, DB 11, AEB 2, DJ 2.

ONTARIO—SCM, Richard W. Roberts, VE3NG—BEO and CKG have joined the ranks of RTTY while VE9OX has his license for ham TV. The Skywide ARC of Toronto will demonstrate RTTY at the Sportsman Show in Toronto. CVD will be on 144 Mc. soon. Rowland Beardow, AML, is the current SEC for Ontario. His QTH is Sarnia. FAS is a new ORS and RCC. Your SCM, NG, is now a member of the A-1 Operator Club. GJ is proxy of the Sunshine and Suds Net. OR is on the healthy list again. DUU was the winner of the V.H.F. SS trophy this year. The Westside ARC, Toronto, held a very successful Annual Dinner in January. EVO, ATB and CUY demonstrated 144-Mc. gear at Boys Training School, Brampton, recently. IB is now at 35 Brooklyn Ave, Toronto 8 and is back on 75 meters. London ARC Officers are DYE, pres.; COB, and CBD, vice-pres.; BOX, secy.; Irene Newton, treas. Belleville officers are AIL, pres.; IU, vice-pres.; BDS, secy.; DXM, treas. DGC is heading down to London. CNB now has his WAC, WBE, WCAN and WAVE. Sudbury ARC is planning Field Day already. DNV has a new call in memory of dear friend VE3KM. AML was guest speaker at the Windsor Club and spoke on AREC matters. ETM is EC for Windsor. EIU is mobile. DOO is s.s.b. with a bang. The ARRL Ontario Convention is now official and will be held in the King Edward Hotel, Toronto, Oct. 19 and 20. The Ottawa Valley Mobile Radio Club is now incorporated. DQ is on the recovery list after surgery. BTI, using 500 watts on 75 meters, worked all VEs and a VP9 in one evening. Silent Keys: PH, ALU, AX and WM. Traffic: (Jan.) VE3CYR 163, CFR 154, DPO 154, NG 130, BAQ 103, BZB 75, BUR 58, FAS 48, DRF 37, AML 28, DUU 27, EHL 20, PR 20, CKG 19, RN 11, ELQ 9, SG 8, OT 4, VD 4. (Dec.) VE3BAQ 136, FAS 85, BUR 40, CFI 4.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Local nets: OQN (c.w.), 3535 kc. daily at 0001 GMT; Quebec Fone Net, 3780 kc. at 2345 GMT. AJD is a newcomer to OQN, and AGM, manager, reports a traffic total of 166 for January. ANK, at Three Rivers, is looking for a

(*Continued on page 138*)

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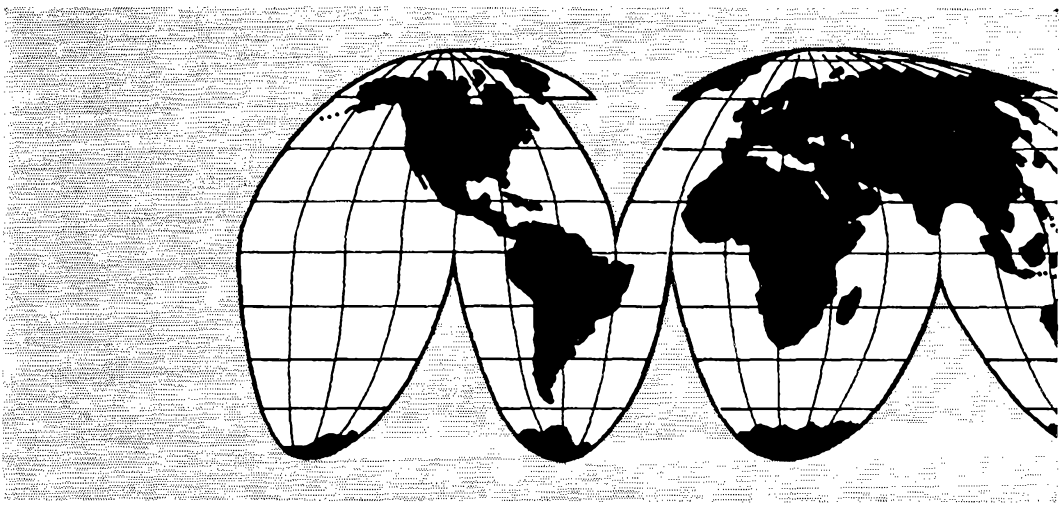

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TA-33 Jr. ER visits 2 meters regularly. YB resides at Quebec City now. EP is proud of a new Drake 2B and almost snagged a quick WAC on 75-meter s.s.b. OO is active on several bands. CA replaced HV (retired) at the local radio store. OR, HS and QB are enthusiastic s.s.b. stations. DR tried 160 meters and met ATU from Arvida. AYY and IL look for DX on this band. VK, St. Martin, works DX on 20-meter phone. AXM, Valois, has a 75-meter phone endorsement. BN, in Sweden, contacts father TA. ALE sticks to 10-meter phone. ARA and ANI like 2 meters. The St. John's Club elected RF, pres.; BCB, vice-pres.; ASL, secy.-treas.; Rev. Etienne and Char. Bourguignon, directors. AOZ, ATL and WT expect second harmonics shortly. An eyeball QSO was had with YV5FL, a welcome visitor to the Lake Shore Club. AIL and BCB are busy giving code classes to SWLs. OA lectures on transmitters. APX expects 10 newly-licensed SWLs soon. ATL left Metane and is back in Montreal. Oscar was heard in St. Maurice Valley by ABJ AIM and ABB. ID, from Shawbridge, turned up on 75 meter phone. The South Shore Club elected SC, pres.; RV, vice-pres.; GD, secy.; NY, treas.; AJI, AEW, BFE, BGO, AMH, directors. Traffic: VE2DR 112, AGM 52, CP 29, EC 22, FY 16, BG 15, BFB 3, AXK 2.

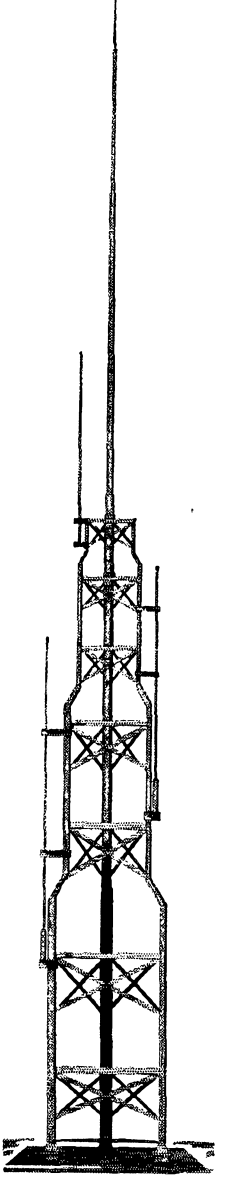
ALBERTA—SCM, Harry Harrold, VE6TG—PAM PV reports mostly blackouts in January and lots of antenna trouble with hurricane winds. The net is being run at 1830 hours to try to beat the blackout hours. RM AEN is not getting much help from the c.w. boys. Let's all give Fred a hand to get started. The PTN meets Tue., Thurs. and Sat. at 2130 hours MST on 3600 kc.; SS (EC) Central Net on Sun. at 0900 hours MST on 3770 kc. Next month we'll have an EC, FK, in Calgary in conjunction with CARA EC. No reports were received from WG (ORS) and DB (OES). HM (OBS) and OO is doing a fine job and keeping skeds with the Far North. Any VE8s are welcome to send reports for this column. BC does a fine job on the Alta Fone Net when the OM is away. CA now is using an HT-37 and an SX-101A with a female voice coming from the HT-37 once in a while. CO is coming forth with d.s.b. We are getting more and more s.s.b. activity in the province with about 22 stations now and more working for that goal. As far as amateurs go we still have a lot of dead wood in this province that needs awakening. Traffic: VE8HM 330, TG 11, AEN 9, SS 9, FS 5, UH 3, ABE 2, ADZ 2, PV 2, TT 2, UK 2, CA 1, PS 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —I wish to make a correction: My PAM is AOI, not AOY. Louis is in Nanaimo not Spring Island. AIK is back on RTTY after four years and looking for old acquaintances. RM reports much activity on 160 meters with AAF, ST, EH, BFK, BGE, BAZ and others on. Congratulations to ZM, still top "Countries Confirmed" in Canada. BBB was in the hospital for surgery yet she made more new awards, Kansas YL, WAC, RCC, WWVA. AC led the appointees in the January CD Contest with FB on the tail end. Well, where are the club reports I hear are coming this way. US writes that he is going great in Trail and is using a Drake 2A, the rig 400 watts PEP s.s.b./c.w. *Zero Beat* is the magazine put out by the Victoria SWC and praise should be given the club for a very fine local effort. BFW has his Advance Class ticket and an Apache transmitter with all the extras. AJ is active again with 100 watts on 15 meters. The BCAREC Net had 27 sessions, 1535 check-ins and traffic handled 263. Not bad since the time is now 0100 GMT. See *QST* Hamfest Calendar. Traffic: VE7AAF 78, BAZ 64, BGE 19, BBB 13, BFW 8, AOY 4.

MANITOBA—SCM, M. S. Watson, VE4JY—Your SCM was privileged to attend and address a meeting of the Fort Churchill ARC and there met its president, JV, also OD, CQ, GD, VE8RN, MS, K3PXK, K9TNT and PK3PH. About 25 interested persons attended. The WARA is now publishing a new attractive bulletin called *QUA*. JA and HW have just received their Advance Class certificates. OO KF reports 3 notices sent in January because of 2nd harmonic radiation falling in the 10-meter band. Six meters is growing in popularity and those participating include GA, VW, KF, TL, JX, FO, RE, FC, HC, IW, HS, WL and WS. Net frequency is 50.040 Mc. January meeting of the ARLM the members were treated to a movie featuring local amateurs, courtesy of RP. Traffic: VE4EF 48, QD 16, KN 14, RB 2.

SASKATCHEWAN—SCM, Jack Robinson, VE5BL—JU, JI, JS, BL, TO, JW, CM and GG drove to Moose Jaw to attend the February meeting of the Moose Jaw Club and items of interest to both clubs were discussed. EJ is building a new transmitter. GI has finished his new homebrew receiver. KK has moved to a new QTH in Regina from Saskatoon. QA is a new call heard in Regina. Code and Theory classes sponsored by the Moose Jaw Club are held at the technical school. YR has moved from Togo to Watson. Traffic: VE5NX 52, LM 28, HP 24, HQ 10, RE 6, JU 4, HX 2.

7mc | W.A.C. in 1 hour 11 minutes



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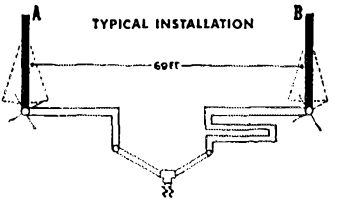
John Mayes, W6BYB Sebastopol, California

*EA 8 CG 0838 GMT	JA 3 CB 0927 GMT
LA 8 FG/P 0850 GMT	VK 2SA 0942 GMT
PY 5 OF 0910 GMT	VE 4 MZ 0949 GMT

PHASE TWO FOR 3DB GAIN



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World Above 50 Mc.

(Continued from page 71)

element beam and a corner reflector for 432 Mc. Final note in Jim's missive "Unable to raise one station."

Clubs and Notes

The Evergreen 50 and Up Club have another project coming up which promises to be very interesting for both club members and many other 50-Mc. operators throughout the country. On May 19th or 20th, 1962, K7QVK, K7LPU and K7IQI are going to operate aeronautical mobile from Seattle, Washington at various altitudes to see what DX can be worked. The flight will take place at 1400 PDT (2200 GMT) on the first of the above dates that the weather is satisfactory. They intend to transmit on 50.4 Mc. at all altitudes up to about 14,000 feet, and would like to make as many contacts as possible in the two hours they will be up. They have high hopes that a dipole at that elevation will enable them to reach out for a little distance. There will be a Heath HW10 Shawnee, Gonset G50, and an Elmac transciter in the plane. By having three complete units they hope to eliminate equipment failure problems. K7GAF, who has given great assistance with the project, will be base control. Special QSLs are being made up for the event and all QSOs will be acknowledged. Call to be used will be that of the "Evergreen 50 and Up Club," K7NNI.

The Dayton Amateur Radio Association and its publication, *R-F Carrier* has endeavored to arouse greater interest in contest operating by sponsoring its own contest with a number of prizes being given out, to both members and non-members of the association. The NAFCO TROPHY to be awarded to the DARA member who has contributed most points for the January VHF Contest; and the K8ERE Proficiency Award for proficiency in operations as determined by voting of DARA members submitting logs. Club President, Bob Zimmerman, W8DPW, sez that the contest within a contest did seem to raise interest quite a little.

Two new nets reported from Virginia; the Central Virginia Six-Meter Net meets daily at 1900 hours around 50.250 Mc. and the Wind Bag Net meets on Saturday nights at 2035 on 50.750 with K4UMK being Net Control. Eight to twelve stations check into this net each week, all in western Virginia. QST

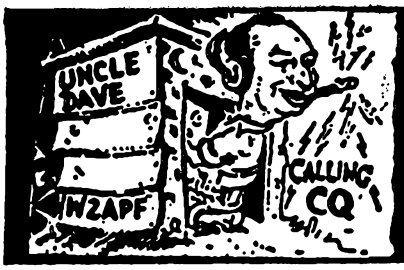
Have You Tried 160 Lately?

(Continued from page 49)

delivering 200 to 250 volts for the v.f.o., buffer and 807 screen, and the other delivering 400 to 600 volts for the final amplifier. For an antenna, I use a half-wave dipole fed with 75-ohm Twin-Lead.

Tuning the transmitter is merely a matter of setting the v.f.o. to frequency and adjusting the antenna tuner for maximum rated plate current while keeping the final tank circuit resonated. The two power supplies should be turned on simultaneously to avoid excessive 807 screen dissipation. After each adjustment of the feedline taps (which should be kept at equal distances from center), the antenna tuning capacitor should be set at minimum capacitance while the final is resonated. The antenna tuning capacitor should then be swung for a peak in plate current. If the

(Continued on page 142)



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R46B	12.00
SX62A	269.50
HT32A	595.00
HT31	195.00
HT32	495.00
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S72 Ptble	39.50

GONSET

3136—6 Mtr. Comm III	$195.00
3133—2 Mtr Comm III	195.00
G28—10 Mtr Xceiver	195.00
GSB—100	375.00

HARVEY WELLS

R9A	$ 75.00

ELMAC

AF67	$114.50
1050 P. S.	25.00

COLLINS

KWM-1	$ 600.00
KWS-1	1195.00

JOHNSON

Mobile	$ 69.50
122 VFO	39.50
Thunderbolt	450.00
Viking 1—with VFO 122	175.00
Valiant	350.00
Viking I	150.00
Courier	175.00
6N2 Thunderbolt	395.00

"WRL"—GLOBE

90	$ 50.00
DSB100	74.50
90A	65.00
680A	79.50
LA-1	85.00
VOX-10	19.50
QT-10	5.95
PA-1	7.95

SPECIALS

1962 Calendar and Schedule Pad Free with purchase of 5 Receiving Type Tubes.

EXTRA SPECIAL

Johnson Pacemaker (No Trades)	$225.00

EICO

730 Modulator	$ 59.95
720 Xmtr.	79.95
Heath MT-1 w/mic.	119.50

HAMMARLUND

HQ160C	$275.00
HQ150	175.00

ELDICO

SSB-100A w/P.S. EXTRA SPECIAL—AS IS	$100.00

BARKER & WILLIAMSON

5100 AM Trans.	$275.00
504C Freq. Mult.	37.50

CENTRAL ELECTRONICS

"Q" Multiplier	$24.95
"A" Slicer	44.95
10A Exciter	74.50
20A	175.00

USED TEST EQUIPMENT

Simpson 485 Crosshatch generator	$ 59.00
RCP 750 Do-ALL TV generator	39.00
Hickok 660 Color-Bar generator.	149.00
Hickok 450 V.D.M.	20.00
Precision CR30 C.R. tube checker.	28.00
Anko 72 tube tester	54.00
Sylvania 140 tube tester	58.00
B&K 500 tube tester	59.00
Precision 620 tube tester	34.00
ITT TV field strength meter with portable battery supply	62.00

TUBES—NEW—GUARANTEED

All individually boxed except where noted in bulk.

	REG.	EACH	DOZEN
6H6	$3.50	$1.05	$11.50
6SJ7	3.75	1.15	12.65
6J7	4.55	1.25	13.75
45 (Bulk pack)	2.05	.65	7.15
2A6 (Bulk pack)	3.65	1.10	12.10
6A8G	5.80	1.75	19.25
6AE6G	2.05	.65	7.15
6S8GT (Bulk pack)	2.75	.85	9.35
6C4 (Bulk pack)	1.50	.45	4.95
6J6 (Bulk pack)	2.35	.75	8.25

BEAMS
NEW AND USED
(AS INDICATED)

Mosley V-27GP (CB) (New)	$ 29.95
Mosley VPA1520 (New)	109.50
Mosley VPA1020 (New)	99.50
Telrex 3 El. 20 Mtr. (Used)	49.50
Telrex 3 El. 10 Mtr. (Used)	39.50
Mosley V144GP (2 Mtrs.) (Used).	17.50
Mosley VPA20-2 (New)	39.50
5A-6M Taco (New)	9.95
10A-6M Taco (New)	17.50
BA6M (Baluns-for-Above)	3.95
Hy-Gain HH-6 (6-Mtr. Halo) (New)	9.95

We have more beams and verticals at very special prices—write us about your needs and we will quote.

Write Uncledave W2APF with your needs and problems.

TRADE-INS ACCEPTED *AND* FOREIGN TRADE SOLICITED
BANK FINANCING

TIME PAYMENTS 18 Months to pay. Life Insurance at no extra cost

UNCLE DAVE'S RADIO SHACK
A SUBSIDIARY OF FORT ORANGE RADIO DISTRIBUTING CO.

plate current is not the desired maximum, bring the taps closer together to reduce plate current, or spread them farther apart to increase current, and repeat the process.

If a key-click filter is to be used, it is best to key only the final amplifier at J_2, with S_1 open. For break-in operation, the key may be used at J_1 with S_1 closed. In this case, all three stages are keyed simultaneously, and S_1 should be open while setting the v.f.o. to frequency.

To go on phone, throw S_2 to the phone position after tuning up for c.w. operation. The plate current should drop to approximately half of the c.w. value. If the plate current is higher than this, increase the value of R_2; if too low, decrease the resistance. The r.f. amplifier plate current should show no change with speech input except for a slight upward kick on voice peaks.

Receiving

Many current-model receivers include the 160-meter band. If yours doesn't, the easiest solution would probably be to build a simple converter.[3] Being a stickler for homebrew equipment, I built a t.r.f. regenerative receiver from old b.c. parts, and even this does a good job on 160. For both transmitting and receiving, get the antenna up as high as you can, of course. QST

[3] Hatfield, "A 160-Meter Converter for 80-Meter Receivers," *QST*, January, 1962.

Happenings of the Month

(Continued from page 98)

Proposed Schedule of Fees for Ship Inspection and Certification — *Vessel Inspected*	*Fees*
Based on Certification Under the Communications Act:	
Title III Part II (Passenger)	$ 50
Title III Part II (Cargo)	40
Title III Part II (500–1600 gross tons)	20
Title III Part III	10
Based on Certification under Great Lakes Agreement	20

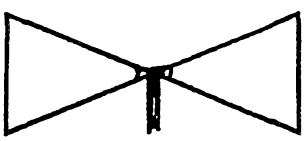
Proposed Schedule of Fees for Experimental Services For Filing Application	*Fees*
All Experimental Services	$ 20

Proposed Schedule of Fees for Commercial Operator Examinations and Licensing Function	*Fees*
Commercial Operator Examinations	
First Class	$ 5
Second Class	4
Third Class	3
Commercial Operator License Applications (includes renewals, endorsements, duplicates, etc.)	2
Restricted Radiotelephone permits	2

Authority for the adoption of the amendments herein proposed is contained in Section 4(i) of the Communications Act, Section 140 of Title 5 of the United States Code, and Budget Bureau Circular A-25 (September 23, 1950).

(Continued on page 144)

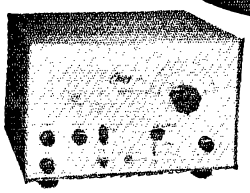
BULLSEYE BUYS at ARROW!



"Wonder Bar" 10 Meter Antenna

As featured in Nov. 1956 QST. Complete with B & W 3013 Miniductor. Only 8 ft. long for 10 meters. Wt. 5 lbs.

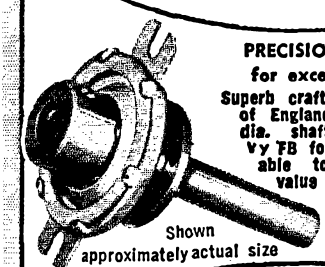
Amateur Net $7.85



99'er 6 Meter TRANSCEIVER

A true ham station, ideal for both fixed station and mobile operation.
Double conversion superhet gives you extreme selectivity and freedom from images and cross modulation.
Transmitter section has an ultra-stable crystal oscillator which also may be controlled by external VFO.
Efficient, fully modulated 8 watt final works into flexible Pi network tank circuit. Large S meter serves for transmitter tune-up procedure.

Amateur net price $139.95

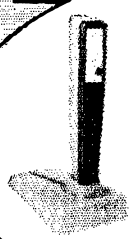


PRECISION PLANETARY-VERNIER
for exceptionally fine tuning

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, ¼" dia. shaft, 1⅛" long, 6:1 ratio, Vy FB for fine tuning. Easily adaptable to any shaft. Comparable value — $5.95.

Amateur Net $1.50 ea.
10 for $13.50

Shown approximately actual size

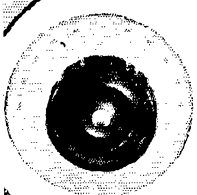


ELECTROVOICE Mod. 729
CERAMIC CARDIOID MIKE

Lowest cost, yet includes every feature essential for SSB operation. Flat, smooth response from 300 to 3,000 cps. Lifts from stand for mobile or desk operation. Hi-Z, output —60 db. Ceramic element unaffected by heat or humidity. Price includes relay-control switch, stand and 8½' shielded cable. Mike size 7¾" x 1½" wide.

Model 729 $15.90

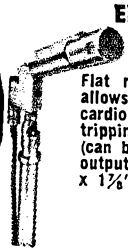
PRECISION BALL DRIVE DIAL



Another superb product of Jackson Bros. of England. 4" dia. dial with 6:1 ball drive ratio. Fits standard ¼" shaft. For that velvet touch...

Amateur Net $3.95

ELECTROVOICE Mod. 664 MIKE
HIGHEST F to B MADE



Flat response (40 to 15,000 cps) penetrates QRM, allows actual increase in RF power out. Efficient cardioid pattern, essential for SSB cuts accidental tripping of VOX ckt. Output —55 db. On/off switch (can be wired for remote control). 150 ohms or Hi-Z output selected at cable connector. Mike size 7-3/16" x 1⅞". Price includes mike and cable.

Model 664 $51.00

Matching desk stand with DPDT switch $9.00
Stand, less switch $6.00

Versatile Miniature Transformer

Same as used in W2EWL SSB Rig — March 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered.) The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x ¾" w. x ¾" d. New and fully shielded.

Amateur Net $1.39
3 for $3.49 10 for $10.75

ARROW Authorized distributor of HEATHKIT equipment

MAIL ORDERS PROMPTLY PROCESSED
SAME DAY SHIPMENT FROM STOCK

TO SAVE C.O.D. CHARGES, PLEASE INCLUDE SUFFICIENT POSTAGE WITH YOUR ORDER. ANY EXTRA MONEY WILL BE RETURNED.

ALL PRICES F.O.B. N. Y. C.
Arrow's Export Dept. Ships To All Parts Of The World!
Prices Subject To Change Without Notice.

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525 Jericho Turnpike, Mineola, N. Y. • Pioneer 6-8686

TRADE-INS WELCOMED

Pursuant to applicable procedures set forth in Section 1.213 of the Commission's rules, interested persons may file comments on or before April 16, 1962, and reply comments on or before May 16, 1962. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision on the rules of general applicability which are proposed herein, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this notice.

In accordance with the provisions of Section 1.54 of the Commission's rules and regulations, an original and 14 copies of all statements, briefs, or comments shall be furnished the Commission.

Attachment: Appendix A

FEDERAL COMMUNICATIONS COMMISSION*

Adopted: February 14, 1962 — BEN F. WAPLE
Released: February 16, 1962 — *Acting Secretary*

* See attached Dissenting Statement of Commissioner Bartley.

* Commissioners Ford and Cross dissenting.

APPENDIX A

5 U.S.C., Sec. 140

"It is the sense of the Congress that any work, service, publication, report, document, benefit, privilege, authority, use, franchise, license, permit, certificate, registration, or similar thing of value or utility performed, furnished, provided, granted, prepared, or issued by any Federal Agency (including wholly owned Government corporations as defined in the Government Corporation Control Act of 1945) to or for any person (including groups, associations, organizations, partnerships, corporations, or businesses), except those engaged in the transaction of official business of the Government, shall be self-sustaining to the full extent possible, and the head of each Federal agency is authorized by regulation (which, in the case of agencies in the executive branch, shall be as uniform as practicable and subject to such policies as the President may prescribe) to prescribe therefor such fee, charge, or price, if any, as he shall determine, in case none exists, or redetermine, in case of an existing one, to be fair and equitable taking into consideration direct and indirect cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts, and any amount so determined or redetermined shall be collected and paid into the Treasury as miscellaneous receipts: Provided, that nothing contained in this title shall repeal or modify existing statutes prohibiting the collection, fixing the amount, or directing the disposition of any fee, charge or price: Provided further, that nothing contained in this title shall repeal or modify existing statutes prescribing bases for calculation of any fee, charge or price, but this proviso shall not restrict the redetermination or recalculation in accordance with the prescribed bases of the amount of any such fee, charge or price."

DISSENTING STATEMENT OF COMMISSIONER BARTLEY

While I can accept the concept that user charges, endorsed by Congress in the Independent Offices Appropriation Act of 1952, is desirable for the types of special benefits conferred by some Federal agencies, I am of the opinion that fees for services of this Commission in regulating communications by wire and radio are incompatible with certain basic principles of the Communications Act of 1934, as amended.

Regulation of communications is for the benefit of the public and not for the benefit of the industry which is regulated.

Licenses may be issued by the Commission for fixed periods only upon a finding that the public interest, con-

(*Continued on page 146*)

CARL E. SMITH
E.E., President

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Please send Free Career Information Material prepared to help me get ahead in Electronics and a free copy of your "Pocket Electronics Data Guide." I have had training or experience in Electronics as indicated below.

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☐ Radio-TV Servicing
☐ Manufacturing
☐ Amateur Radio
☐ Broadcasting
☐ Home Experimenting
☐ Telephone Company
☐ Other_____

In what kind of work are you now engaged?

In what branch of Electronics are you interested?_____

Name_____ Age____

Address_____

City_____ Zone____ State_____

QT-4

venience and necessity would be served thereby. Thus, the primary beneficiary of our licensing activities is intended to be the general public. Although a license issued by this Commission may have considerable economic value to the licensee, use under the license is always subservient to the public interest.

Licenses issued by the Commission are for use, only, of a frequency and confer no ownership rights therein. Charging fees for licenses may well create here a contention of ownership or proprietary right inherent in other types of license fee payments.

The Commission is charged with the responsibility of promoting maximum effectiveness in the use of wire and radio communication for service to the people of the United States and for the safety of their life and property. The assessment of fees would be a deterrent to effectuation of that purpose by making more difficult our implementation of new uses under Section 303(g) of the Communications Act of 1934, as amended.

In view of the foregoing, I dissent to the issuance of this proposed rulemaking. QST

The Hairpin Match

(*Continued from page 14*)

Any values not in the range of the graphs can be computed by using equation (8) of Appendix A, or equation (5) of Appendix B.

Appendix A

Fig. 1C shows the equivalent circuit of the antenna with hairpin inductance attached. Admittance equations are written for this circuit and solved, with C_a eliminated, to find the value of L required for matching a given R_a to a given R_t. C_a is determined experimentally, instead of by computation, by adjusting the driven-element length for optimum v.s.w.r.

In Fig. 1C the input admittance, Y_t, must equal the reciprocal of the transmission-line resistance, and also must equal the sum of the two branch admittances.

$$Y_t = \frac{1}{R_t} = Y_1 + Y_2 \qquad (1)$$

The admittance Y_1 of the branch containing the capacitor is

$$Y_1 = \frac{R_a}{R_a^2 + \frac{1}{\omega^2 C_a^2}} + j\frac{\frac{1}{\omega C_a}}{R_a^2 + \frac{1}{\omega^2 C_a^2}} \qquad (2)$$

where $\omega = 2\pi f$, and f = operating frequency.

The admittance Y_2 of the branch containing the inductor is

$$Y_2 = -\frac{j}{\omega L} \qquad (3)$$

Substituting (2) and (3) into (1) gives

$$\frac{1}{R_t} = \frac{R_a}{R_a^2 + \frac{1}{\omega^2 C_a^2}} + j\frac{\frac{1}{\omega C_a}}{R_a^2 + \frac{1}{\omega^2 C_a^2}} - j\frac{1}{\omega L} \qquad (4)$$

Equating the real parts of (4) gives

$$\frac{1}{R_t} = \frac{R_a}{R_a^2 + \frac{1}{\omega^2 C_a^2}} \qquad (5)$$

(*Continued on page 156*)

LAFAYETTE RADIO

AMERICA'S HEADQUARTERS FOR HAM EQUIPMENT

THE LAFAYETTE HE-30

Professional Quality Communications Receiver

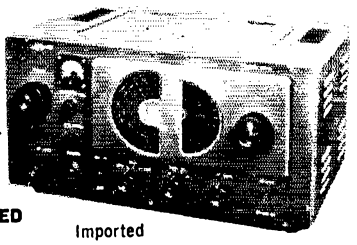
Imported

99.95 NO MONEY DOWN

- TUNES 550 KCS TO 30 MCS IN FOUR BANDS
- BUILT-IN Q-MULTIPLIER FOR CROWDED PHONE OPERATION
- CALIBRATED ELECTRICAL BANDSPREAD ON AMATEUR BANDS 80 THRU 10 METERS • STABLE OSCILLATOR AND BFO FOR CLEAR CW AND SSB RECEPTION • BUILT-IN EDGEWISE S-METER

Sensitivity is 1.0 microvolt for 10 db, Signal to Noise ratio. Selectivity is ± 0.8 KCS at —6db with Q-MULTIPLIER. TUBES: 6BA6—RF Amp, 6BE6 Mixer, 6BE6 OSC., 6AV6 Q-Multiplier—BFO, 2-6BA6 IF Amp., 6AV6 Det-AF Amp. ANL, 6AQ5-Audio output, 5Y3 Rectifier.

TOP VALUE COMMUNICATIONS RECEIVER



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KT-200
in Kit Form
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HE-10
79.95
WIRED AND TESTED

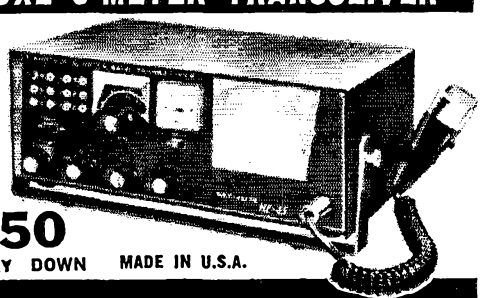
- SUPERHET CIRCUIT UTILIZING 8 TUBES AND RECTIFIER TUBE • BUILT-IN "S" METER WITH ADJUSTMENT CONTROL • FULL COVERAGE 80-10 METERS • COVERS 455KC TO 31 MC • VARIABLE BFO AND RF GAIN CONTROLS • SWITCHABLE AVC AND AUTOMATIC NOISE LIMITER

The Communications Receiver that meets every amateur need—*available in easy-to-assemble kit form.* Signal to noise ratio is 10 db at 3.5 MC with 1.25 microvolt signal. Selectivity is —60 db at 10 kc, image reflection is —40 db at 3 MC. Tubes: 3—6BD6, 2—6BE6, 2—6AV6, 1—6AR5, 1—5Y3.

NEW! LAFAYETTE HE-45 DELUXE 6-METER TRANSCEIVER

- Highly Sensitive Superheterodyne Receiver Section for 50-54 Mc
- Effective Series Gate Noise Limiter
- 3-Stage, 12-Watt Transmitter with 2E26 Final
- Illuminated Panel Meter for Plate Current and "S" Readings
- Pi-Network Transmitter Output
- Built-in 117 VAC and 12 VDC Power Supplies
- Push-To-Talk Ceramic Microphone

Provides maximum convenience and flexibility in either mobile or fixed operation.



LAFAYETTE HE-50 10-METER TRANSCEIVER
Similar to above except for 10 meter operation

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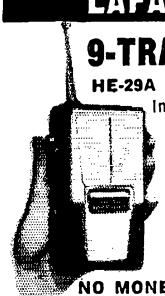
NO MONEY DOWN MADE IN U.S.A.

LAFAYETTE HE-29A

9-TRANSISTOR C.B.

HE-29A Imported "WALKIE TALKIE"™

39.95 2-For-78.88



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- Transmits and Receives up to 1.5 Miles
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LAFAYETTE 6-METER VFO

- Highly Stable Oscillator Circuit
- 8 MC Output
- Illuminated Dial — 50-54 MC Range
- Fully Wired — Not a Kit

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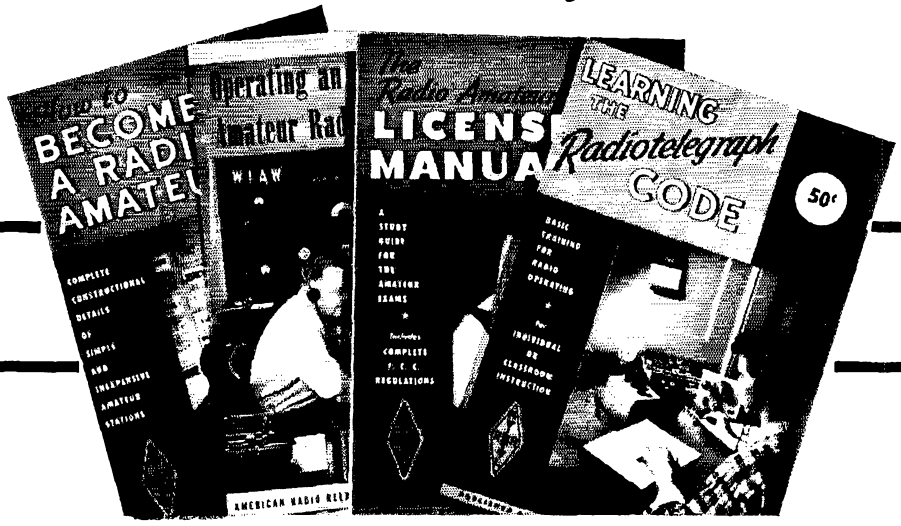
Gateway



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- ★ OPERATING AN AMATEUR RADIO STATION

Anyone starting out in amateur radio will find these publications a necessary part of his reading and studying for the coveted amateur radio operator's ticket. Written in clear, concise language, they help point the way for the beginner. Tried and proven by thousands upon thousands of amateurs, these ARRL publications are truly the "Gateway to Amateur Radio."

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The American Radio Relay League, Inc.—West Hartford, Connecticut

BARRY ELECTRONICS CORP.

ELECTRO-VOICE/RME 6900—SSB/AM/CW

HAM-BAND RECEIVER

THIS CAN BE YOURS . . . *and BARRY will make it EASY for you to buy it.*

BUY FOR CASH . . . OR, BARRY ELECTRONICS WILL OFFER YOU THE MOST FABULOUS TRADE-IN IN HISTORY. WRITE!

The RME 6900 offers optimum performance on SSB, AM, or CW with no compromises or apologies to competitive high-priced receivers. Units are in factory-sealed cartons, and are covered by Electro-Voice/RME full-factory warranty. Whether you operate SSB, CW, or AM, you feel that the RME 6900 was designed solely for you.

Has complete function controls necessary for a modern communications receiver . . . Vernier control knob with over-ride clutch for fast tuning; RF gain; AF gain; Antenna Trimmer; Band-Selector; Stand-By/Receive/Calibrate/Transmit; ANL/Limiter; "T"-Notch Filter; Internal 100 Kc Hermetically-sealed crystal calibrator. Some additional important features of the RME 6900 are:

- **CONTROLS:** 11½" Single Slide Rule Tuning Dial: Logging Scale.
- **COVERAGE:** 80, 40, 20, 15 and 10 on 5 Bands, plus 10 to 11 Mc for WWV or WWVH.
- **PEAK** Selectivity plus tunable "T" Notch.
- 500 and 4 Ohm Outputs.
- **NOISE** Limiter for SSB and CW, AM.
- **SEPARATE** Detector for Single Sideband.
- **S METER** Calibrated in 6 db Steps above S9 for Better Reading.
- **IMPROVED** Fast Attack AVC Circuit.
- **SELECTABLE** Sideband. Upper or Lower.

RME 6900.... **$369.00** Amateur Net

RME 6901 Matching Speaker..... **$19.50** Amateur Net

RME/PREPAID ANYWHERE: USA OR FOREIGN

ONE-HAND control knob of the Modemaster Switch gives five distinct functions. The AM band width is 3.5 Kc with fast attack AVC System. In upper and lower side-band the AVC System is also switched to fast attack with the BFO automatically turned on and positioned for desired side-band reception. An advanced Product Detector switches in to replace the Diode Detector in all SSB and CW positions. When switched to the CW position, the band pass on the IF system is reduced to 500 CPS with the BFO Injection Control and Pitch becoming operational. The AVC System is changed for optimum use when operating under CW conditions. The RME 6900 is truly the paramount CW/SSB/AM Receiver. You are cordially invited to visit us and listen for yourself.

FABULOUS trade-ins on your present receiver will be given. Let us know of your interest and we will give you the *BEST POSSIBLE DEAL* available! The top DX'ers now using this receiver have attested to its capabilities PARTICULARLY when QRM conditions prevail or when the rare DX shows up.

ELECTRO-VOICE MICROPHONES:
Model 664 Dynamic, HI-Z with Model 419S Desk Stand. **$57.00.**
Model 911 Crystal, HI-Z. **$19.50.**
Model 715 Ceramic, HI-Z. **$7.80.**
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Plate Transformer:
Pri: 115 VAC @ 60 CPS.
Sec 3200 V.C.T. @ 350 Ma.
Compact, shielded, Net wt: 21 lbs. 6" H x 4½" W x 6½" D. Order stock #ET-18A. **$13.95.**

Mobile Radio Power Supply: Mfd by Minneapolis Honeywell Model W612A. Input: 12.6 VDC (Nominal) with 17 Amp Maximum current draw at full load. All transistorized. Output: Dual voltage — 250 and 500 VDC, Nominal. Current — 300 Ma. on 500 V. tap. 200 Ma. on 250 V. tap. 6⅛" H x 5½" W x 3¼" D. **$54.95.**

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☐ Enc. is my order with money order or check.
☐ Send new 1962 Barry's Greensheet Catalog.
☐ Send information on RME 6900 Receiver.
☐ I have available for trade-in for the 6900 Receiver the following.....
Condition.....
Name.....Title
Company.....
Address.....
City.....State.....
Prices FOB, N.Y., except RME Recvr FOB destination

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ALL RECEIVERS WITH CLOCK
AND MATCHING SPEAKER

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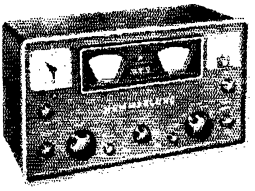
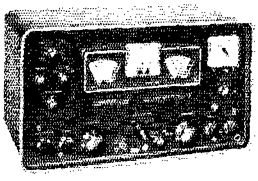
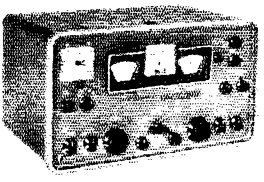


HQ-110C $273.95

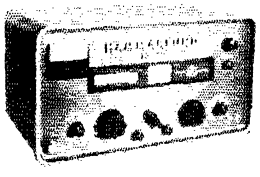


HQ-145XC $298.95

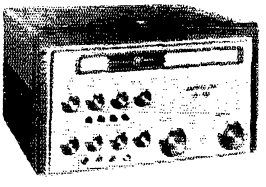


HQ-180C $458.95

TRANSMITTERS



HX-50 $399.50



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Address _____

City _____ State _____

Dear Bill, W4FHY:

☐ I have to Trade in my _____

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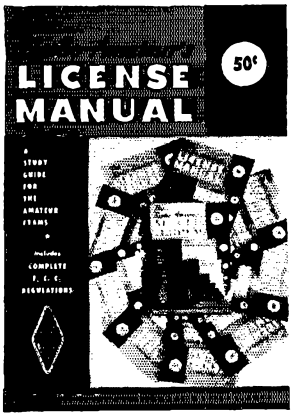
☐ Send 1962 Hammarlund Catalog with your quote.

BILL SLEP CO., P. O. Box 178-Q Highway 301, Ellenton, Florida, Phone 722-1843

UP TO DATE . . .

THE 48th edition of the Radio Amateur's LICENSE MANUAL is complete, up to date and revised to include latest information on amateur licensing. Contains information on questions included in FCC amateur exams, all the dope on frequency privileges for the various classes of amateur licenses, the full text of RACES regs, details of the U.S.-Canada Reciprocal Operating Agreement, code-practice schedules, and the current FCC examination schedule. A useful manual for all, newcomer and oldtimer alike. **Always up to date.**



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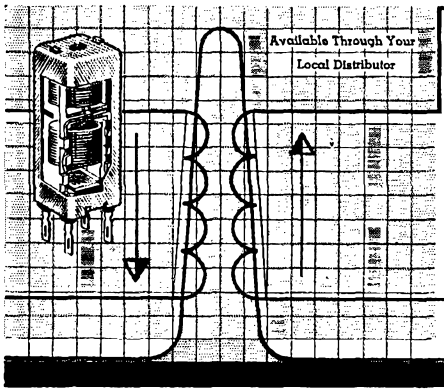


COMMUNICATION

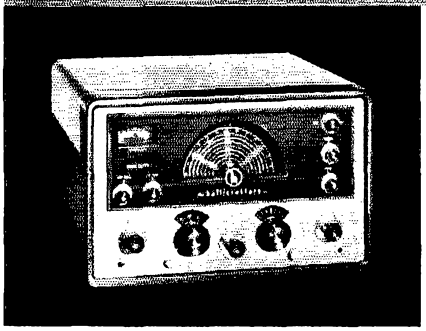
I.F. Transformers

TYPE		ITEM	6 db*	20 db*
12-C30	455 kc.	Input/Interstage I.F.	11.5 kc.	30.1 kc.
12-C31	455 kc.	Output I.F.	13.6 kc.	32.6 kc.
13-W1	1500 kc.	Input/Interstage I.F.	130.0 kc.	264.3 kc.
13-W2	1500 kc.	Output I.F.	121.4 kc.	240.5 kc.
913-C1	455 kc.	Input/Interstage I.F.	8.5 kc.	24.3 kc.
913-C4	455 kc.	Output I.F.	10.9 kc.	28.6 kc.
913-W1	1500 kc.	Input/Interstage I.F.	19.5 kc.	61.5 kc.
913-W4	1500 kc.	Output I.F.	25.6 kc.	73.4 kc.

*Tolerance: ±10%

J. W. MILLER COMPANY
5917 So. Main St., Los Angeles 3, California

southwest's most complete ham stock



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BERT W5FU

hallicrafters

Model SX-115 Receiver

Radio, Inc.
1000 S. Main LUther 7-9124
TULSA 19, OKLA.

The Hairpin Match

(Continued from page 146)

and equating the imaginary parts of (4) gives

$$\frac{1}{\omega L} = \frac{\frac{1}{\omega C_a}}{R_a^2 + \frac{1}{\omega^2 C_a^2}} \tag{6}$$

Solving equations (5) and (6) simultaneously for ωL gives

$$\omega L = R_t \sqrt{\frac{R_a}{R_t - R_a}} \tag{7}$$

Since $\omega L = X$, the inductive reactance, equation (7) is plotted as X vs. R_a for various fixed values of R_t to give Fig. 7.

Substituting $\omega = 2\pi f$, equation (7) becomes

$$L = \frac{R_t}{2\pi f} \sqrt{\frac{R_a}{R_t - R_a}} \tag{8}$$

Equation (8) is plotted with $f = 14.28$ Mc. and $R_t = 52$ ohms as L vs. R_a to give Fig. 3.

Appendix B

For the capacitor match the equivalent circuit of the antenna is shown in Fig. 5C. Admittance equations for this circuit are written and solved for the required C to match a known R_a to a known R_t. The value of L_a is determined experimentally by adjusting the driven-element length for best v.s.w.r.

Equating the input admittance to the reciprocal of the transmission-line resistance, R_t, and to the sum of the two branch admittances gives

$$Y_t = \frac{1}{R_t} = \frac{R_a}{R_a^2 + \omega^2 L_a^2} - j\frac{\omega L_a}{R_a^2 + \omega^2 L_a^2} + j\omega C \tag{1}$$

Equating the real and imaginary parts of (1) gives

$$\frac{1}{R_t} = \frac{R_a}{R_a^2 + \omega^2 L_a^2} \tag{2}$$

$$\omega C = \frac{\omega L_a}{R_a^2 + \omega^2 L_a^2} \tag{3}$$

solving (2) and (3) simultaneously for $\frac{1}{\omega C}$

$$\frac{1}{\omega C} = R_t \sqrt{\frac{R_a}{R_t - R_a}} \tag{4}$$

which is the capacitive reactance, since $X = \frac{1}{\omega C}$, where $\omega = 2\pi f$ as before.

Equation (4) gives the required value of capacitive reactance for the capacitor of Fig. 5C.

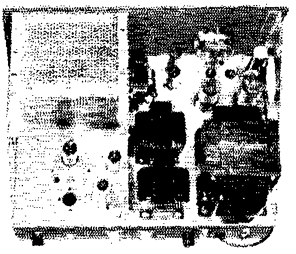
Also, it is noted that equation (4) of Appendix B is identical to equation (7) of Appendix A. Thus, the value of capacitive reactance required in the capacitor match of Fig. 5 is identical to the value of inductive reactance required in the hairpin match of Fig. 1 when the same R_a and R_t are used.

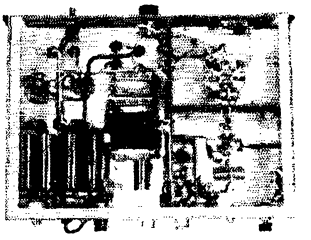
Therefore, reactance values graphed in Fig. 7 can be used either to compute hairpin inductance values for the hairpin matching system, or to compute capacitor values for the capacitor matching system.

The value of capacitor required in the capacitor match is, then,

$$C = \frac{1}{2\pi f R_t} \sqrt{\frac{R_t - R_a}{R_a}} \tag{5}$$

175 WATTS SSB ON SIX METERS with P & H 6-150 TRANSMITTING CONVERTER





Here's the simple, easy way to go VHF on SIX METERS! Just feed the 20 meter output of your present SSB, AM or CW exciter into the P&H 6-150 and you have 175 Watts PEP on SIX METERS, either crystal or VFO controlled, depending on your exciter features. Resistive Pi-Pad and switchable Half-Power Pad permits operation with any 5 to 100 Watt exciter. Since the 6-150 is a high stability mixing device, the output signal stability is the same as that of your exciter. Uses a 6CX8 crystal oscillator/Class A buffer; a 6360 Balanced Mixer and a NEW AMPEREX 8117 push-pull output tube. Power input to 8117 final: 175 Watts PEP on SSB, 165 Watts CW, 90 Watts linear AM. Entire chassis and all shielding is COPPER PLATED. Output jack provided to furnish oscillator signal injection for receiving converter. Quiet 200 CFM forced-air cooling. 50-70 ohm input and output impedances. Husky built-in power supply has three separate rectifiers and filter combinations. Meter reads; PA GRID, PA PLATE and RELATIVE RF OUTPUT. Modernistic curved corner grey cabinet; 9" X 15" X 10½". The P&H 6-150 is so thoroughly shielded, by-passed and parasitic-free that it operates as smoothly as an 80 meter transmitter. COMING SOON! THE P&H 2-150 FOR TWO METERS!

Complete — With Built-in Power Supply, All Tubes and Crystal, for Only $299.95

WRITE FOR LITERATURE

P&H ELECTRONICS INC.
424 Columbia , Lafayette , Ind.

DOW-KEY PANEL MOUNT

Durable, silver plated, precision made. Only ⅝" hole is needed, no screws.

DK60-P **.70** ea.

CONNECTORS

DOW-KEY DOUBLE-MALE CONNECTOR DKF-2

Favorite everywhere. Precision made, rugged locking type. Silver plated. **$1.25** ea.

At your electronics dealer or write:

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ENJOY STEREOPHONIC SOUND AT ITS BEST

Now you can listen to your stereo equipment without bothering anyone else and still get the quality of a high class speaker system with a set of well designed stereo headsets. *(Imported)*

Write EPPEL ENTERPRISES
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MITCHELL, S. DAK.
Lot prices listed on request

Send check or money order for $19.95. ($3 deposit on C.O.D.)

IN A CLASS BY ITSELF!

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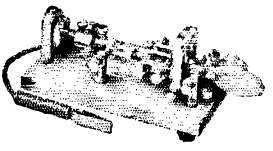

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THE VIBROPLEX CO., INC.
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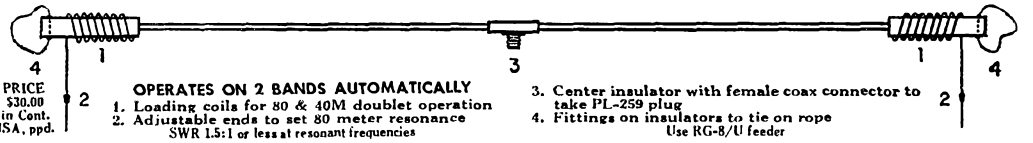
LRL-70 ANTENNA **70' LONG, 80 & 40 M** • Power rating 2 Kw. P.E.P. or over



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OPERATES ON 2 BANDS AUTOMATICALLY
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LATTIN RADIO LABORATORIES • Box 44 • Owensboro, Kentucky

QST readers like the fact that the amateur radio business is still being managed by amateurs (January QST, page 160). Wrote K4IEX: "Sure is reassuring to know that hams still run the business." "Happy to see that there are so many hams serving hams," said W0DSU when he sent in his sheets of calls. After compiling his list, K3QFG stated that "besides being intrigued by the number of hams in their own businesses, I bought some of the wonderful quality they advertised"; while W2MCU said, "By the time I finished I just had to have a Dow-Key relay and a 500 ft. reel of Glas Line" and WA6AJF told us that poring over all the 1961 ads again "makes me want to rush down to Henry Radio and trade in my old bucket of bolts."

Taking another look at the 1961 ads seemed to be a popular project in all call areas. K1BOL, K2GTF, W3WBD and W6OUY called it fun; K4TRQ, W5ISF, K7IMH, K8YKL, K9TAW and KØUJJ said they enjoyed it. W2TOX/1 paid a welcome tribute: "Keep up the standards of the ads for QST. They're sure worth reading."

It was nice to get flowers for ARRL, too. K3PGC declared that the W1AW code practice sessions were a big help in passing the code test; K8VPQ said, "I truly owe my license and station to the American Radio Relay League."

We're still getting lists of calls every day, so we're happy to agree with K4QAV who told us: "This should convince any hard-hearted advertising man that he should use QST."

73,

ADVERTISING DEPARTMENT of ARRL
L. A. "Pete" Morrow, W1VG

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(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 nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. 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 except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

MICHIGAN State Convention, Grand Rapids, 15th Annual April 14, 1962, Pantlind Hotel. Write Post Office Box 333.

ROCHESTER, N.Y. is again Hamfest Headquarters for W.N.Y. on May 12. See May Hamfest Column for details.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

RECEIVERS: Repaired and aligned by competent engineers using factory standard instruments. Factory service at reasonable prices on Collins, Hallicrafters, Hammarlund, Gonset, National, Harvey-Wells. Our 25th year. 90 day guarantee. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

DON'T Fail FCC tests! Check yourself with a time-tested "Sure-check Test". Novice, $1.50; General $1.75; Extra, $2.00. We pay the postage. Amateur Radio Specialties, 1013 Seventh Ave., Worthington, Minn.

TRIGGER. Cash paid for ham equipment. 7361 W. North Ave., River Forest, Ill. PR 1-8616, Chicago #TU 9-6429.

TOROIDS: Uncased 88 Mhy, like new. Dollar each. Five/$4.00 P.P. DaPaul, 309 So. Ashton, Millbrae, Calif.

SOUTHERN California: Transmitters and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. KEllog 8-0500.

WANTED: All types of aircraft or ground radios. 17L, 618S, 388, 390, GRC, 51V, 51X2 units. Especially any item made by Collins Radio whatsoever. Also large type tubes and test equipments. For fast action write Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

WANTED: Two or more 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

ATTENTION Mobileers! Leece-Neville 6 volt 100 amp. system, $50; 12 volt 50 amp system, $50; 12 volt 60 amp system, $60; 12 volt 100 amp syst. $100. Guaranteed no ex-police car units. Herbert A. Zimmermann, Jr. K2PAT, 1907 Coney Island Ave., Brooklyn 30, N.Y. Tel. DEwey 6-7388.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 399, Mt. Kisco, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmany 8-8262.

HAM TV Equipment bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

WANTED: KWM-2 Transceivers and any old issues of QST from inception through 1925. Al T. O'Neil, Camp Lakeview, Lake City, Minn.

TOROIDS: 88 mhy with mounting hardware. Uncased; like new. Information sheet included. $1 ea. 5/$4.00 postaid. KCM, Box 88, Milwaukee 13, Wisconsin.

ANTENNA Farm 20 acres. Tall sky hooks. Trout brook, 7 miles to capitol. $2000. W1THM

QSLS? WPE? DX specials? Rainbow maps? State maps? Cartoons? Samples 25¢, (refunded). Sakkers, W8DED, Box 218, Holland, Mich. (Bible verse QSL samples 20¢).

C. FRITZ QSLs guarantee greater returns! Samples, 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Ill.).

QSLS. Twenty exclusive designs in 3 colors. Rush $3 for 100 or $5 for 200 and get surprise of your life. 48-hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

QSL-SWL-WPE. Finest. Since 1946. Largest assortment. Priced right. Send 10¢ for samples to: Glenn Print, 1103 Pine Heights Ave., Baltimore 29, Md.

QSLS "Brownie." W3CJI, 3110 Lehigh, Allentown, Penna. Samples, 10¢: with catalog, 25¢.

QSLS-SWLS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo, 1, Ohio.

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢

QSLS-SWLS, 100 2-color glossy, $3.00; QSO file cards, $1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo.

QSLS: samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

QSLS-SWLS Samples 25¢. David Spicer, 4615 Rosedale, Austin 5, Texas.

QSLS, SWLS, WPE. Samples 5¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSL's 100 glossy 4 color $3.70 Postpaid. Samples 10¢, or send 25¢ for large assortment and "Danger, High Voltage" sign. Dick, W8VXK, Rt. 1, Gladwin, Michigan.

QSLS, SWLs, XYL-OMs (sample assortment approximately 95¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fantabulous, DX-attracting, prototypal, snazzy, unparaxoned cards (Wow!). Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

CREATIVE QSL Cards. New catalogs and designs being completed. Free samples and catalog. Personal attention given. Wilkins Creative Printing, P.O. Box 1064-I, Atascadero, Calif.

QSLS. Fast service. Write for free samples. Satisfaction guaranteed. Blanton's, Box 7064, Akron 6, Ohio.

DON'T Buy QSLs-SWLs until you see my free samples. Bolles, W5OWC, Box 9445, Austin, Texas.

SPACE AGE 3-D QSL cards. Don't miss out! Free sample brochure. 3-D QSL, Dept. QM, 5 Wood End Road, Springfield, Mass.

SUPERIOR QSLS, samples 10¢. Ham Specialties, Box 823 Bellaire, Texas

QSLS, 3-color glossy, 100—$4.50. Rutgers VariTyping Service, 7 Fairfield Rd., Somerset, N.J.

PICTURE QSLs. Cards of your shack, home, etc., Made from your photograph. 1000, $13.00. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

QSLS, 300 for $4.35, Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill.

QSLS-SWLS. Samples free. W4BKT Press, 123 No. Main, McKenzie, Tenn.

QSLS. Samples free. Phillips, W7HRG, 1708 Bridge St., The Dalles, Oregon.

QSLS. Samples dime. Rubber stamps: name, call and address $1.35. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSLS, $2.50 and up. Samples 10¢. RBL Print M.R. 12, Phillipsburg, N.J.

QSLS. Free Samples. W7IIZ Press, Box 183, Springfield, Oregon.

QSLS. Kromkote-3 color. Order 200, get 25 each of 8 different styles—many styles. Samples 10¢. Progress Printing, Box 1154, Biloxi, Miss.

QSLS, SWL's that are different, colored, embossed card stock, and "Kromekote". Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

RUBBER Stamps. $1.00. Call and Address. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, N. J.

HUNDRED QSLS: 80¢. Samples, dime. Meininger, Jesup, Iowa.

CERTIFIED QSLS-SWLS, unique designs, speedy service. Catalog 25¢ (refundable) Certified Printing, Box 1023, Whittier, Calif.

QSLS. Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 10¢. K2VOB Press, 62 Midland Blvd., Maplewood, N.J.

1¼" Call QSLs (2 sides printed), 100, $2.75; sample free. Gariepy, 2624 Kroemer, Ft. Wayne, Ind.

QSLS. Samples, dime. Printer, Corwith, Iowa.

QSLS. Priced right. Samples (stamp appreciated). K2ZMH Press, Box 55, Copake Falls, N.Y.

QSLS. Dime. Filmcrafters, Box 304, Martins Ferry, Ohio.

RUBBER Stamps for hams, sample impressions, W9UNY, Hamm, 542 North 93, Milwaukee, Wis.

ATTRACTIVE QSLS: Large selection of styles, cartoons. Multicolored, same price. Personal ham stationery. Samples 25¢ (deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn 13, N.Y.

QSLS. Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLS-SWLS 3-colors 100 $2.00. Samples dime. Bob Garra, Lehighton, Penna.

QSLS. Free samples and catalogue. Bill Pyper, P.O. Box 33, Edwards, Calif.

GLOSSY QSLS, 2 colors, 200, $4.00. Each additional 100, $1.50. Dingle, KN3RDN, 5828 Virlona Ave., Elkridge, Md.

QSLS. Large selection styles including photos. Lowest prices. Fast service. Samples dime. Ray, K7HLR, 679 Borah, Twin Falls, Idaho.

QSL Specialists. Distinctive. Samples 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago 39, Ill.

QSLS Multi-color "Kromekote". 100, $2.00 up. Samples 10¢. Millsprint, Box 1004, Lima, Ohio.

QUALITY QSLS. New designs monthly. Samples 10¢. Giant, 25¢. Savory, 172 Roosevelt Rd., Weymouth, Mass.

QSL Cards. $1.00 per 100. Lewalski, 1367 Perkiomen, Reading, Penna.

CANADIANS! QSLS in fluorescent colors, by silk screen process. Free samples. Martin, 314 Delatre St., Woodstock, Ont.P., Canada.

CANADIANS! National Selecto-O-Ject, S.O.J. 2, Model, $10.00; Hammarlund frequency standard with Bliley 100 kc. xtal. $10. A. B. Morgan, VE3OI, RR No. 1, Box 66, Dundas, Ont. P., Canada.

CANADIAN Used, surplus and new gear. Giant catalog, 25¢. Low prices, thousands of items. ETCO, Box 741, Montreal, P.Q., Canada.

CANADIANS! Selling out 20 meter Mosley beam w/20 ft. tower and AR22 rotator, $75.00; Heathkit Apache transmitter professionally wired used 20 hours, $295.00; Hammarlund HQ110 rcvr, as new, $195.00, or the lot $500.00. R. T. Latimer, VE3ATY, 668 Wilson Ave., Ottawa, Ont., Canada.

CANADIANS. Receiver CR91A (AR88LF) Stoddard NM20B field intensity meter. Both in exc. condx. VE3ATU, 2408 Drury Lane, Ottawa 3, Ont.

CANADIANS: Knight R-100 receiver, in mint condition, expertly assembled by experienced technician. With S-meter, crystal calibrator, speaker. Excellent value at $150.00. Will pack carefully and ship express collect. J. A. MacEwen, VE1SD, 20 Tower View Drive, Halifax, N.S.

KWS1. $900. W2ADD.

LOWEST Prices. Factory fresh sealed cartons, Central Electronics, CDR, Dow-Key, Drake, Electro-Voice, Gonset, Gotham, Hallicrafters, Hy-Gain, E. F. Johnson, Mosley, P & H Electronics, Telrex. Self-addressed stamped envelope for lowest quotation on your needs. Gonset G-33 brand new factory sealed cartons, $75.00. Brand new PL-172 and socket, $125.00. Used, perfect Ranger, $150.00; Valiant, $275.00; SX-110, $125.00; SX-100, $180.00; DX-40, $50.00; Sonar-120, $50.00; Adventurer, $35.00; Two brand new Eimac 4CX300A's, both $55; Mosley A-320B, $40. H D H Sales Co., P. O. Box 73, Rowayton, Conn.

PROCEEDINGS Of the I.R.E. 1914 through 1933. Some volumes complete. Will sell any copy or copies. Excellent price on entire lot. (Mrs. Miriam Knapp, W1ZIM, 191 Beechwood Rd., West Hartford 7, Conn. Tel. JAckson. 3-7560.

CASH For your gear! We buy, trade and sell. We stock Hammarlund, Hallicrafters, National, Johnson, RME, Hy-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H & H Electronic Supply Inc., 506-510 Kishwaukee St., Rockford, Ill.

WANTED: QSTs for personal collection: QSTs January through August, 1916; ARRL Handbooks: Editions 1 and 5. W1CUT, Box 1, West Hartford 7, Conn.

CHICAGOLAND Amateurs! Factory authorized service for Hallicrafters, Hammarlund, Johnson, Gonset. Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halstead St., Chicago Heights, Ill. Tel. SKyline 5-4056.

TRAVEL Abroad costs less, and is lots more fun when arranged by The International Ham-Hop Club. Non-profit, non-political. Members in 50 countries. W6THN/1, Gunther, 165 Lloyd, Providence 6, R.I.

SSB Transceiver from the BC-453, 40 or 80 meters. 53 page step by step instructions, $3.00 ppd. WRA, 10517 Haverly St., El Monte, Calif.

COLLINS 32S-1, AC supply, $525.00; 75S-1, $375.00; Johnson Thunderbolt, $375.00; $1195.00 buys all. Will deliver 150 mile radius. W. L. Knowles 10 min. terr. Upper Montclair, N.J. PI 4-5994.

COLLINS 75S-2, $375; URA-8A converter, $225; 51J2, 51J3, 51J4 reconditioned Collins receivers 500 kc.—30-30.5 kc. Teletype and Kleinschmidt equipment takes in trade for new amateur equipment. Write Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

USED Equipment Bargains! List 10¢. Brand's, Sycamore, Illinois. Equipment wanted.

SELL: Johnson Thunderbolt, $400; HT32, $400. Both in like-new condx. Used very few hours. Write for details. K2SJJ/8, 4038 Herman Ave., S.W., Grand Rapids 8, Mich.

ELDICO P-101 transistor power supply, small quantity left. 800 VDC 200 Ma. output, 300 VDC, 150 VDC 35-65 volt DC control relays exc. for KWM-2 type equipment. $100 F.o.b. Farmingdale, N.J., W2HKY, Reeves Instrument Corp., Lakewood Road, Farmingdale, N.J.

GLOBE Champ., Model 350, mint condx. 350 W. CW, 275 W AM. H. Webb, K2GKH, 125 Ocean Ave., Jersey City, N.J. Tel. HE 3-0803.

SALE: G4ZU 20/40 mtr. Birdcage beam in cartons, new, $55; HC-453 w/pwr. supply $10.00; Cush Craft 10-15-20 mtr. vertical antenna, $10. W2COY, Box 552, Sidney, N.Y.

4X250B, two only, in factory sealed bags. $32.00 each. 3CX100A5, one only, $25; both new Eimac. Price includes insured postage. Terry Miller, 110 Meadow Lane, Phila. 14, Penna. Tel. NE 7-1432. W3FCM.

QSTS: 1922-1960, 30¢ each. K1LPL, 108 Whitehall St., Providence, R.I.

CLEANING House: In exc. condx: New Eico 720, $65; BC-683 police rcvr 26-42 mc, tunable, $25; code monitor, $9; TR switch, $9. Gil Kellersman, Stony Brook Rd., Darien, Conn.

SELL: DX-100, $120; HQ-100C, $120; both in exc. condx. K2TPG, 260 Metape South, Bound Brook, N.J.

NORFOLK Bound hams 40 ft. KTV tower antennas 2 thru 80, including TA-33. Located near Virginia Beach. House and large lot goes with package. W4SCW.

FOR Sale: MR-1, MT-1, MP-1 mobile antennas, coax, mount, pwr. supply, $220.00. W2UGM, 66 Columbus, Closter, N.J.

DX-60, VF1, 20 xtals, all like new, $80. Ted Doob, 124 West 79, New York City, SC 4-4010.

SCARCE RG-17A/U military surplus 52 ohm low loss coaxial cable, excellent condition, price in 50 foot rolls $22.50, freight prepaid. Tubes brand new boxed and guaranteed, 4-65A $4.50, 4-125A $12.50, 4-250A $15.00, 4-400A $22.50, 4-1000A $65.00, 4X150A $6.00, 4X250B $12.50, 3CX100A5 $12.00, 4PR60 $18.50, 811 $3.00, 811A $3.75, 813 $8.50, 829B $4.50, 832A $4.00, 866A $2.25, 2C39A $6.50, 3B28 $3.25. Add postage-insurance. Moon-bouncers, APX-6 transceivers in excellent condition, complete with all tubes. No missing or broken parts. These are getting scarce, price $18.50, shipping weight 45 lbs., order today, Bill Slep Company, Drawer 178Q, Ellenton, Florida.

QSTS Wanted: 1915 to 1922. Have extras 1922 up. Sell Bird 81-B 80 watt load, Electro-Impulse 60 watt wattmeter, new, best offer. W2IDYU, 36 New Lawn Ave., Kerney, N.J.

SELL: Mobile transmitter dual 10-6, Vibropacks, PE103A, HQ129X, SCR522, limiter amplifier, Class B driver-modulator 1 Kw. W8QI, Detroit 3, Mich.

NEED Bandset dial and bandspread dial for SX-25 receiver. Must be in good condition. Name your own price. John Calvin, K6KTI, 222 Whittier St., Daly City, Calif.

SALE: HQ-170C with S-200 spkr, $315; Valiant, $325; both clean and well kept; new Elmac mobile power supply, $55; 750TL, $15, Will ship on approval. K5QWR, Ben Judd, Jr., Box 38, Richardson, Texas. 214-AD 5-7301.

RME VHF-126, $150, audio generator, $7; transistor stereo preamp, $25; 6/2 meter xmtr/conv., $5 each; Speed Graphic 4X5, $125; accessories, electronic key, $25, other items. W4API, 1420 South Randolph, Arlington 4, Va.

FOR Sale: National NC-173 receiver with speaker. Beautiful condition, $125; Stancor kit type xmitter 100 watts with home-brew preamp and PP 807's modulator, $100; Philco 7" TV with enlarging lens compact wood cabinet. Needs deflection condensers, $25. New York area only. Will deliver 100 miles. Jacob Dubinsky, W2LVR, 134-54 Maple Ave., Flushing 55, L.I., N.Y.

GONSET G-66B receiver, $150 or best offer. R. Toumi, W7JHL, c/o Northrop Institute of Technology, 1155 West Arbor Vitae, Inglewood 1, Calif.

FOR Sale: Gonset G-50 with E-V mike; a few xtals included. 18 months old. In A-1 condx. Shipped F.o.b. $225.00. F. R. Angell, KØLCX, 3007 7th Ave. South, Ft. Dodge, Iowa.

TWO New 4-400s. Never heated. Make offer. Will ship C.o.d. K6AKN/5, 5527 Arboles, Houston 35, Texas.

I Have Valiant in mint condition. Also NC-240-D and NC-101-X in excellent shape. Will trade transmitter for mint 75A2. Make $ or trade offer for receivers. E. Peter Krulewitch, K2OEF, 88 Morningside Drive, N.Y.C. 21, N.Y. Tel. UN 4-6581.

KWM-1, $495; 12V 516E-1 power supply and 351D-1 mount, $195. W8KBT, 1417 Holderby Road, Huntington, W. Va.

FOR Sale: Heath Seneca, VHF-1, professionally built, 8 months old. $175. HT-32 top condx. $450; Johnson 275 Matchbox, new, $40; New Jersey area preferred. W2PUL, 1 Washington Ave., Martinsville, N.J.

ELMAC AF67 with instruction book for sale, $90; Super 12 converter, $40. Wanted: 455 Kc mechanical filter. H. Henderson, WA2CMX, 523 Greenwood, Riverside, N.J.

COLLINS 74A4 receiver with Deluxe spkr and chrome light, $575. F.o.b. Other filters available, $45.00. W2JMH, 23 Locust Ave., Eatontown, N.J.

VIKING Valiant factory wired, $315; SX111, $195; R48 spkr, $15; D-104C with G-stand, $20; Heath AM2 SWR bridge, $10. All perfect. H. W. Barton, K4MYY, Box J-1, Greensboro, N.C.

FOR Sale: Plate transformers: 3600-0-3600 at 1 amp. (110V & 220V pri.) $35.00, 7000 v.a.c. at 600 ma. (110V at 220V pri.) $25.00. Peter W. Dahl, 5331 Oaklawn Ave., Minn. 24, Minn.

$275 Buys expertly wired, perfect, Heath mobile and fixed station with antennas, cables, manuals, spares and F.S. meter. Cost over $400. Write P. Glazier, Brownell Rd., Kirkville, N.Y. or call Chittenango, N.Y. NT-7-9407.

SELL Complete station. SX-101-A recvr, excellent condx. $295; Viking II xmtr with Johnson VFO, both in fine condx. $175. Will pay half of shipping. Write Steve Baum, WA6DZB, Cal Poly, Box 663, San Luis Obispo, Calif.

COLLINS Exchange SSB late 75S1, 32S1, 30S1 for an inboard cabin cruiser in A-1 condition. Full details. V. Burzi, 225 Terrace Ave., Jersey City, N.J.

TRADE Leica lenses for ham gear. 50mm Nikkor f1.4, 85mm Cannon f1.9, 135mm Cannon f3.5. Robert Fortman, 636 Chilton, Niagara Falls, N.Y.

HALLICRAFTERS SSB: HT-30 exciter, $250. SX-100 receiver, $200. Both excellent physically, electrically. College bound. Fenstermacher, W3FYR, Drew University, Madison, N.J.

HAMMARLUND HQ-100, like new, excellent condx. Will accept best offer over $100. Mrs. Jack B. Vest, 335 N. Drury, Kansas City 23, Missouri.

SELL: 1-TH-4 Thunderbird: 60 ft. Jordon tower; Ham-M rotator, practically new; B&W 5100; 51 SB; SX-101 Mark III-A with spkr, all for $750. Ted Cliff, W9ET, 3 Elk Drive, Deerfield, Terre Haute, Ind.

75A4 #4601, perfect, $475. Extra filters available. W2KOY, 1740 Front St., East Meadow, L.I., N.Y.

ELMAC AF-67. New (25 hours) with power plugs. Handbook, etc. $99. Al Cookson, K2LHP, 30 Highland Drive, North Caldwell, N.J.

MUST Sell: S-53A, exc. condx, $35. looking for good HW29, WA2GVJ, Whitney Point, N.Y.

WANTED: Day Sailer, enterbd, FG, 15-18 ft., will trade HT-37, Drake 1-A plus cash. K2EHR.

FOR Sale: Johnson Valiant, $300; HQ-110, $150; Ham-M Rotator, $75; Hornet Triband beam, $30. Must be picked up. No shipping. K2QYP. Phone WY 8-0676. Watts, 121 Chestnut St., Kearny, N.J.

TA3JJR, rotary Triband dipole, original sealed box, $15. WA2PPE.

HEATHKIT Apache, like new, $200. W4NGY, 109 Elliott Circle, Oak Ridge, Tenn.

TRADE Or sell: Globe LA1 GG Linear amplifier for Globe AT-4 SR. Ant. matcher or $60. Like new. K3EWQ, Jack, 44 Commonwealth Blvd., New Castle, Del.

GOING UHF. Will sacrifice Elmac AF-68 transmitter, PMR-8 receiver, M-1070 6-12-115 volt power supply, $405. Used approximately 10 hours. Excellent condx. DX-40, $45; VF-1, $15. Both $50. Jim Rea, K5HSO, Cabot, Arkansas.

SELL: R-100 with xtal cal. S-meter, and matching speaker. Good condx. To best bid over $65. Shipped C.o.d. B. Sheldon, 12 Linda Lane, Darien, Conn. OL 5-3281.

MUST Sell (College). RME 435QA, barely used; $190.00; Viking Challenger w/VFO, $125; TR relay, $10; Lightning bug, $14; E-V Cardax mike, $20; C. E. slicer, w/API, $50. All for $400. Any offer considered. K8IVJ, 1454 Lake Blvd., St. Joseph, Mich.

SELL: Johnson screen modulator, $8; Adventurer, $30; Heath VFO, $10. Walt Steen, 8 N. 3rd St., Selah, Washington.

SALE: Valiant excellent condx, $300. Drake 2A w/Q mult., xtal calibr. Excint. $250. Gear in operation now. No shipping. K8OYX, Box 174, Chesterhill, Ohio.

KWM-2 with 516F-2 power supply. Late serial number. Like new. $1050. Mosley TA33 with AR22 rotator, $100. Both $1125. Charles Crannill, W3VCN.

HAMMARLUND HQ100C, mint condx, will deliver to your door, $110. Consider trade on good SSB rcvr. K3NFL, 4 Stones Throw, Wilmington 3, Del.

FOR Sale: 32-S1 and 75-S1 with 312B-4 console; perfect condition with latest modifications factory installed, no scratches on cases. Used by me one year. Must sell to make way for KWM-2. Will ship in original cartons anywhere for $900. Contact John C. Phares, K5WYJ, 255 East Church St., Beaumont, Texas.

WANTED: AA coil for HRO 50. K5YAM, 9244 Meadowglen Drive, Dallas, Texas.

WANTED: Good grid dip meter also 304 THs. State price and condx. W6WIE, 6920 Adams Ave., LaMesa, Calif.

SELL, Brand new CD unit Communicator III. For 2 meters. Used 3 hours. Has canvas cover. Best offer. N. Freund, 48-53 44 St., Woodside, L.I., N.Y.

ESTATE of 5EVI offers 1 HT32, $350; 1 SX62, $100; 1 MMI Micromatch, $15; 5 806 50¢ ea.; 1 250T, $10 ea.; 4 810s, $10 ea.; 3 HK54s, $2.50 ea.; 8 1625s, 50 ea.; 1 HK354, $5; 1 304TH, $10; 2 813s, $10 ea.; 2 812s $2.50 ea.; 5 872s, $3 ea.; 1 Eico 950 cap. analyzer, $15; 20 2" and 3" meters, $2.00 ea.; 1 DB 20 preamp, $10; 1 DM36, $10; 1 Triplett #2400 VOM, $15; 1 DI04 mike, $10; 1 BC453, $8; 1 Triplett #1200AVOM, $10; 1 pr. meters for 1200A, $5; 1 CMI Morrow Conelrad monitor, $20; 1 #712 Teletalk, $35.; 1 630 PL Triplett VOM, new, $35. Write W5ATQ for information and list.

NC-300 perfect, $200; Ranger, completely dependable, $165; Apache brand new, $275; AF-54 $45; Super Six $25; ship C.o.d. receipt first money order or certified check. All letters answered. W6ILZ/K6KPG.

SELL: Gonset two-element Triband beam. $40. F.O.B. W6CZP, 850 Groff, Pomona, Calif.

"TRADIN Hoss on Ross" has for sale Collins 75A1, $250; 75A3, $425; 75S1, $395; 75S1 with noise blanker, $430.00; GSB-101, $285; HQ-160, $260; store demonstrators SX-115, $555; HT-32B, $655. Amateur Electronics, Inc., 2802 Ross Ave., Dallas, Texas. Tel. RI 8-9198.

GPR-90 receiver for sale, in exc. condx. $360. Ester, WA6OQZ, 2242 E. Adams, Orange, Calif.

FOR Sale: Neat homebrew 350 watt plus linear amplifier taken from 1958 Handbook, 80 through 20. Will ship. $50. Please write K2LLA, Hillsdale, N.Y.

SELL: Like new Eldico 100-F, $475. New PL-172 and socket $105; (4) 3B28 $14 power trans. 2800 VDC @ 1 amp. $75. DuMont scope, $30. WA2ELC Al. Samter, 1268 East 12th St., Brooklyn 30, N.Y.

DX100 plus spare pair of 6146s and Dow relay, $135; in exc. condx. TA33Jr., $25. Art Freud, K2OHT, 63 Robin Drive, Hauppauge, L.I., N.Y. ANdrew 5-6479.

WANTED: Gonset Communicator III (2 meters) for cash. State price. K5WQF, 4214 Markins Drive, Corpus Christi, Texas.

FOR Sale: Like new Eldico Kilowatt linear 1000F and filter SSB exciter 100F. Each $400. Rev. Tom Patterson, K2CIV, 114 Old Country Road, Hicksville, L.I., N.Y.

WANTED: 32V2 or 32V3 in A-1 condition. State your best price in your letter. All letters will be answered. W1WEE, 92 Baldwin St., Meriden, Conn.

TECHNICIAN Class hams: Now, a monthly publication for and by Technicians. Latest issue 25¢. "The Technician". Box 465, Billings, Montana.

FOR Sale: Six meter mobile, complete, with mike, xtal, pwr. supply. Robert Dollar model 222, 226 xmtr and rcvr modified for six. Make offer. K0QYD, 1500 1/2 ave., E East, Bismarck, N.D.

BAY Area Hams: 75A-1 with spkr, $225; Drake 2A, $235; complete 6146 bandswitching phone/c.w. transmitter, integral VFO, deluxe cabinet, $70; 811s to 813 modulator with speech amp. and drivers, includes 400V screen supply, hi-level clipper, $25; 3 in. Triumph scope, $8; 1200 VDC at 300 Ma. pwr. supply, in cabinet, meters, Variac, $30; pair handie-talkies 3885 Kc., $50. Dave Walsh, WA6RN1, 1930 Marta Drive, Pleasant Hill, Calif.

COLLINS 75S1, 32S1, 516F2, used less than 200 hrs. $975. WA2REQ, 1347 West 6th St., Brooklyn 4, N.Y.

HEATH Mobile and fixed station; MT-1 Cheyenne; MR-1 Comanche, HP-10 DC power supply; UT-1 AC power supply; AK-6 speaker, AK-7 base mount; ceramic mike. Sell complete station only. Pick up $200. Firm. K3JHG, 2789 Highland Ave., Broomall, Penna. EL 6-0822.

FOR Sale: Complete instructions including 28 page booklet and 26" x 36" schematic for converting the ART/13 transmitter to AM and SSB. $2.50 satisfaction guaranteed. Sam Appleton, K5MKI, 501 N. Maxwell St., Tulia, Texas.

RCA Oscilloscope, $35.00. K2PHF.

S-77 converted, immaculate, inquire Bob Ensminger, 712 Locust, Lodi, Calif.

SELL: Clegg 99'er, $100; Two-er 6CW4 preamp, $45; Mon-Key, $25; KW amplifier $175; 60 ft. and 70 ft. crank-up towers, $100 each; 8 ele. 6m. and 6 ele. 6m. beams, $25 each.; trio rotor, $15; 2-100 ft. RG/8-U, $15; 727 mike, $6; Turner 300, $10; Junk box, $25. All for $600. Want 2M gear and SX-101A. K. Higgins, MMA, Mexico, Mo. K0UZR/ø.

SELL: Globe 6N2 meter transmitter, BC348R recvr, 2M converter pwr. supply, Astatic 10D microphone, complete AR22 rotor with 8 el. beam and RG8U coax, exc. condx. Complete station, $295. WA2RJ1, 204-16 43rd Ave., Bayside, N.Y., BA 5-8261.

INDUSTRIAL Tubes type 5555, $95 each. AN/URA-6 frequency shift converters, $295 or will swap for other gear. Spera Electronics, 37-10 33 St., L.I.C., N.Y.

$250 Value 4X5 Crown graphic camera, Synchro compur Schneider lens, new condx, with Grafilite flash and film holders. Want trade for DX100 or Apache, in gud condx. Will sell 4D32 tubes, $15 and 813s at $8.00. W9OXF, 1704 Gleason, Rantoul, Ill.

SELLING: Collins 32V3, perfect, $300; TMCs GPR-90, perfect, catalogue, $782 (including speaker), $325. Mechanical filter adapter with Collins 2.1 kc filter (center frequency 455 kc), $40. Combination Monitone and 100 Kc standard oscillator, beautifully constructed to custom standards, $22.50. Back issues of Radio-Electronics and I.R.E., your price. Want Ham-M rotator. Joseph Marshall, Jr., 22 Clare Drive, East Northport, L.I., N.Y.

WANTED: Phonograph recorder, overhead lathe type, with/without amplifier. Cash or trade ham equipment. W6NHT, 1700 Pine St., Martinez, Calif.

WANTED: BC-611. State condx and price. Roy Schmiesing, Glenwood, Minn.

WANTED: QSTs before 1923 and March 1923. G-E Ham News. Vol. 2 bound or separate issues. Claudet, F8AJ. 7 Allee des Bois, Orly, France.

FOR Sale: Hammarlund HQ-150 spkr. manual, $220; Hammarlund HC-10, manual, $80. Mint condx. Carl Leschinski, 49 No. 23rd, Kenilworth, N.J.

IMMACULATE Collins speaker 270G-3 for sale, $15. K1JPR.

WANTED: Mechanical filter, type 353C-14, for 75A1 receiver. Jack Shiels, W3OKP, RD 3, Box 628, Murrysville, Penna.

EICO 720 xmtr, 730 modulator, Heath VFO, ant. relay, mic and stand, 7 novice xtals. Like-new condx, $175. Charles Greco, WA2ILY, RFD 79, Brant Lake, RFD 79, N.Y.

TUBES, New 4D32, $10; 416B-2 for $8; 829s, $3; 832s, $2; 814s, $2.50. K2RNN, 322 Farwood Road, Haddonfield, N.J.

FOR Sale: One of the largest collections in the country of early wireless parts, commercial and amateur receiving and transmitting gear, broadcast gear, scanning disc, TV sets and tubes, $5,000 and you pack and transport. Not interested in piecemeal sales. A bargain for anyone seriously interested in a museum of early wireless lore. Will consider giving collection to a Middle West school, museum or institution who will properly care for and display same for public benefit. Franklin F. Wingard, 500 Rock Island Bank Bldg., Rock Island, Ill.

SELL Or trade, New Elmac M-1070 supply. K8GNZ, 823 Vermont Ave., Fairmont, W. Va.

ALUMINUM For every ham need. Write to Dick's, 62 Cherry Ave., Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

DX-40 like new, $55; BC-223A transmitter with built-in modulator, TU-17A tuner (2000-3000 kc), never used, $50: both have instructions. Will ship. Faucett, W4DML, 2218 Harden Circle, Hendersonville, N.C.

SALE New NC-155 won at Lawton Hamfest Feb. 1962. Best offer over $175. W5BMQ, 321 Madison, Purcell, Okla.

FOR Sale: Teletype TD unit, Will trade for tape repertorating unit. Tom, K5AON, 867 Berkinshire, Dallas 18, Texas.

WANTED: RME 4350, RME Preselector, Amceo TX-86W, Lampkin 105-B, other test equipment. Sell or trade: Rare Hudson percussion .480 cal. silver forend, patchbox, orig. except sights, $225; .357 S&W Magnum, 5 in. holster, Herrett's Target grips, fired 5 rounds, $130; FN Mauser, deluxe, .308, sling, 6X Kahles 'scope, new cost $251, take $200; VW Microbus Center seat, new, $90; 9mm Browning, original holster, nice blue, $45; BC-603, 110 AC, $18; LM-13, $35; S&W .38 Chief's Special, near new, $48. Jim Bailey, Box 213, Grand Canyon, Arizona.

PRACTICALLY new 4-1000A. Best offer takes. WØAAE, RR 3, Ames, Iowa.

3 RCA 12V mobile FM transmitter-receivers 152-174 Mc, Type CMV-4E. Units were used in commercial service. Can be converted for 2 meter use. Complete with cables and mike. All three for $100 or $35 each. L. D. Goss, 77 S. Main St., Manheim, Penna.

SELL: Gonset Twins with power supply and mounting brackets, $250.00. G66-B Universal P/S and spkr; G77 with modulator and 6/12 volts p/s. Rich, WA4DMH, 20 N.E. 17th Ave., Pompano Beach, Fla. Phone 941 8280.

SELL: Communicator II, 2 meters, 12-110 volt, whip, power cords, $149.00. John W. Dilges, K9GKR, Box #3, Fairfield, Ill.

VIKING I, TVI'd, spare 4D32, operating manual. FB rig, $100. Jack Luck, K8HUI, 316 Raff Rd., NW, Canton 8, Ohio.

BC-683-A receiver 27-39 MC, AM, 110V, 12V supplies. Perfect. $35 F.o.b. Rip Ewell, W4ZBR, R2, B964F, Winter Haven, Fla.

SALE: 75A1 in exc. condx., $200.00. W9PIO, Columbia, Ill.

HT-37 Hallicrafters SSB transmitter. Beautiful condition. Used ten hours. $350. Viking Adventurer, 6146 final, $35. Need cash, will discuss prices. Curtis, 1313 Thirteenth St., Altoona, Penna.

A-1 RECONDITIONED equipment. On approval. Trades. Terms. Hallicrafters S-85 $79.00, SX-99 $99.00, SX-100 $199.00, SX-111 $179.00, SX-101A, HT-32, HT-37; Hammarlund HQ-100 $129.00, HQ-110 $179.00, HQ-160 $229.00, HQ-170 $289.00; National NC-183D $199.00, HRO-60 $345.00; Gonset G-50 $229.00; Central 20A $149.00, Viking II $159.00, Valiant $279.00; Collins 75S-1, 32S-1, 32V-1, 32V-3, 75A-4, KWM-2; Elmac, Globe, Gonset, Heath, Johnson, RME, other items. List free. Henry Radio Company, Butler, Missouri.

SELL: BC221AH. Best cash offer. L. Brennan, 799 Silvercrest Ave., Akron 14, Ohio.

MUST Sell: DX-100, $140; Mohawk, $230; plus shipping. Will deliver in the Southeast. Warren Culpepper, K4LNQ, Andalusia, Ala.

MOBILE: Trade or sell complete Elmac 12V station, except antenna; AF67, PMR7, "S" meter, PS12 supply, dynamotor and relays. All fine condition, with manuals. Want 6M Gonset transceiver, Lakeside Bandhopper, VFO—or what? K9EGD, 5963 N. Nina Ave., Chicago 31, Ill.

BEGINNERS: Code bothering you? Now learned in one hour. New method. Quick approach towards ham ticket. Used in Armed Services, Ham Radio, Scouting. "Ketchum's Hour Code Course", $1.00 postpaid. Guaranteed. Oaks Ketchum, 10125 Flor Vista, Bellflower, Calif.

HRO-60T standard coils, speaker, slicer/Q multiplier, perfect; $295. F.O.B. K6HTG, Box 9515, Sacramento 23, Calif.

SELLOUT Bargain prices, or best offers. National 303 spkr, $13; Webcor wire recorder Mod. 181-1, $15; 2" Monitor 'scope, $10, new 813s, $8.50; 805's, $3.00. Write W8IQ.

GOODIES: Engraved Shack Plaques—Badges—Desk Plates. Printed Call Card Mailing Envelopes, etc. Illustrated list, 10¢ (refundable). K1VRO, Shirley Decker, 36 Hampden Street, Westfield, Mass.

HAM Special: Vacation on beautiful Lake Winnipesaukee. One to three bedroom cottages. Safe, sandy beach, boats, fishing, free water-skiing, recreation area. Special June and Sept. family rates. Literature. Tom Spencer, W1KVG, P.O. Box 156, Wolfeboro, N.H.

ELDICO EE-3 electronic key with built-in lever and monitor, originally $80. First check for $35.00 postpaid. KH6IJ, Lihue, Hawaii.

FOR Sale: Elmac PMR-7 with 12 volt and 110 volt power supply. In excint condx, $90.00. Lenard G. Mumm, 933 North 24th St., Milwaukee 3, Wis.

SELL: Hammarlund HQ-170C, $280; Gonset Super 6, $25.00; Viking Mobile transmitter, $35.00; Hy-Gain 14AV with roof mounting kit, $17.00; Relay rack cabinet 65 in. high on heavy casters, $25.00. Will ship collect. Inquiries promptly answered. K8NMO/4, 2417 Tullibee Drive, Norfolk, Va.

FOR Sale: New Amplex 960 with matching spkr/amplifiers. In original cartons with 18 new pre-recorded 4-track stereo tapes. The ultimate in stereo recording/reproduction. Complete $685. Will consider late serial 100V or 200V. H. C. Martin, 613 Pearl St., Bluefield, W. Va. Tel. 327-9254.

SACRIFICE: SX-99, perfect. Factory reconditioned. Shipped collect, same day I receive first check for $70. Worked all states and 20 countries with this gem. K7KBN.

FILTER Sale: Hermes 2215KA xtal, $33; Collins F455J05, $55. KH6BG, 94083 Awamoku, Waipahu, Hawaii.

SELL: SX-101 Mark II receiver with R42 bass-reflex speaker, $200; superb combination resulting in hundreds of solid contacts under all band conditions on AM-CW-SSB. Prefer not to ship but will discuss it. Walter Lindgren, W2AJR, East Hampton, L.I., N.Y.

DX-100 in mint condx, $150.00. W. Fieldhouse, WA2ELS, 27 Morningside Ave., Paterson 2, N.J.

FOR Sale: HQ-170C Serial 276C. Excellent. Bill Hicks, 2039 Nettie Ct., Decatur, Ga.

FOR Sale: SX-110 receiver, in exc. condx, only three months old, only $120.00. Viking II and VFO. The transmitter needs work done on it. Write for details. I am asking $120.00 for both of them together. Richard Lentini, 123 N. Huron St., Cheboygan, Mich.

HY-GAIN Hy-Tower 18 HT antenna. New, factory sealed cartons. Shipped prepaid. $95. W7UPF, 231 North Harris Ave., Tucson, Ariz.

WANTED: Jennings Vacuum Variable. Type UCS, B&W 850A inductor, PL-172, 4-250A, Cardwell type 8013; what have you for KW final and receiver? L. Severe, RR No. 2, Box No. 5, Wilmington, Illinois.

NEW, Valiant $300; HQ-110C, $200; D-104, Cesco SWR, ant. tuner, clocks, wood console, ants, parts, etc. This is not clean equipment. It's absolutely new! Sell all for $460 or any part. You name terms. K8IDH, 5211 Hillgrove, Lorain, Ohio.

FOR Quick sale: HT-37, $325.00; HQ-170C w/spkr, $275; G66B w/3-way pwr., $150; Comm. III, 6 mtrs., $150.00; all clean and like new condx. F.o.b. 2130 Hanover Dr., Waco, Texas. K5MBZ.

SELL SX-71 with Heath Q Multiplier, $125.00. Clean. Will deliver within 50 miles of Philadelphia. Call or write to Art Lipschutz, W3FWI, Tel. TRinity 7-0003.

WANTED: SX-28A, any condition. Need the parts. Must be reasonable. WA2OEK, 131-14 131st St., So. Ozone Park 20, N.Y.

GONSET Communicator IV, 2 meters, perfect, $250; NC-98 matching spkr, like new, $90; S53A, fine, $45.00. Shipping charges collect. Rex Talbot, K3HHT, 2920 East 33rd St., Erie, Penna.

SELL: Collins KWM2, 351D-2 mobile mount, 516E-1 12 volt supply. Sell completely only 5 months old. K2RBY, 190 Chestnut Dr., Roslyn, N.Y. Tel. MA 1-8211.

SELL Or swap: Meissner 150B transmitter, 300 watts phone and CW 813 final, 811 modulators. In exc. condx. Make an offer. A. Yacovone, W1IKL, 122 Wolcott Hill Rd., Wethersfield, Conn. Tel. JA 9-3662.

SALE: QSTS 55, 56, 57, 58, 59, 60. F.o.b. Baltimore. Make offer. Ballard, W3KKH, 3021 Fendall Road, Baltimore 7, Md.

HAMMARLUND HQ-170C, in original container and instructions. First check for $275.00 gets it. K0UDS, 2611 Oak Ave., Rapid City, S.D.

FOR Sale: Valiant xmtr, with Matchbox, SWR meter; HQ170 rcvr w/match ng spkr, both for $500. Hornet 10-15-20 beam with rotor and 10 ft. tower and cables, $60. Herbert J. Werner, 79 Drexelbrook Dr., Apt. 2, Drexel Hill, Penna

APACHE, SX-101/III, Homebrew keyer, SWR bridge, Dow-I-R relay; $525 takes all. WA6VSC, 16 LaSalle Dr., Moraga, Calif.

SELL: B&W 5100 and 51SB. Best offer. John Gillen, 912-50 57th St., Phila. 43, Penna.

SELL: RME 4300, spkr, $90; Globe 65B, $35; Gonset G28 transceiver, $150; Globe King as is, $150. L. Jones, W3PEJ, 9700 Hilliard Rd., Pittsburgh 37, Penna.

MOBILE: New Gonset G-66B with 6-12-110V 3-way pwr. supply 50W 80M 12V Command xmtr, 500V, 300 Ma. Dynamotor, 2-2E26 Mod., bias supply and extras. $160. Brand new HT-32 A, $580; HQ170C w/spkr, mint condx, $290. Make offer on both. K0DVI, Box 532, Mead, Nebr.

CLEANING House: HQ-129X, $129; D-104 with PTT stand, $20; 100 watt CW rig, $25. Might trade. Dave Goggio, 1419 Favell Dr., Memphis, Tenn.

CONVERT any television to sensitive, big-screen oscilloscope. Only minor changes necessary. Plans $2. Relco, Dept. S-3, Box 10563, Houston 18, Texas.

SACRIFICE For quick sale: Heathkit "Tener" with 12 VDC vibrator power supply, $25; Heathkit HW-29A "Sixer", never placed on air, top shape, $30; two little used 4-400A's, $20 each; never used Collins 2.1 Kc mechanical filter, 455 Kc center frequency, $30; Heathkit CA-1 Conelrad Monitor, $5; Heathkit B-1 balun coil, $5; Heathkit FM-3A (FM) tuner, $10. K8BLL, Rte. 2, Box 77, Stevensville, Mich.

COLLINS 12 volt power supply, $200; mobile mount, $70 for KWM2. K9OSN, Route 4, Freeport, Ill.

TAPE Recording business opportunity. Good money in your own community making tapes and records. Full or spare time. $1.00 brings idea-packed booklet explaining all you need to know to cash in on interesting unexploited field with small investment. Cook Laboratories, 101 Second St., Stamford, Conn.

FOR Sale: HQ-140X, excellent condition, $150. Also Heath Q-Multiplier and calibrator, $10 each. W2HDW, 26 Nokomis Road, Somerdale, N.J. Tel. STerling 3-4343.

GOOD HRO-60T, A,B,C,D coils, $255.00; DB-20; $23.00; Bell RT-75 tape recorder, $45; BC-SW table radio, $7.00; 33 and 1/3 rpm turntable, $6.00; combination 2-speed record player-radio, $14; 30A circuit breakers, manual push reset .20; solonoids 24-28V; SPST .30, 3PDT .45, 4PDT .35, latching SPDT .35. All above good-better working condition. Prices as stated or best offers. All inquiries answered. All FOB. Other items—list. K1NNC, Unionville, Conn.

SELL: AF-67, $110; PMR-7, $100; power supplies, James 6-12-115 volts, $35; PS-2V, $30; instruction books included. Leon Stuber, Amherst, Ohio.

VIKING Valiant factory-wired, with SB-10 for SSB 80 thru 10, $325. W2KJQ, 3930 Anne Drive, Seaford, L.I., N.Y. SU 5-5755.

WANTED: Commercial or Surplus Aviation and Ground Transmitters, Receivers, Test sets, 18S, 17L, 51R, 618S, GRC, PRC, ARN14, RT77/GRC. Bendix Collins, others. RITCO, Box 156, Annandale, Va.

SELL: DX-100 with "B" revision, $125; HQ-129X recvr, $100. Mahr, 20 Millford Dr. Plainview, N.Y. Tel. WE 8-9154.

FOR Sale: 4-10000A, new condx, $25; AR-22 rotor with control, $22. All prices F.o.b. WA2DZB, 31 Franklin Ave., Pompton Plains, N.J.

SELL: Collins 75S-1 recvr, perf, condx, like new. Best offer. Heath 3" 'scope. WØAEP, 2723 B Ave. NE, Cedar Rapids, Iowa.

WANT To buy Kleinschmidt TT-4A page printer and TT-76 (or 76A) tape unit. Phone 312-IN-3-3561, W9UE, Ben Woodruff, 6140 N. Harding, Chicago 45, Ill.

DX-100, excellent, $150.00. J. M. Tucker, 31 Lawrence, Madison, N.J. Tel. FR 7-7300.

SELL: S-49 power supply, DX-40, Courier, HT-18, and preamp. Wanted: Ham-M rotator. W2QQ, Bowmansville, N.Y.

GLOBE Champion, 300A, 300W, c.w., 275W a.m. Best offer or swap for Gonset Twins. Call Larry Stillman, W3JFH, 403 East Wadsworth Ave., Philadelphia, Penna. Tel. CH 7-2883.

NC109 Receiver with speaker. Excellent condition. Used rarely. $150 or best offer. Write Charles Ferguson, 90 The Fenway, Boston 15, Mass.

AMPLIFIER and power supply: full kw., 2000 watts P.E.P. on S.B.B. Heath, KL-1 and KS-1 constructed by Heath engineer. Kit price $570. Asking $395. Buyer pick up. K8PNH, 2717 Morton Ave., St. Joseph, Michigan.

NOVICE Special: Ideal novice c.w. transmitter! Runs full 60-watts using 3 tubes in a popular ARRL design. Instructions and hefty 500-volt power supply with four-stage filtering are included. $25.00. C. D. Austis, Box 269, Hamilton, N.Y.

SELL DX100B, perf, condx, $150. Will deliver within 200 miles. K4MOF, 190 5th St., N.W., Atlanta, Ga.

KWM-1 and AC power supply; exceptional physical and electrical condition; best offer. D. W. Kransteuber, 2905 Snow Road, Parma, 34, Ohio.

APACHE, Professionally wired, in perf. condx, $199. W6BZ, Mel Whiteman 1809-A Third St., Alameda, Calif.

GOING Sideband, DX-40, VF-1, Eldico TR75, Knight VFO, Heath signal generator LG-1, Johnson Signal Sentry, B&W 504 multiplier unit, Heath grid dip osl, GD-1B, Heathscope OR-1, Ameco PV-144 preamp, converted BC-454, 10 mtr, 28 watt plate modulated mobile rig, PE-103, 25 watt modulator, C. Cangiolosi, 541 Midland Ave., Garfield, N.J.

SELL: SX101A, speaker, $260; NC-240C, speaker, $60; complete power supply 1500/600 ma., other KW amplifier parts incl. grid, tank components, meters, chassis, panel. Write K2EIU/2, 2256 Burdett Ave., Troy, N.Y.

COLLINS 32S1 and 516F-2 AC supply, perfect, $550. Connie (OM) Malinowski, W1DQA, So. Deerfield, Mass.

WANTED: QST v. 1, date; CQ v. 1—date; ARRL Handbook, all editions. Please do not reply unless runs are complete or near complete. All replies answered immediately. Library, Serials Div., Univ. of California, Davis, Calif.

COLLINS 51J3 first-class shape and calibration, best of three originally selected manual intact complete $660; Hammarlund HQ100C exceptionally hot with 100 kc. barmod $115 Emory Cook, Box 3267 Ridgeway Station, Stamford, Conn.

SELL: NC-270 receiver and speaker, $185.00; Johnson Challenger 240-182-2 factory wired, $95. Both in perfect condition. R. E. Lake, 15789 Steel Ave., Detroit 27, Mich.

LEARNING Code? Have tape recorder? If so, write Reiss, P.O. Box 353, North Haven, Conn.

HT-32A, immaculate, $445.00. George Barnes, 3451 Ridge Ave., Dayton 14, Ohio.

SELL: 75A3, $350; 101R stereo-tuner, $150; Bell 3030 stereo preamp and amp, $100; Roberts stereo 4 track tape recorder with amplifiers, $300. Lamb, W3VDE, 1219 Yardley Road, Morrisville, Penna.

HAMMARLUND 110 with clock, good condition, $145.00. Can ship. K2KDJ, 117 Sylvan Ave., Newark, N.J.

DRAKE 1A, calibrator, $175; 20A, QT1, Deluxe VFO, $175; the original 1625GG linear, CQ Sept., 1960, $75. Whole station, $400. Partially completed Cabral Mark II 40 meter SSB transceiver with instructions, Collins mechanical filter and PTO-70E15 (sealed). Described in "73", Sept. 1961. $125.00. Bell, 1088 Rubio St., Altadena, Calif.

FIRST Reasonable offer takes DX-35, VF-1, S-85, QF-1, TR switch, SWR Bridge. K2TVP, 20-59 27 St., N.Y.C. Tel. RA 6-0314.

FOR Sale: HQ-129X receiver with speaker and product detector, $110.00; RME HF 10-20 converter, $35.00; Drake QXR, Q multiplier, $8.00. All in A-1 condition. R. Boswell, W9YGY. 11254 N. Solar Ave., Mequon, Wis.

SELL: RCA 1 KW modulation trans. (550 audio watts) $21.00; PE-103-A complete, $10; three BC1306 transmitters w/tubes, less case, $7.35 each; all above never used. BC625, BC624, each $7.50; BC624, filament modifications, $5.00; all with tubes. BC-454-B, BC-455-B receivers one each, $3.50 new, less tubes. Carter Dynamotor 6V/600V 250 Ma., Dynamotor 6V/425V 375 Ma., each $3.00. Four each 2E22, 211, 807, $.60 each. One each 813, $5.50; 35TG, $3.00; 832A, $3.00; 802, 75e, tubes unused. SX24 speaker, metal cabinet only, $3.00. F.o.b. Jackson, R.J. Liechti, W8VUK, 4231 Pinehurst Dr., Jackson, Mich.

GONSET 6 Mtr. Communicator II with xtals, mike, $115.00. Local sale only. Collection of transistors, Diodes for sale cheap. Send 15¢ for sample transistor and full listing. Samkofsky, 201 Eastern Pkway, Brooklyn 38, N.Y.

SELL: National NC-270 receiver, used only 2 hours, $200 or best offer. Reason medical expenses. WØYNF, 1701 Pike Ave., Carroll, Iowa.

SELL: NC-183-D, $200; Viking II, $100. Robert D. Walker Jr., Box 546, West Lafayette, Ind.

417As for sale, also Seneca, spare 6146s, TCS-13 rcvr, Ameco six mtr. converter, E-V Hi-Z mike. Make offer. John Knowles, WA2NJE.

SELL: Collins 75A2; Viking Ranger, Matchbox w/directional coupler and built-in indicator; speaker; mike and manuals. Clean, $450.00. Pick up deal only. George R. Moneuse, K2BDU, 60-40 Grove St., Ridgewood 27, N.Y. Tel. HY 7-7993.

DRAKE 2-A receiver for sale. Will ship in original carton with instructions. In excellent condition; used very little. Priced for quick sale at $220. R. L. Nordlund, K9KVQ, 7635 W. Irving Park Rd., Chicago 34, Ill.

HALLICRAFTERS SX-71, $131.00; S-41, $22; RCA Chanalyst, $46; D-104 mike, $14; RCA signal generator, $23.00; Heath 3" 'scope, $37. All guaranteed. W8NCN, C. Comer, Ona, W. Va.

SELL: Viking II, VFO and mike, $160; SX 111, $185; Wanted: 4X250B tubes and sockets, F455J-21 filter, Morgan Closs, K6POB, 30 55th St., Gulfport, Miss.

SELL: New HT-37. Operated less than 10 hours. Never on 10 meters. Best offer over $375.00. K5TVC, Gravette, Arkansas.

FOR Sale: Gonset G-76 transceiver with A.C. power supply; booklet included. Less than 50 hours use. Good condition $450.00 W3CWP, M. Conroy, 1117 E. Price St., Phila. 38, Penna.

COLLINS Receiver 75A-4 serial #4921, excellent condition, $525. Kenneth H. Engstrom, W5CUM, 833 Oak Forest Dr., Dallas 32, Texas.

LAMPKIN 205-A modulation meter, $185. Also 103-B frequency meter, $145.00. Both units $300. W4KUV, J. L. Best, Jr., 610 N. Madison Ave., Goldsboro, N.C.

FOR Sale: 75A4, serial 4319, matching speaker 3 Kc filter, manual, like new condx. $475.00 F.o.b. W5POG, 2252 North 43rd St., Waco, Texas.

FOR Sale: Dumont 5890B frequency/modulation meter; new condition; .00025% accuracy meets latest standards; with 9 crystals, $325.00. Fred Fish, 1003 Shirley St., NE, Albuquerque, New Mexico.

KWM2, 516F2, speaker, $895; KWM2 mobile station including 1959 Rambler. Make offer. Huston, KØWMN/2, 3-4 Edgehill Terrace, Troy, N.Y.

SSB Station: Hammarlund receiver HQ-170 with speaker in original cartons, $285; Gonset SSB exciter GSB-100, $330, both in excellent operating condx and appearance. Bryson Lowman, W4TTH, 3212 Park St., Columbia, S.C.

COLLINS 75A-4, serial #5835 with speaker, $625.00; KWS-1 serial #471, $850.00; both for $1400.00. KWM-1, $450; 75A-1, $215.00; new 30L-1, unopened, $485.00; 75S-1, noise blanker, $439.00. Late Drake 1-A, $185.00. W8WGA.

GONSET G77A with modulator-power supply for 12 and 115v., and G66B with 12v. supply, $250.00. Bandhoppers Radio Club, 907 Deandell, Ferguson, Missouri.

SX-100, purchased new six months ago, in flawless condition: $225.00. J. D. Wilson, RR 1, Carmell, Indiana. Tel. VI 6-8410.

COMPLETE SSB Station for sale; HT-37, Drake 2A receiver with Q multiplier speaker combination and crystal calib. B&W L-1000A linear amp, James G. Wooten, T-354 Camp Green Bay, Great Lakes, Ill. Ph. ON 2-0353.

SELL: B&W 5100S. Mint condition, many extras. 150 watts AM, CW, SSB all bands. Factory modified for SSB. You supply SB10. Price, $175.00; HQ-170, perfect, $275.00. Both original equipment. W2GYO, Marc Felt, 50 Prince Lane, Westbury, L.I., N.Y. Tel. EDgewood 4-5135.

SP200 Hammarlund receiver, 540 Kc—20 Mc., rack style, w/pwr. Supply, less spkr. You try it out and carry it away. $35.00. Fred Benkley, W1OHJ, 35 Whipple, Lexington, Mass.

BC-221 AK freq. meter with modulation, in exc. condx, with cal. book and voltage regulated silicon rect. power supply, $70; set of James Millen 90601 wave abs. freq. meters 1.5-40 Mc., $10. KØAKD, R. Davis, Altoona, Iowa.

COLLINS 75S-1, 500 cycle filter, all crystals; 32S-1, 516F-2 power supply, 312B-4 console. Last 3 units never used, original cartons. Cost $1,450, sell complete $1,000. Also, mint Ranger, $180.00. QRL work. W4ALR/2, P.O. Box 53, Burlington, N.J.

SELL: SX-28, in A-1 condition. $100.00. Charles Leigh, 10 S. Lanning, Hopewell, N.J.

SELL: Converted and unconverted Command xmyrs and revrs; Hy-Gain multi-band vertical; pair 813s, new; Precision E-400 sweep generator, new condx. Wanted: SSB exciter. Roberts, WIKUK, 49 Daniel Rd., West Haven, Conn.

$1.00 Frames 60 QSL cards in clear plastic! See picture on page 134 this issue. John Thomas, K4NMT, Box 198, Gallatin, Tennessee.

Wanted: Gonset G-76 with AC supply, or both AC and DC. K4NMT, John Thomas, Box 198, Gallatin, Tennessee.

NOVICE Code Practice material. Any 3¾ I.P.S. tape recorder. 25 minutes, $2.50 PPD. Don Vaughan, W4MTY, 4607 Briarcliff Rd., Atlanta 6, Ga.

ELMAC AF-67 with manual, $90 or trade for radial arm saw or? W6HOJ, 2006 Hamner, Corona, Calif.

HT-32A. Immaculate. Original carton, less than 30 hours logged. Perfect condx. Going to college. $500. Randy Bailey, K5KNR, 2220 Ave "O", Huntsville, Texas.

COLLINS 32S-1 and power supply, $500; perfect condx. Used very little. WA2HOW, Vernon Chitty, 627 W. 113th St., N.Y. 25, N.Y. Tel. MOn 6-0911.

HQ-110C, $169. A-1 condx. Will ship. Kellick, K8EOZ, 1505 Orchard, Middletown, Ohio.

SSB: HQ-170-C, spkr, $285; HT32A, $450. McRae, 82 Holder, Princeton, N.J. WA40355.

HALLICRAFTERS HT32-A, Hammarlund HQ-170-C, new July 1961, best offer over $695; Heathkit KW Warrior $195; Hornet 750 Tribander, AR-22 rotator, 24' tower, $95; prices F.o.b. WA2DDV, Chester, N.J. Tel. TRinity 9-5319.

WANTED: Antenna rotator. WA2UNN, 267 Lake Shore Drive, Lake Hiawatha, N.J.

FOR Sale: Polar Relays Type 255A, mint condx, $2.00 postpaid two for $3.50 continental U.S.A. only. Bernard Feissle, WØZKN, 1061 Gabriel Dr., St. Louis 37, Mo.

SELL: Apache; HQ-140X, J. E. Anderson, K7KIV, 313 North Grandview, Yakima, Wash.

BEFORE You buy receiving tubes or electronic components, send now for your giant free Zalytron current catalog featuring nationally known Zalytron first quality TV radio tubes, Ham, Hi-Fi Stereo Equipment, Kits, Parts, Special Purpose Tubes, antennas, etc. All priced to Save you plenty. Why pay more? Zalytron Tube Corp., 220-Q W. 42nd St., N.Y.C.

TRADE Or sell: Johnson 6N2, $100; Ranger with PTT, $150; test equipment: Simpson 479 signal generator; Sencore LC-3, SS-105, HG-104, TR-115; Seco current tester; Win-Tronix dynamic sweep analizer, AGC analizer. Want: VHF, SSB, Scope, and RTTY gear. K5GNA, 2220 18th St., Galena Park, Texas.

KWM2 Transceiver, serial 971 with 516F2 AC pwr. supply, serial 3222. Like new condition, never used in car. $920. KØDSN, Frank McLin, 409 Old Marion Road, Cedar Rapids, Iowa.

WANT For cash: Vantron Q-Probe; "Single Sideband Techniques" by Jack N. Brown, W3SHY, 1954 Edition; all CQ's for 1945 only. For sale: QST's 1930 to 1959, $3.00 per year, plus postage. W4ID, 461-3rd Ave., Sea Park, Eau Gallie, Fla.

SELL: AF67, $90; SX28A, $70; 6-10-15 meter converters, $8.00 each; Temco transmitter 250 watt, all-band, $70; Bandspanner mobile ant., $15; 12V Gonset converter, $30; 110V P.S. $10; 12V P.S. $5; 12V relay, $8. Package deal: $295. Louis Grill, 511 Philadelphia Ave., Egg Harbor, N.J.

NUVISTORS: 6CW4s, $1.59; tubes 6146s, $3.98; 2E26s, $3.19; 826's, $1.95; OB2's 89¢; 5763s, $1.39. All tubes tested, boxed guaranteed perfect on arrival. No C.o.d. shipped prepaid. Electronic Traders, 608 S. Dearborn St., Chicago 5, Ill.

"HORSE-TRADER" Ed Moory is in business to save the "Ham's Money": Pay Cash and Save: Used Equipment Guaranteed—75A-4, Perfect $489.00; HT-37, $389.00; Viking Invader, $469.00; 30L-1, $409.00; 75A-3 Like New $355.00; 75S-3 Repossessed $505.00; Mosley CM-1, $119.00; Drake 2-B, $219.00; Heath Warrior: Wired, $199.00; Globe Champion, $89.00; Thunderbolt Linear, $339.00; New HT-37's Old Price $450.00, New Collins 75S-3's old price $620.00 While they last. Swan Transceivers: Immediate Delivery $279.00 With Mobile Antennae. Terms: Cash and No Trades. "Ed" Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone Whitney 6-2820.

RECTIFIER 24 volt 10 amp., $5.00; 110 volt selsyns, $2.00; Leece-Neville alternator 150 amp., $40. Trade dictaphone Dictator for good SSB generator. B. J. Kucera, 10615 So. Highland Ave., Cleveland 25, Ohio.

SACRIFICING: 4-1000A linear, partially assembled but includes all parts, 3000v P.S., variac, excellent 4-1000A, $225; brand new 4-1000A, $55; excellent SX-101 Mark III, $215; SX-28, $75; 1 Kw. Ultra modulation unit model UM4B (cost $90), $35; Thordarson 3100-2500 CT 500 mills, $25; Stancor 5v 22 amp., $10; filament transformer capable 2-4-1000 a's, $20; Inca 500 watt mod. trans, multi-tapped, $25.00; Peerless 4000v, 1 amp. plate trans., $35, 100ths, $3. WA6MSE, 6803 Amestoy Ave., Van Nuys, Calif. Tel. Dickens 4-1736.

SELL: Trade, Heathkit Cheyenne, Comanche, MP-1 and HP-20 power supplies, accessories, excellent, $235.00. Will trade for Chevrolet V-8 engine. K4MUP, 113 Hagood, Pickens, S.C.

WEST Coast: BC-221, calibration book, crystal, modulation, $75. WA6OQP, 151 Estates Drive, Santa Cruz, Calif.

SELL: Johnson Valiant, $249; HQ-170-C, $249.00. John Conners 207 Spring, Fox Lake, Wisconsin.

PITTSBURGH Area: E-Z Way tower, 50 ft. with ground post and telescopic drive tube. Cost $300. Sell for $135.00. You help dismantle. Sry, no shipping! W3AEV, Tel. TE 5-9548.

SELL Or Trade: Hy-Gain vertical Model 14AV, w/base mount and grid plane 40-10 mtrs. Want BC-221 freq. meter. D. Springsted, W2GRI, 837 Eastern Ave., Schenectady 8, N.Y.

CLEGG 99er. Cheap. K3JZH.

CRYSTALS Airmailed: SSB, MARS, Net, Novice, CD etc. Custom finished FT-243 .01% any kilocycle 3500 to 8600 $1.49. (10 or more same frequency, FT-243, 99¢) 1707 to 20.000 $1.95. 20.001 to 30.000 $2.25. Overtones above 10 Mc. Fundamentals 10 to 13.5 Mc. $2.95. Add 50c each for .005%. Add 65c each for HC-6/u hermetics. QST Projects—FT-243 crystals: SSB Package five mixer $9.95, seven matched filter (FT-241-A) $9.95, DCS-500, "JMP", Phasing (Nov. 1959), $9.95, SSB Transceiver April 1961 $7.95. Also other project crystals and sets. Be specific, write. Airmailing 9¢ crystal, surface 5¢. Crystals since 1933. C-W Crystals, Box 2065-Q, El Monte, California.

SELLING Home: Bargain prices for many high quality high power broadcast type components. Also new Ranger I with Cesco reflectometer and Dow-Key DK-60 relay. $270; Hewlett-Packard 410-B r.f. probe VTVM, $125.00; unusual heavy duty beam rotator, $75. Buyer must pick up with cash. W. C. Resides, W1UKV, Sherwood Road, Ridgefield, Conn. IDlewood 8-6436.

COLLINS MBF 6M transceiver, $50; 2C39, 4X150A, 4CX300A, $5.00 each. Resistors, $1.00 for 100. W7POS, 2319 E. Indianola, Phoenix, Ariz.

TOWER: Aluminum 42 ft. triangle. Hy-Gain TH-3 Thunderbird Tribander beam, CDR 22 rotator, all complete, with guys and rotator cable. $98.00. K5FTH, 1305 Berkshire, Austin, Texas.

GOING Boating. Sell HT-37, $300; SX-101A, $300. Both used 20 hours, like new condx, also 250W Matchbox, with indicator, $50.00. W2FRM, 4 Nassau Road, Poughkeepsie, N.Y. GL 4-5238.

SX-101A/R-48 speaker, late number, very exc. condx. Both $335. "Ric", WA2SSQ, N.Y.C. BO 1-7614.

FOR Sale or Trade: Federal Model LX-1 U.H.F. signal generator. 115 volts a.c., 60 cycles, 5 bands, 7.5 Mc. to 330 Mc. Output 0-1000 microvolts, 1-20 millivolts, internal or external modulation, excellent condition. Will sell for best offer or swap, what have you? Write L. G. McCoy, c/o ARRL, 38 La Salle Rd., West Hartford, Conn.

SELL, swap. Receivers: Skyrider Marine covers b/c and 140kc—18Mc when hi ranges realigned; K80X GE recvr 5 bands no bfo; Hall. S-31 BC-FM Tuner 9x18 panel; Autronic Key(new) $13 fob; For RTTY: WE 1A head & Kellogg WU5B distributor, 8x17 oak base; Mod 504 B/W Freq., Mult. in SW3 box; Fld. Strength meter 0-10 micro-v Ch 2-13 Transvision; Heathkit S-2 sig. tracer like new; 522-625A vhf transmitter; QST Xmtr easily updated for new ham 6V6G 6N7G 807 exciter 7x19x6¼ AL panel & 100 ma 3" meter fr ea stage, no pwr supply; Fil. Transf; (2) 12v c.t. one 175w; 5v 25a Thor Type 6420. Best offers. WANT: 1200 cy filter for 75A4, Compact linear amplifier for rack mount. W1BDI, 35 Brookline Dr., West Hartford 7, Conn.

FOR Sale: 75S1 with .5 kc filter and BFO xtal, in mint condx, original carton, $420.00. Erroneously priced at $240.00 in March Ham-Ads (QST's error). K2YEQ, Smith, 57 Melbury Road, Babylon, L.I., N.Y.

WANTED: Good grid dip meter also 304 THs. State price and condx. W6WIE, 6920 Adams Ave., LaMesa, Calif.

GOING U.H.F. Selling F.W. Ranger I, new Christmas '61, $250.00; SX-71, $125.00; Heath VFO, $10.00; DX-40, $55.00. K5BOI/4, 100 Glencrest Dr., Marietta, Ga.

GOING SSB. Sell F.o.b. Stratford: G28 Communicator, $150.00; G50 Communicator, $200.00; SR34AC six and two transceiver, AC only, only $200; AF67 with six meters, $75; KW Matchbox with SWR bridge, $80; G66 Universal pwr. supply, spkr, $75; Blue Racer bug, $10. W1ZQZ, 1950 Main, Stratford, Conn. F. R. McElroy.

HALLICRAFTERS SX101 Mark III, R46B spkr, like new, factory reconditioned, $220. WA9AWC, 204 Lagoon, Northfield, Ill.

ORDERS. Viking II with Vik. VFO, $210; SX-71 rec. like new, $100; DLDX1 3-element Triband beam with rotor and tuner, $55; desk mic, $5.00; coax relay, $7.00; 3-element 10-meter beam with coax, $10. Capt. Reardon, 347 Highland Ave., Columbus, Ga.

HALLICRAFTERS HT-30, in exc. condx, best offer over $200; Clegg 99'er, brand new, best offer over $100. Prefer deal Philadelphia area. K2ITP, Box 57, Haverford College, Haverford, Penna.

SALE: Collins SSB station 32S-1, 312B-4, 516F-2 and 75S-2 recvr with 500 cycle c.w. filter and 20 extra xtal positions. $1250 f.o.b. Baltimore, Md. Also Collins 75A-4 and DX-100. Best offer takes either. Chuck Sprague, K3LNK, 222 Stonewall Rd., Balt. 28, Md.

FOR Sale: DX-40, $45.00; in perf. condx. Call or write Herbert Lebowitz, 1133 East 10th, Brooklyn 30, N.Y. Tel. DE 8-8627.

COLLINS SC101 Speaker, console, (KWS1-A4), wattmeter, clock, etc. Complete, $395.00. K4ORV, 1467 Harper St., Augusta, Ga.

MOBILE Shopping? Elmac A-54, Regency transistor converter, plus Bandspanner whip, mount, dynamotor, mike, and cables. Sell or trade. For info write me: Jim K4VBH, Box 1069, Americus, Ga.

WANTED: Hallicrafters Dual diversity receiver: came out sometime before WW II. Quote price and condition. W1LWV.

MUST Sell for college: HQ-110C, in A-1 condx, $184.50; Ranger gud condx, push-to-talk, $169.50, both $350.00. W7JBJ, G. A. Larson, 1432, So. 303rd Auburn 210, Washington.

HQ-170 with i.f. noise silencer, 5 months, $295.00; Gonset Four-Six Meters, $295.00, both excellent; used 4-1000 A $15.00. Cash & carry. Gordon Reese, 95 Jefferson St., Yonkers, N.Y.

HQ-140X, in exc. condx, $165.00; DX-35, $35.00; Hy-Gain 10M. 3-el. beam, $15.00. Alprodco rotor w/cable and control, $15.00. Both for $25.00. K4TCK, Lexington, Ky.

WANTED: Linear amplifier over 500 watts output to run with 10 watt exciter. WA2MJF, Richard Nadelson, 688 Longacre Ave., Woodmere, L.I., N.Y. Phone: FR 1-0824.

COLLINS 75A3 with vernier knob, crystal calibrator, 3.1 kc. filter, $350; Model "B" slicer, $45; 6 kc. filter for 75A4, $25. W1LOP, 71 Hilldale Rd., West Hartford, Conn.

Index of Advertisers

"MATT" MATTHEWS, K4KMF, enjoys occasional skeds with other members of the "Raytheon field team" and members of the headquarters staff.

FIELD ENGINEERING WITH A FUTURE

Man on the move

Meet Matt Matthews, Raytheon Field Engineer and truly a man on the move. Since joining Raytheon's Electronic Services Division in late 1958, Matt has held a series of increasingly responsible assignments that have provided him with the necessary technical and administrative background for his present position. As the Raytheon representative at a major SAC base, Matt's current project responsibilities include on-the-spot engineering and logistical support.

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GONSET GSB-201
LINEAR AMPLIFIER, Reg. $419.50

HY-GAIN TH-3 3-ELEMENT
TRI-BAND BEAM, Reg... $ 99.75
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SALE ENDS MAY 31, 1962

ALLIED SPECIAL BONUS PACKAGE PRICE, ONLY $439.25 ***NO MONEY DOWN***

GIVE YOUR SIGNAL A REAL SEND-OFF WITH THE GONSET LINEAR AND HY-GAIN TRIBANDER FOR 10/15/20!

Big news for Ham value hunters—save $80 on this DX-getting combination! Popular GSB-201 Linear operates at 1500 watts* on SSB, 1000 watts CW, and 400 watts AM. Can be driven by any 60-150 watt exciter. Bandswitched coverage of 10, 15, 20, 40 and 80 meters with pi-net output. Panel meter reads plate current or relative RF output. Antenna relay and bias supply built in. Compact: 8½ x 12⅝ x 17".

Husky Hy-Gain 3-element Thunderbird Tribander included for 10, 15 and 20 meters; has heavy-duty aluminum 2" OD boom and 1¼" elements tapering to ¾". Weather-proofed "solid state" Slim-Traps (1¼" dia.); excellent forward gain; less than 2:1 SWR with no adjusting. Turning radius, 14'8". GSB-201 for 110-125 v., 50-60 cycle AC. Shpg. wt., 127 lbs. **20 SX 352-ZD.** Complete Gonset—Hy-Gain Package. *No Money Down. Only* **439.25**

Exclusive ALLIED Pre-Spring Specials on New and Reconditioned Equipment

QUANTITIES LIMITED...ALL ITEMS SUBJECT TO PRIOR SALE—ORDER NOW!

B&W 51SB SSB Generator. New. Reg. $279.50. Closeout price, only. **$179.00**

B & W Matchmaster Model 651. Only. **$19.50**

Gonset Model 3275 6-Meter Converter. New. Was $74.50. Closeout price, only. **$44.95**

Vocaline AT-30 (421-449 mc) AM Transceiver w/PTT mike. New. Reg. $92.00. Closeout price, only. **$29.50**

Pierson KE-93 Mobile Receiver w/AC Supply. Only. **$159.00**

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Transcon Vox Boxes (4/6v-2/12v), for voice-operated break-in operation of any voice-modulated station. Requires 150-250 V DC @ 30 ma. New. Closeout price, only. . . **$14.95**

Tecraft 220 mc Converter. Brand new. 14-19 mc IF output. Closeout price, only. **$24.95**

NO MONEY DOWN. Allied Credit Fund Plan gives you bigger buying power.

15-DAY FREE TRIAL on equipment

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*PEP input is approximately twice average d.c. input.

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On the lab bench and in the field . . .

NC-270 provides exceptional stability . . . sensitivity!

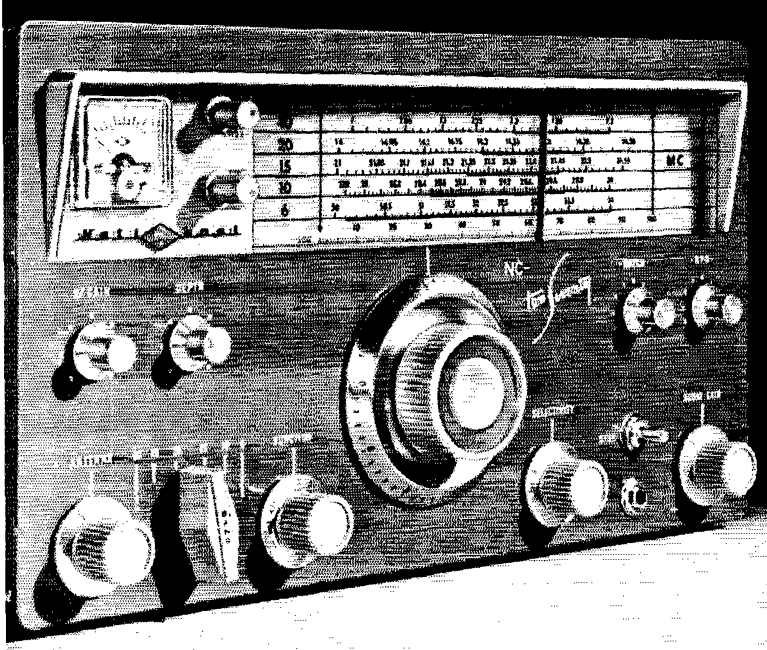
National's NC-270 proves itself the *only* way — in actual performance on the lab bench and under adverse operating conditions in the field. CQ and QST experts gave the NC-270 truly remarkable reviews. Of equal importance — letters from amateurs all over the world cite astounding performance under almost unbelievable receiving conditions.

FROM QST — JANUARY 1961

"Stability, both mechanical and electrical, is exceptional . . . The NC-270 works well enough on 50 Mc. to encourage a v.h.f. enthusiast to design his converters . . . so that they will work into the 6-meter range rather than into the lower bands. This would give him full coverage of the 144-Mc. band and a four-megacycle spread in any of the bands from 220 Mc. up . . . and he can skip the construction of a 50-Mc. job. The NC-270 should do all he'll need in that range."

FROM CQ — MAY 1961.

" . . . retains all the "feel" of the more expensive receivers for which this company is known . . . It is unusual to see a front panel NOTCH DEPTH control in this price class . . . The a.n.l. circuit in the NC-270 is exceptionally good . . . Mechanical stability is impressive. It is possible to tune a s.s.b. signal on one of the high frequency bands, lift the front of the receiver up several inches and let go. Unless the main tuning knob moves, the signal will still be there . . . (The National NC-270) is an extremely stable and sensitive receiver . . . "



BRUCE W. BUTLER W5PXN/5 CITES OUTSTANDING 270 PERFORMANCE DURING HURRICANE CARLA

"I would like to congratulate you on one of the finest communications receivers on the market; the NC-270. (At RACES center during hurricane Carla) communications were maintained with schools and hospitals . . . Your receivers performed for over 60 hours. The thing that impressed me most was its extreme stability under the most adverse conditions. Emergency power and, at best, poor antennas did not help our situation, nor the 70 mph winds which blow at the airport where we were set up. The selectivity of the NC-270 helped to maintain contact with other stations with low power and bad antennas. On 6 meters, we rarely needed a relay and when this did happen it was due to their receiving conditions, not ours . . . performed like a high priced receiver . . ."

If you want a proven medium priced receiver, we strongly suggest that you hear the NC-270 at your dealer's. Write today for technical information.

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Rush me free, complete information on the National NC-270.

Name.....

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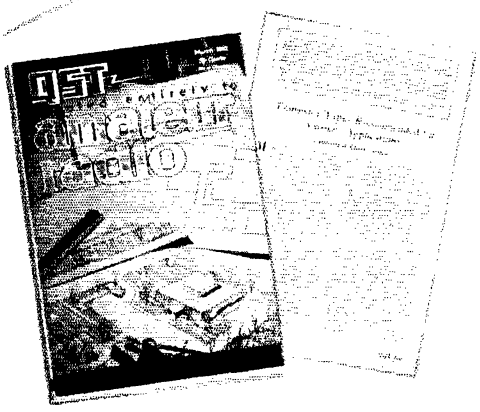
City.....State.....

If you would like a copy of National's 270 instruction manual enclose 25¢.

$279.95 — Slightly higher west of Rockies and outside USA.

Q-04

Which RCA Transistor for that Circuit Job?



See QST, MARCH, 1962

It's all in the article by W2OUY.

It will serve as a dependable and valuable guide when you are choosing from nearly 100 transistors and silicon rectifiers for specific applications. W2OUY covers the transistor types recommended for receiver rf, preamplifier, if, local oscillator, and converter stages. He points out the types to use in transmitter oscillators and rf amplifiers. In addition, the article lists types for audio stages, inverters, dc/dc converters, and voltage regulators. And there is a handy chart classifying 17 rectifiers having ratings ranging from 50 to 800 volts (PRV)—at dc loads of 500 and 750 milliamperes.

RCA offers one of the most complete lines of high-quality transistors and silicon rectifiers for amateur radio. And your RCA Industrial Semiconductor Distributor handles every one.

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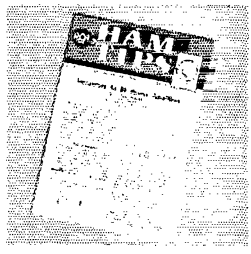

NEW HAM TIPS
Tells how to use RCA transistors in rf power amplifiers. Includes practical theory, transmitter circuits, a modulation technique, and on-air operation. Get a free copy from your RCA Industrial Semiconductor Distributor. Or write: Sect. D37SD, Commercial Engineering, *RCA Electron Tube Division*, Harrison, N.J.

Help Your League Build Membership

Free Lapel Emblem

to Campaign Boosters

In its forty-eight years the American Radio Relay League has grown from a mere handful to more than 100,000. ARRL membership increased again in 1961. But we have still not reached what should be our common objective — 100% of all hams as members of the League.

The League is *you* — the members — and its effectiveness in promoting and protecting and providing for the needs of amateur radio depends to a large extent upon the support of *every* radio amateur.

The Membership Committee of the ARRL Board of Directors wants each member of the League to accept an honorary appointment to the Committee and help build our membership roster.

If each of you obtained only one additional League member, obviously our rolls would double! If an "every-member-get-a-member" campaign is at all successful, we can come pretty close to our objective! But we need *your* help.

The Committee asks, then, that sometime before July 1, 1962, you actively support the program by recruiting one new * League member from the ham ranks.

To mark you as an active ARRL booster and participant in the program, for a new membership so obtained the League will send you without charge a special gold-plated ARRL-diamond lapel emblem.

Talk this up among your nonmember ham friends and at the local radio club. The fact that *you* are a member is the most convincing argument. You belong to ARRL for a reason, or more likely for several reasons. They should be equally effective on your recruit!

Set your sights for one new member. You will be helping both your League and amateur radio!

Rules and Procedure

Using the application on the reverse side of this page, sign up one new member. A new member is defined as one who has not been on the League records within the twelve months previous to application. Add your name as sponsor. Send us the application and his year's dues. In addition to issuing the membership credentials to your new man and putting him on the *QST* list, we shall send you a special lapel emblem.

This offer applies only to memberships at the rate of $5 in U. S. and possessions, $5.25 in Canada, $6 elsewhere. Applications must be submitted on this form; additional copies are available upon request. The offer expires July 1, 1962.

* As some amateurs are spasmodic members, off and on the rolls irregularly, we define a "new" member as one who has not been on the roster during the previous twelve months.

Every Member Get A Member

.....1962

ARRL Hq.
West Hartford, Conn.

I have obtained a new † member for our League per completed application below. In accordance with your offer, please send me a free ARRL lapel emblem.

Name and Call .....

Street and Number .....

City and State .....

† Not having been a member within the previous 12 months.

Application for Membership

Being genuinely interested in amateur radio, I hereby apply for membership in the American Radio Relay League and enclose $5 * in payment of one year's dues. Begin *QST* with the next available issue.

My call .....Class of Operator license .....

Send my Membership Certificate ☐ or Membership Card ☐ (indicate which) to the address below.

Name .....

Street and Number .....

City and State .....

* $5 in the U.S. and possessions; $5.25 in Canada; $6 elsewhere.