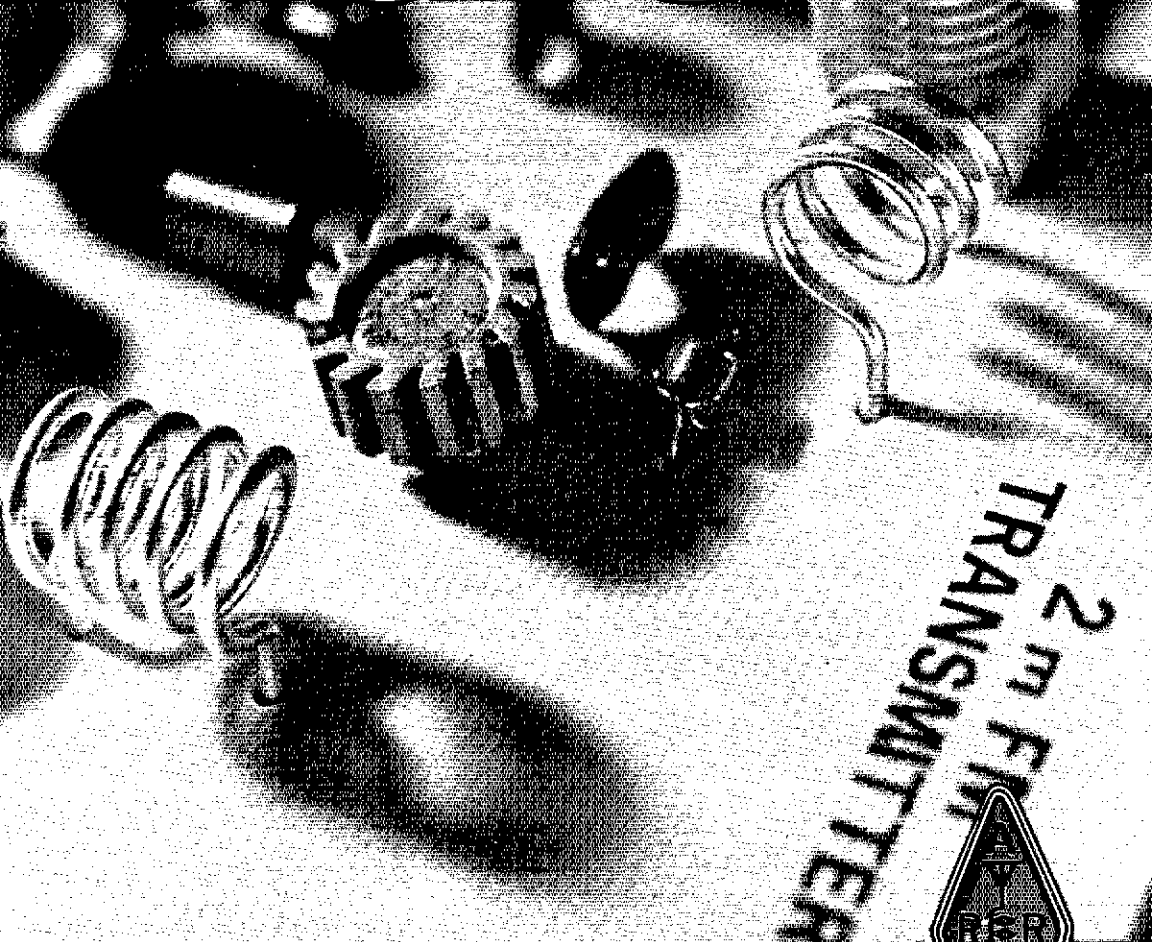


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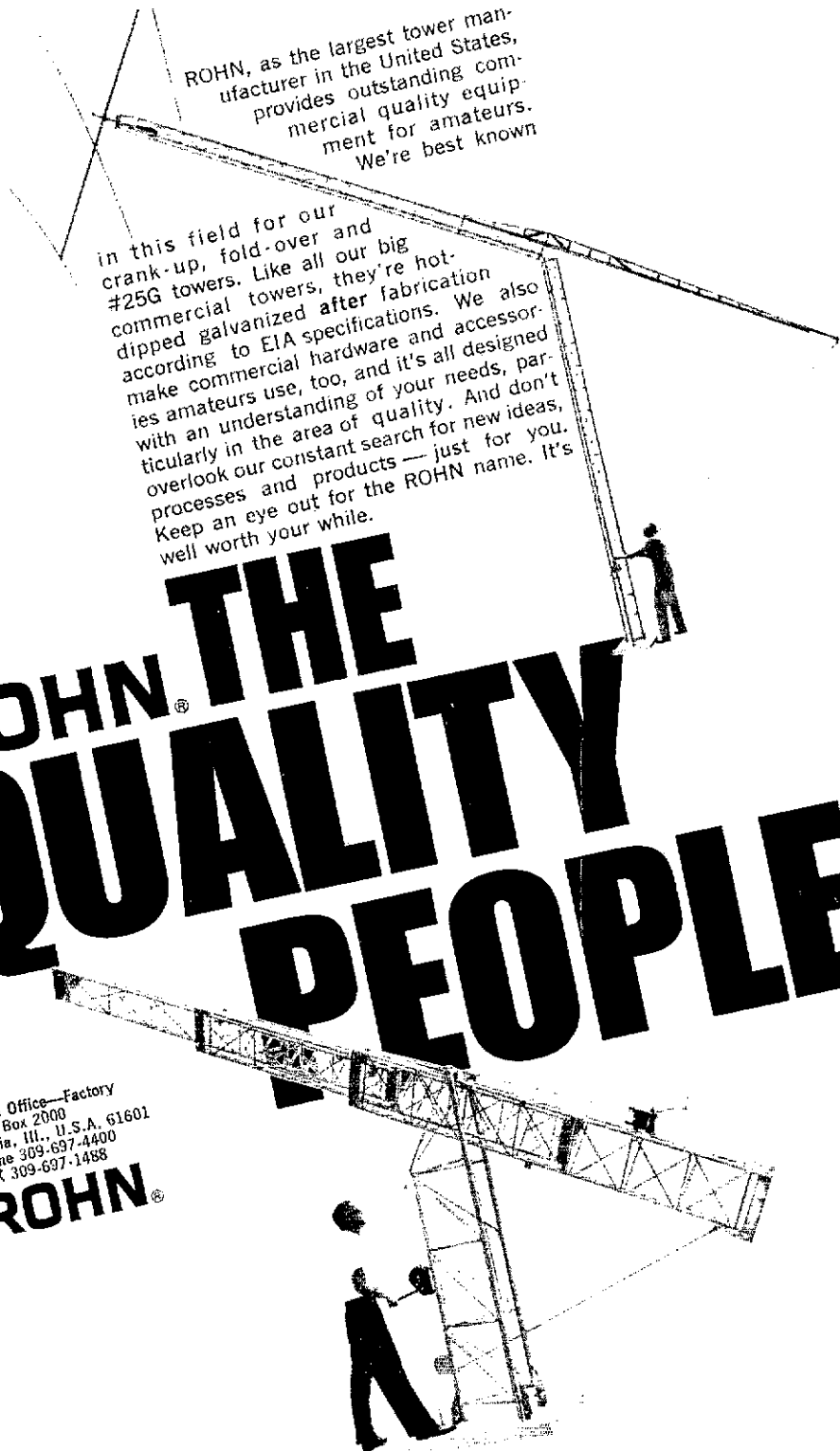
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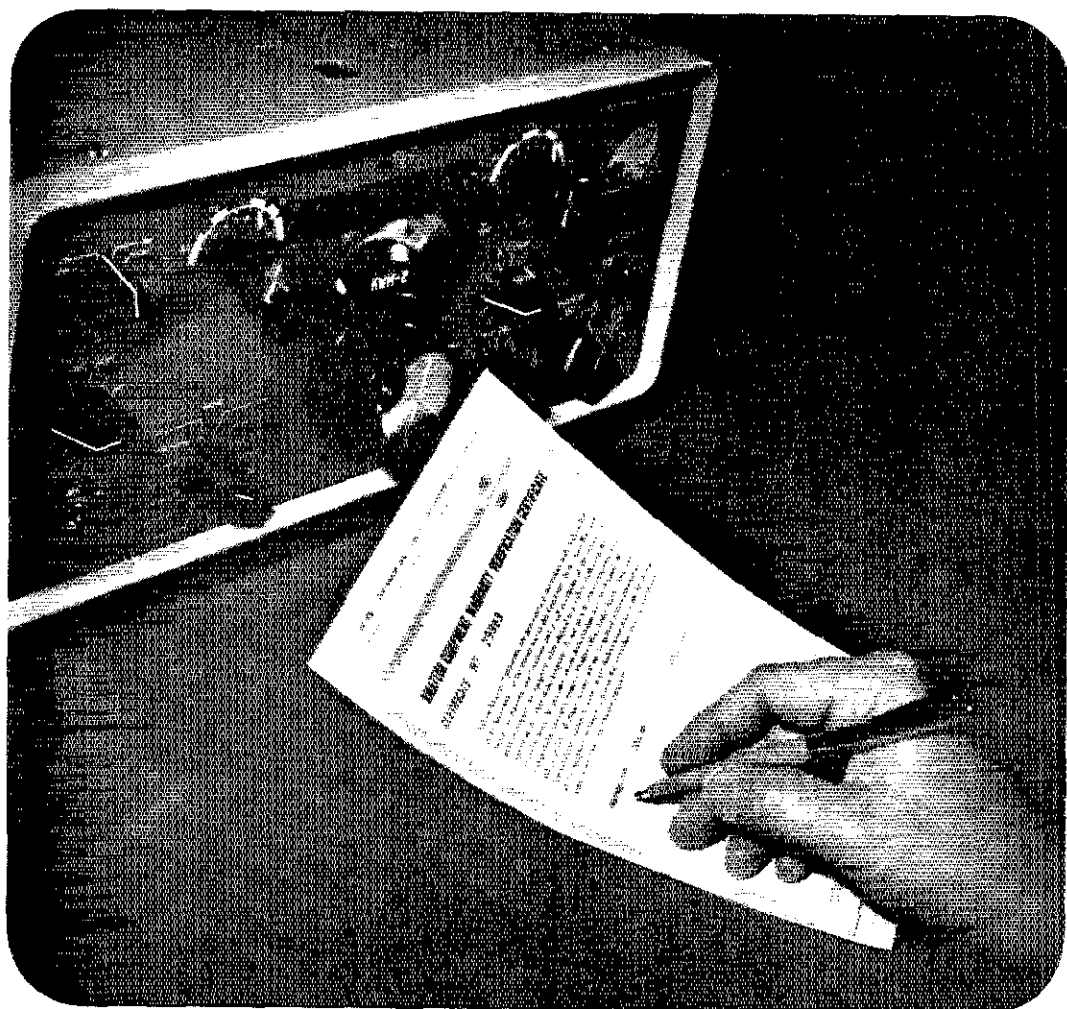
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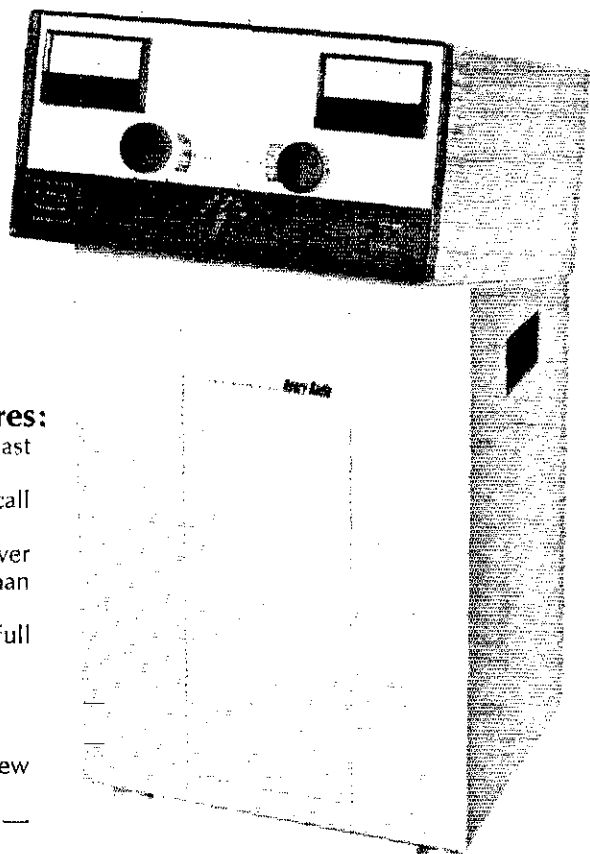
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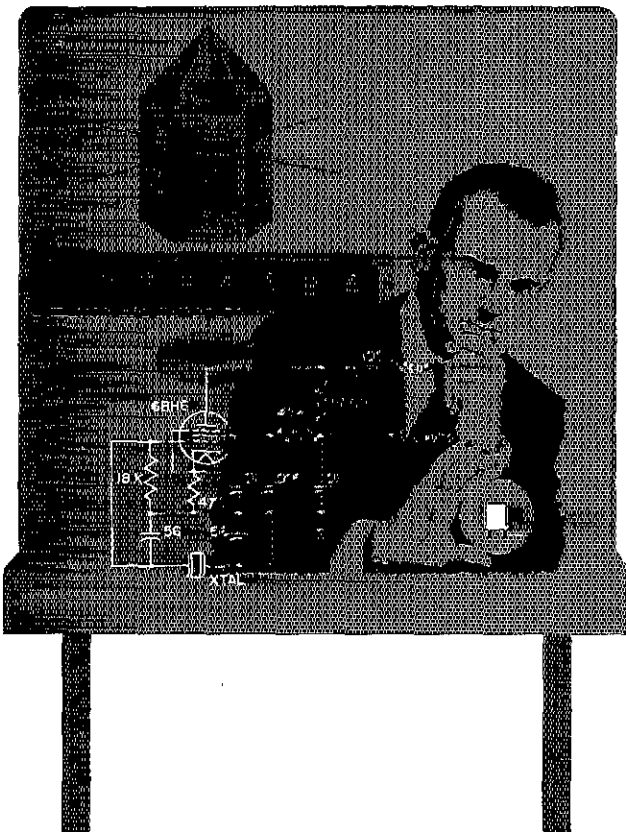
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"It Seems to Us..."



UPBEAT

ANY APPRAISAL of amateur radio the past five years or so would be less than accurate if it failed to recognize that we have had our problems. To some extent they were a reflection of lagging industry activity, as the peak periods of widespread conversion from a-m to sideband passed and the volume returned more to a norm. To some extent they were from outside influences, particularly as the national mood became laced with pessimism. To some extent they were of our own making, as we went through a period of critical self-examination of our posture in the communications world.

But in our view, the greatest impact came from prophets of doom within our own ranks — mostly from those who are never happier than when throwing rocks in the direction of the League.

"Ham radio is going to pot . . . It isn't growing . . . We aren't getting any youngsters . . . Home-brewing is dying out . . . Clubs are languishing . . . Incentive licensing is ruining the bands . . . Municipal zoning is outlawing all towers . . . TVI and RFI are getting worse . . . Cheating has ruined DXCC . . . The League is losing thousands of members . . . License fees are doubled * . . . ARRL is not preparing for the ITU conferences . . . CB is taking over . . ."

Even among the majority, who were able to see beyond the narrow limits of this totally-negative approach, the talk produced a feeling of uncertainty — a sort of wait-and-see attitude. And so, we had some doldrums.

Things have changed, and are still changing — gradually, for the most part. League membership is up — a growth of some 1600 last year. Sales of our "beginner booklets" (*Learning the Radiotelegraph Code, How to Become a Radio Amateur, The Radio Amateur's License Manual*) are up substantially. Our promotional motion picture, "The Ham's Wide World," was labeled by one loan

*Certainly, the impact of license fees discouraged renewals by long-inactive license-holders, which shows up as "lack of growth" in FCC figures.

agency as "the most popular film we've ever had" — and unfortunately for some, most of the 80 prints in circulation are booked months ahead. Half the newcomers to amateur radio are age 20 or younger. If the tone of bulletins is any criterion, club interest is up and optimism is evident. Although always susceptible to unpredictable ups and downs, convention attendance is strong. The number of visitors welcomed to Hq. last year reached a new peak; we had to hire two extra people to serve solely as hosts on guided tours. Many came in buses, on organized special trips. And many of them were youngsters, members of high school or early college clubs and groups.

The wails of agony over inability to find a suitable source for components shows there is still a strong body of home-brewers. Sweepstakes participation last November was up — almost 20%! 1970 was the biggest year ever in DXCC. 5BWAS and 5BDXCC are being actively chased by hundreds — maybe thousands, if one judges by low-band activity. The number of Advanced Class licensees increased 50% in the past three years; Extra Classers doubled in the same period. We look forward to an ITU conference this year not with fear and trepidation, but with confidence — based on careful preparation — that our needs will be reasonably met. The over-all tone of our correspondence — in years past occasionally laced with a "drop dead" or two — is warm, complimentary, encouraging and enthusiastic.

Somehow all this doesn't sound to us much like ham radio is going to the dogs. Maybe the prophets are losing their grip? Maybe we're all better able to recognize their taking a modest negative point and blowing it all out of proportion.

Not that everything is rosy. There are — and always will be — problems. Let's approach them with reason, rather than emotion. Let's be careful not to let the pessimistic aspects affect our thinking too deeply.

The word is, indeed, UPBEAT!

QST

League Lines . . .

Members of the ARRL Advisory Committees for 1971: Contest -- W3GRF (chairman), W1AX, K2KIR, W3WJD, W4UQ, W5QNY, KH6IJ, W0HP, VE2NV. VHF Repeater (all reappointed, particularly since FCC and DOT repeater regulations still await final action) -- W9BUB (chairman), W2ODC, W4GCE, W5VPQ, W6GDO, W6MEP, W7FHZ, W0CXW, VE3ADO. And the new DX group -- W4QCW (interim chairman), W1RAN, W2FQG, W6RGG, W7LFA, W8BF, W9NN, W0ELA, VE3ACD; W4DQS and W1CW are board and Hq. liaison. More details next month.

After several years of doldrums, League membership totals increased slightly in 1969, and more noticeably last year -- a growth of some 1600. See editorial, previous page, for more comment.

Questionnaire returns from nearly 600 affiliated clubs throughout Canada and the U.S. show the average yearly dues in 1970 to be \$7.45 -- up from \$6.77 a year earlier. League membership will, sooner or later, have to follow this trend.

The imminent rise in postal rates alone will be quite an impact. It will cost ARRL some \$5,000 more per year in mailing membership certificates and one expiration notice (not counting second mailings to those who do not renew promptly). And authoritative reports say that mailing rates for society journals such as QST will go up 258% over the next ten years!

It's that time of year again -- even with a heavy covering of snow on the ground (up here, anyway), thoughts are turning to preparation for the annual meeting of the Board in May. Election of directors, as accomplished last November, is only part of the member's responsibility in grass-roots control of the League. You must also keep him informed of your, and your club's, views on matters of the day. He'll be glad to hear from you; see page 8 for addresses.

ARRL Official VHF Station (OVS) appointees, and others, will soon receive a new card form calling for a listing of repeater information. Hq. will tabulate returns, entering details in the net directory. Send for one of the cards (CD85A) today to file your repeater data.

A \$500 prize competition has been announced by the Federal Communications Commission to be awarded for the best design of a new official seal for that agency. April 15 is the deadline; details and rules for submission of designs available from the Office of Information, FCC, Washington, DC 20554.

W1KQM's car was often seen in the Hq. parking lot on December and January weekends. Now we know why: it's been a number of years since the November Sweepstakes report appeared in this early an issue. A whopper of an SS, too, up about 20% in entries with close to twice the number of affiliated clubs appearing in the gavel competition.

Each year the officers, directors, General Manager and Communications Manager make extensive reports on the progress and status of amateur radio and League affairs nationally, and in each division. The bound volume of those for 1970 will be available probably in early May. A copy is sent without charge to any affiliated club on request; make sure your club secretary asks to be put on the mailing list. If you want a personal copy, it's \$1, the approximate cost of production.

A new Operating an Amateur Radio Station is now in distribution -- free to members on request, 25 cents to others. Contents have been revised by W1NJM, and type size increased to improve readability.

A Bearing and Distance Calculator

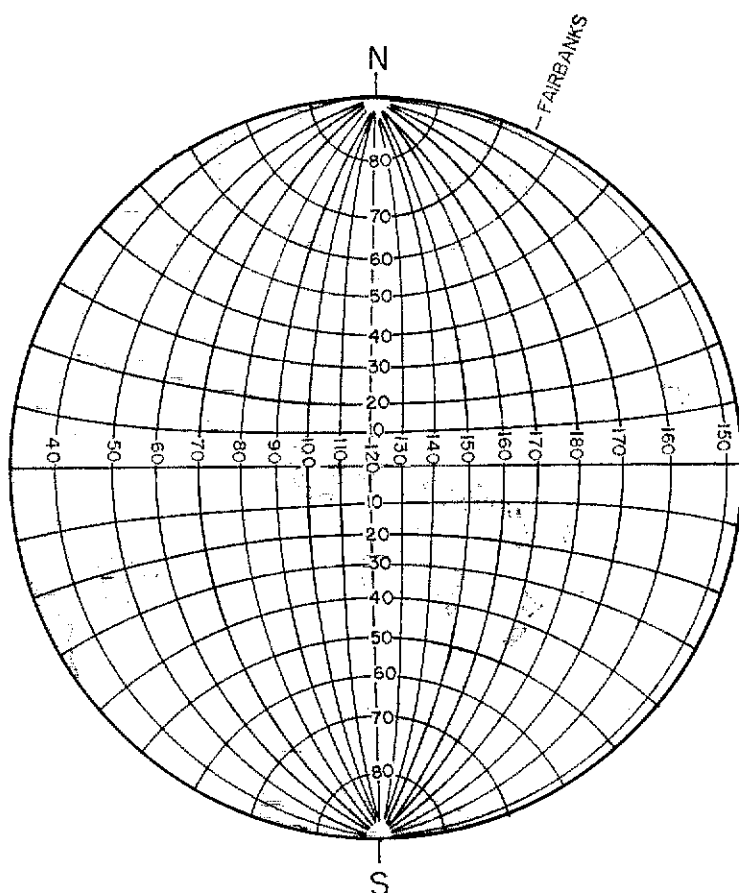


Fig. 1—Base graticule with landmasses shown. This graticule is constructed for Fairbanks, Alaska.

BY K. R. KLOPF,* KL7EVO

SOME TIME ago, Sandy, KL7EWH/VK7BA, left for Tasmania on an extended visit to see her daughter Nancy, VK7ZA. After keeping a few schedules and listening to some unkind remarks about the power my long-wire antenna was feeding the down-under crowd, I decided to put up a directive array to reduce their abusive comments. I settled on a four-element extended collinear (*à la* extended Zepp) in an end-fire configuration, with the thought that possibly I would repeat the arrangement later for broadside directivity. Now I had to aim the array.

The *ARRL Antenna Book* illustrates three methods for obtaining a bearing from one point on the earth to another, to aid in pointing antennas for optimum communication. Of the methods given, probably the easiest to use is an azimuthal-equidistant map centered on your locality, since from this map you can read directly the bearing and distance to any part of

the earth. Unfortunately these maps have only been constructed with a few large cities or scientific points as centers. The Institute for Telecommunications Sciences issues maps which can be used to determine direction and distance, but these maps may not be readily available and are not easy to construct. The next best method, as far as simplicity goes, is to use a globe, and this is well discussed in the *Antenna Book*. If none of these methods is available, you can resort to an arithmetical solution of the spherical triangle consisting of the pole and the two station locations as vertices. This method rapidly becomes tedious if many bearings are desired.

I don't have a globe, and although Fairbanks-centered azimuth-equidistant maps are available I was too lazy to drive in to obtain one, so I worked out the Tasmania bearing using the spherical trig. formulas given in the *Antenna Book*. I hung the array using the bearing, and the results were gratifying. So I started to figure out what other areas I could work. After a night

* 2½ Mi. Steele Cr. Rd., Fairbanks, Alaska 99701

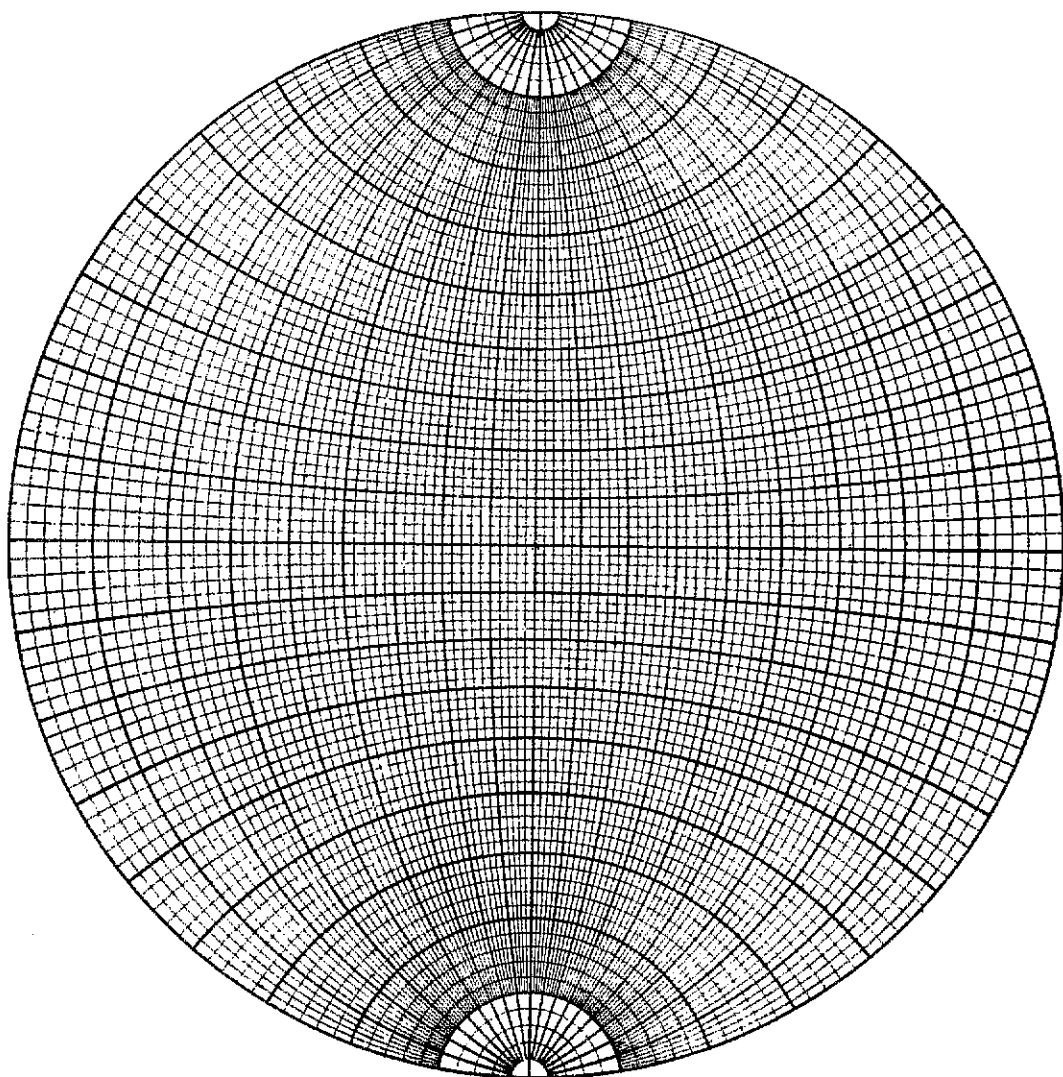


Fig. 2—Stereographic net. In this net, arcs are spaced at two-degree intervals with ten-degree intervals accentuated.

of looking up sines and cosines, I decided I would look for an easier way to solve the spherical triangle. I tried other mathematical methods but they didn't satisfy me, since they required a separate calculation for each location. I considered constructing a nomograph, but I discarded that idea for a number of reasons. Then I remembered that many years ago I had used a stereographic net, which is an ancient Grecian projection of a sphere onto a plane, to solve geometrical problems. Now I put it to work solving the bearing and distance problem. This was vastly easier than using the spherical trig. formulas, but it still required a separate graphical calculation for each direction and distance. In order to make a simultaneous solution possible for all cases I moved my station location to the

circumference of the stereographic net, and wound up with an easy-to-construct method which gives the bearing and distance to *any* location from my own. The method uses the stereographic projection of two hemispheres each with my location on the circumference at the proper latitude, and each with a similar stereographic net superposed, with its poles at my location and its antipode. (The antipode is the point where the line from my location through the center of the earth pierces the other side of the globe.) At first, I found the latitude and longitude of a particular location from another map of the earth, and transferred that information to the longitude and latitude arcs on the net. But later I drew in the landmasses on my projections, and now the calculator is self-contained.

The principal advantage of the stereographic projection (stereographic net) of the earth is that it is simple to construct. By superposing two such projections—one with the poles

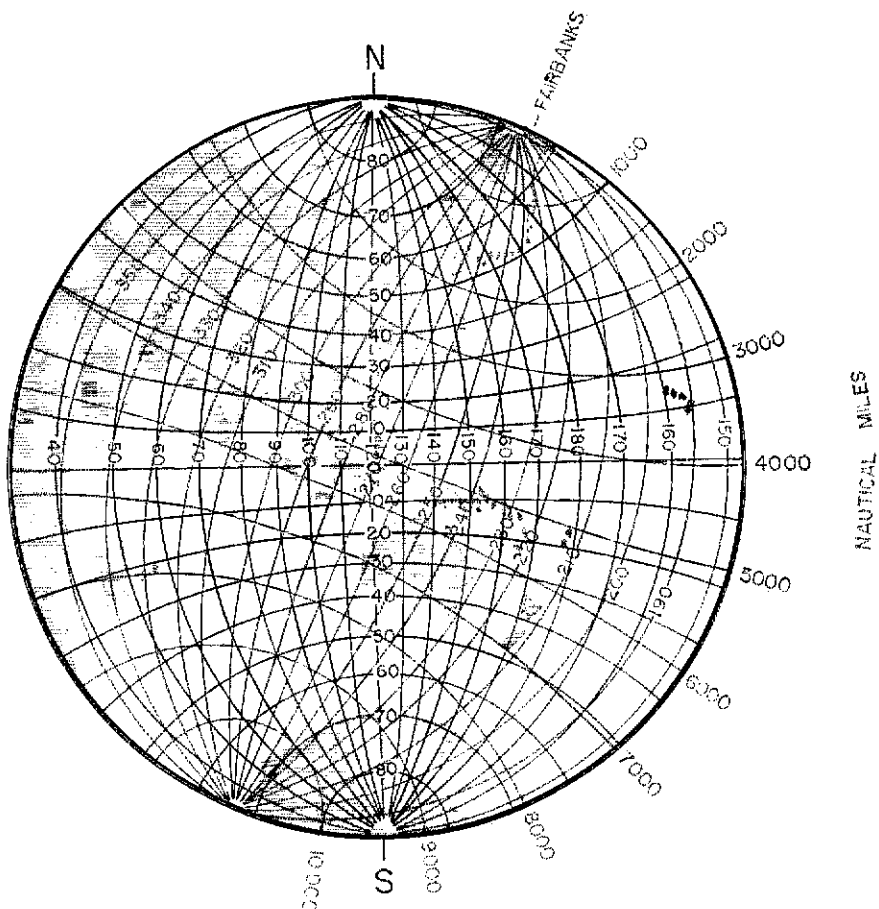


Fig. 3—Westerly great circle bearings and distances from Fairbanks, Alaska. From relative position of landmass areas or from black latitude and longitude coordinates, determine the location of the distant point. Then, from the red coordinates, read off bearing and distance from Fairbanks.

coinciding with the geographic poles and the other with the poles coinciding with your location and its antipode — the bearing and distance from your location to any other location may be read directly from the map. For complete coverage of the earth, two maps, one for each hemisphere, must be constructed. I made my two maps in about a day, and most of that time was spent in tracing the landmasses on the projection of the latitude and longitude circles.

The easiest way to make the maps is to use a meridional stereographic net (Fig. 2) to trace off the latitude and longitude graticule. In this net the arcs are spaced at two-degree intervals. A 40-cm net (HO MISC NO 7736-1) with one-degree intervals is available from the U.S. Hydrographic Office, Washington, D. C. However if you wish to make your own net they are easy to construct, since the projections of the latitude and longitude circles are arcs of circles. Thus, a ruler and compass are all that is necessary. A

beam compass will be necessary for the low latitudes and central longitudes. The Appendix gives the method.

On the maps that I have made, a ten-degree spacing on the latitude and longitude graticules seems to be about ideal, and it gives sufficient accuracy as well as no undue cluttering of the map. Since one nautical mile equals one minute of arc, one degree equals sixty nautical miles, and one thousand nautical miles equal 16.65 degrees; the latitude arcs of the graticule through your location should be in 16.65-degree increments in order to portray thousand-nautical-mile distance circles from your location.

Compared to the azimuthal equidistant map, the map constructed has the advantage that, in addition to being simple to make, the shapes of the landmasses in small areas are correct and the landmasses are recognizable. However a disadvantage is that two maps are required, one for each hemisphere.

To illustrate the method of construction let's use my QTH, 65 degrees north latitude, 148 degrees west longitude, near Fairbanks, as our station location. First we will work with the western hemisphere (west of my location). See Fig. 1. Initially we must make a tracing of the stereographic net of Fig. 2 on a sheet of paper. We

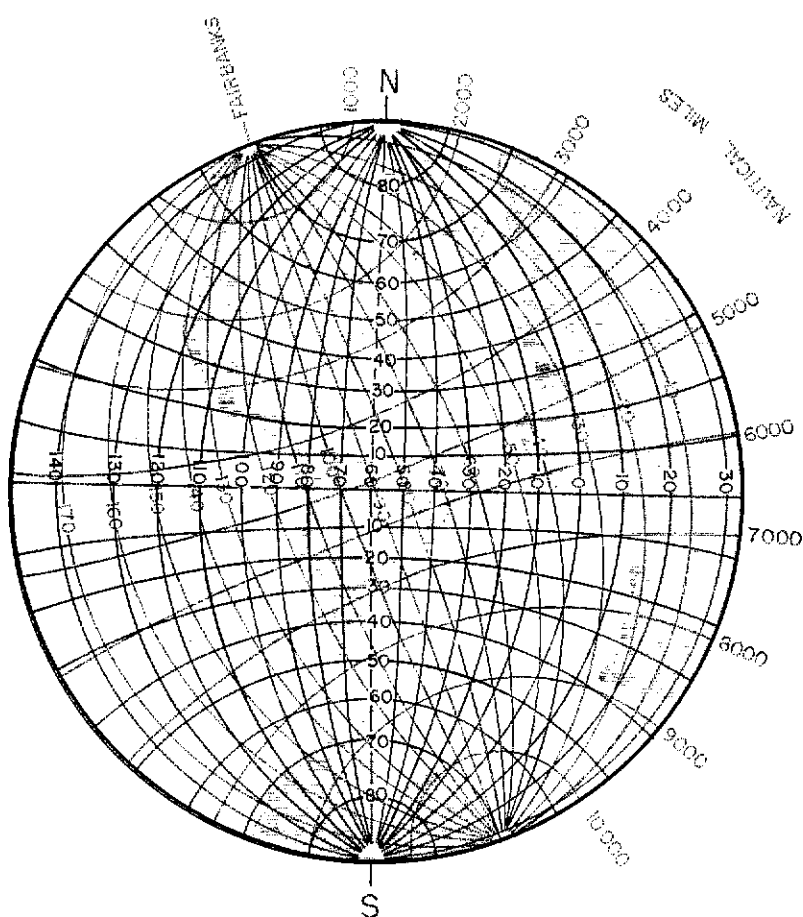


Fig. 4—Easterly great circle bearings and distances from Fairbanks, Alaska. Use of this map and that of Fig. 3 gives complete coverage of the globe from Fairbanks.

will call it the base graticule. Since my longitude is 148° W. and this must be on the right half of the circumference, and since we want to have the longitude arcs labeled in ten-degree increments, longitude 150° W. will be the first arc two degrees west of the Fairbanks meridian. The other longitude arcs are traced out, and the last one before the circumference line at the left will be 40° E. At the left, the circumference line will be eight degrees distant from this line, representing 32° E, longitude. This completes the longitude arcs of the base graticule.

Trace out the latitude arcs in increments of ten degrees, starting from one of the poles. The horizontal line halfway between the poles is the equator or zero latitude. North latitudes are above the equator and south latitudes below. Each latitude arc is labeled with its corresponding value. The location of Fairbanks, 65° N. lat., 148° W. long., is then marked on the base graticule at the right intersection of the circumference and 65° N. lat. Now is the best time to sketch in the map of the land in this hemisphere, by referring to a world map and its coordinates.

After this is done, construct the bearing and distance graticule by rotating the base graticule on top of the stereographic net until 65° N., 148° W. coincides with one of the poles of the net. See Fig. 3. Now trace the longitude arcs in ten-degree intervals. These arcs are the bearing lines from Fairbanks. Also trace the latitude arcs in 16.65 degree increments away from Fairbanks. These arcs are the thousand-nautical-mile increment arcs from Fairbanks, and are labeled out to ten thousand nautical miles. The direction arcs are labeled clockwise starting with 180 degrees on the right-hand circumference, to give bearings clockwise from true north. This completes the western hemisphere.

Constructing the eastern hemisphere proceeds in the same manner except that now Fairbanks will be on the left half of the circumference, and the direction arcs will be marked from 0 to 180 degrees. See Fig. 4.

When you construct your own maps it is easiest to choose the closest integral number of degrees for your location's latitude and longitude, since an error of one or two degrees in plotting your position is not generally of practical importance in this application. In order to make the maps more easily readable, use fine lines and one color for the base graticule and

Converting the HT-41 for 572-Bs

BY E. W. LJONGQUIST,* W4DWK/WICQS

NO DOUBT many hams have had the frustrating experience of trying to find replacements for the 7094 tubes used in their HT-41 amplifiers. This amplifier is a well-designed piece of gear with a very rugged power supply. Ah, but those 7094 tubes can be a real problem. After blowing two sets of them and trying to beg, borrow or steal a pair of replacements, (at over 80 bucks per pair), I gave up and put the HT-41 on a shelf and forgot about it. But alas, there is nothing to replace power in pile-ups, so I decided to try to find a reasonably-priced replacement for the 7094.

After much searching, I heard of the Cetron T-106L-572B¹. The 572B has a greater plate-dissipation rating than the 7094 (160 watts versus 125), filament voltage is the same, and the 572B is a lot cheaper. So, it was decided to modify the amplifier to take a pair of the tubes.

Mechanical Changes

The mechanical changeover is not a big job. The hardest part is wrestling the amplifier out of the cabinet. Carefully disconnect all the leads to the 7094 socket mounting plate, then remove the plate. The old plate can be used as a template for the new mounting plate. 572Bs require 4-pin sockets, and steatite sockets should be used. We used aluminum for the new mounting plate because steel is just too tough to work with. The tube sockets should be mounted with the filament connections facing one another. Fig. 1 shows the modifications.

A new filament choke is required for the tubes. I used six feet of No. 12 Formvar, doubling the wire, and then winding 32 close-spaced bifilar turns on a 1/2-inch-diameter dowel rod. The winding was then carefully slid off the dowel rod, and the

*1655 Meridian Road, West Palm Beach, FL 33406

¹Cetron Electronics Corp., 715 Hamilton St., Geneva, IL 60134.

1/2-inch-diameter ferrite rod slid into the coil. I rounded off the edges of the ferrite rod before inserting it into the coil so as to prevent abrasion of the Formvar coating on the wire.² I secured the wire with Duco cement, let the cement dry, and then cut the loop at the one end of the winding. Mounting brackets for the choke were made from pieces of aluminum, putting electrical tape under the aluminum to protect the windings from shorting to ground.

The grids were grounded directly at the tube pins. I didn't bother connecting up the grid-metering lead; I just taped it off. Also, just as a safety factor, I used ceramic tube caps for the 572Bs. The other metering functions are not changed by the new circuit, so they are left just as they were.

The first test of the amplifier was on 15 meters. Everything worked fine. However, on "20" and "40" I proceeded to burn out the parasitic suppressors. After much parasitic chasing, I came

²Ready-made chokes can be purchased from William W. Deane, W6RET, 8831 Sovereign Road, San Diego, CA 92123.

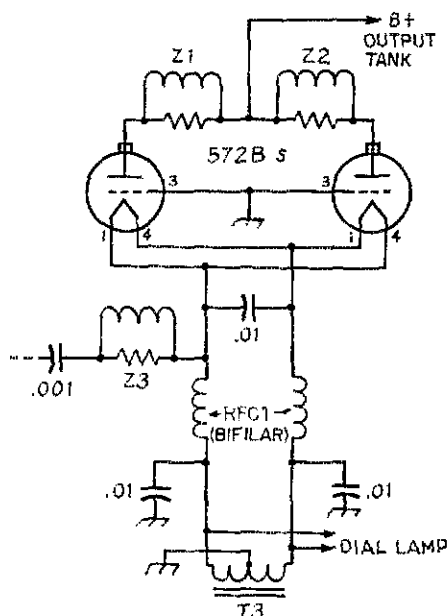
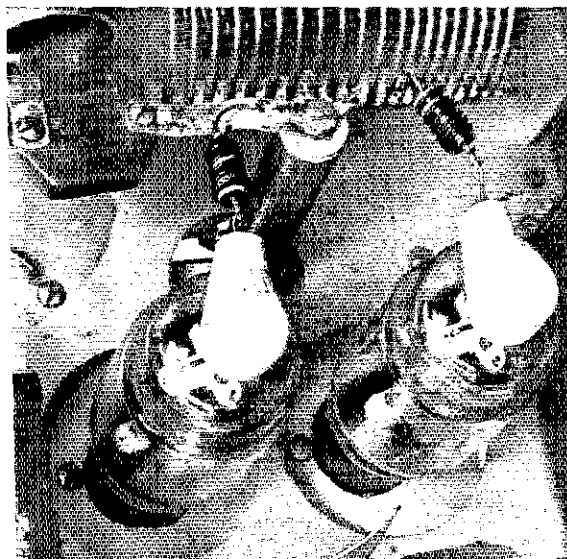


Fig. 1 — Circuit diagram of the modified HT-41. See the text for details on Z1, Z2, Z3 and RFC1.

Here are the 572Bs, installed and ready to "play."

QST for



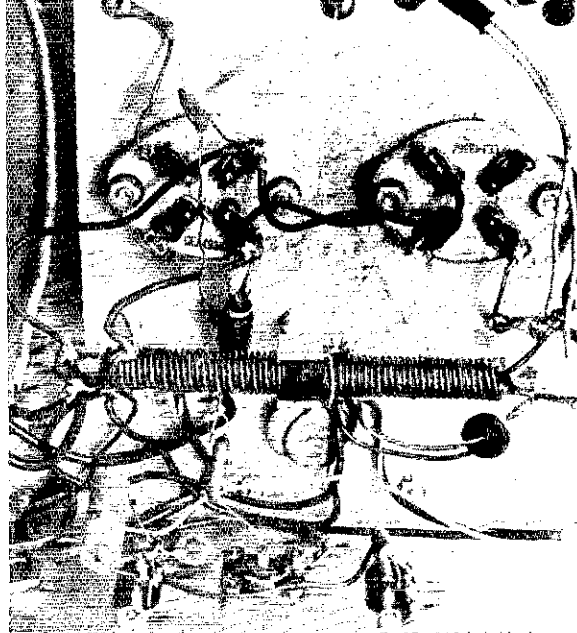
This view shows the installation of RFC1, which is mounted on a small insulator. The parasitic suppressor is visible just to the left of the insulator.

across an amplifier article written by W2OL³ in which he used a parasitic suppressor in the *cathode* circuit, and none in the plate. Not to be outdone, I wound up three suppressors, each consisting of 5 turns of No. 14 wire wound on 47-ohm, 2-watt resistors. I installed them as shown in Fig. 1. Testing the amplifier on all bands showed that it was stable. As long as the amplifier was stable, I didn't try removing the plate suppressors, as did W2OL. (I figured it was best to leave well enough alone!)

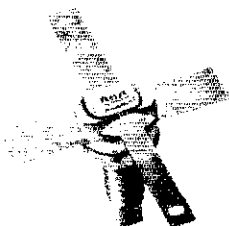
So my HT-41 is back on the operating table and I am getting RST 599 reports, even with my beat-up beam. I can run more dc input than before, and can make a few tuning mistakes without losing 80 dollars worth of tubes at a clip. Anybody want some blown-out 7094s for desk lamps?

QST

³Anderson, "The Evolution of an Amplifier," QST, April, 1969.



● Technical Topics



2-Meter Solid-State Amplifier

THE CIRCUIT of Fig. 1 was developed for use with the new RCA 2N5995 and 2N5996 npn overlay rf power transistors. Both units are identical in appearance. Low-inductance radial-type leads are used for the base, emitter, and collector connections. The mounting stud is independent from the transistor elements. This ideal feature makes it possible to bolt the transistor to the wall of the equipment case, thus using the cabinet or chassis as a heat sink.

Both transistors are "mismatch tested" by the manufacturer. This means that an infinite load mismatch from short to open can be tolerated by the transistors during driven periods, provided the

maximum junction temperature is not exceeded. The circuit shown here was tested for both short and open conditions, and no damage to the transistor resulted.

The 2N5995 is rated at 7 watts minimum output for operation at 175 MHz. V_{ce0} is 36 volts, I_C is 1.5 A, and P_T is 10.7 watts. Unit price is \$8.25.

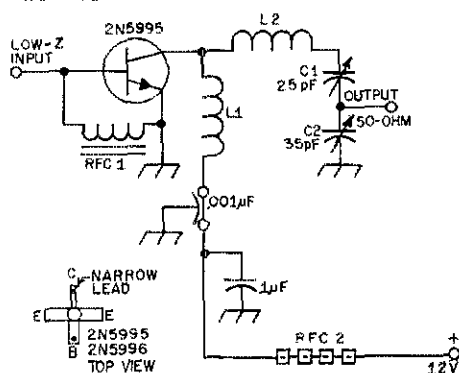
Ratings for the 2N5996 are: 15 watts minimum output at 175 MHz, V_{ce0} of 36 volts, I_C 5.0 A, and a P_T of 35.7 watts. Unit price is \$11.60.

This circuit is designed for use with the fm transmitter described elsewhere in this issue of QST. No base matching network is needed because the output circuit of the exciter, when connected directly to the input of this amplifier by means of two very short jumpers, can be tuned to effect an impedance match.

Driving power for the 2N5995 is 3/4 watt. The 2N5996 requires approximately 5-watts drive to develop its rated power output. The 2N5995 can be used as a driver for the 2N5996 to obtain approximately 20-watts output at 146 MHz. Similar circuit constants can be used for both stages.

— WICER.

Fig. 1 — Diagram of the solid-state 10-watt amplifier. C1 and C2 are miniature air variables. L1 = 9 turns No. 20 enam., closewound, 3/16 in. dia. L2 = 3 turns No. 14 tinned bus wire, 3/8 in. ID X 1/2 in. long. RFC1 = 4 turns No. 30 enam. wound on Amidon ferrite bead (turns looped through core), or four Amidon beads on a 1/2-inch length of No. 20 wire (Z should equal approximately 450 ohms). RFC2 = four Amidon ferrite beads on a 1/2-inch length of No. 20 wire. Heat sink used here is a 3 X 3 inch piece of aluminum, 1/16 inch thick.



A 75/80-Meter Vertical Antenna Square Array

BY JAMES L. LAWSON,* W2PV

BECAUSE OF the low-angle radiation properties of vertical antennas, which make them especially useful in the reception of high-frequency (75-80 meter wavelength) signals, it seemed appropriate to investigate the possibility and practicability of providing a suitably phased array of vertical elements to improve horizontal-plane directivity. There have been many examples in the past where two vertical elements have been used either in a broadside mode or in an end-fire mode.¹ There is also a good example of the use of four verticals² in a switched system providing not only (normally) good end-fire directivity along the line of verticals, but also with appropriate excitation a bilateral "beam" broadside to the array.

However, some years ago the author investigated the possibility of using an array of four vertical elements arranged in a square configuration for producing four electrically-switchable separate "beams" along either the diagonals of the square or in the direction of the sides of the square. Through a computer program produced by H. Hurwitz, WA2VBW, the square array was simulated,³ and it was soon found that such an array could indeed produce a very fine pattern along its diagonal (substantially better than along its edge). The side dimension of the square is not especially critical, but should be in the neighborhood of a quarter of a wavelength, $\lambda/4$; however, the phases of the currents in the four radiators must be adjusted for the particular dimensions of the square. At the time of construction of the square array (1963) the author wished to use the array for both 75 and 80 meters, and also on 40 meters, so that the actual size of the square was set to 42 feet (about $\lambda/6$ on 75/80 meters, and $\lambda/3$ on 40 meters). For such an array, and numbering the elements consecutively around the square, the currents in all four elements are made equal and the phases are set to the following computer-determined values.

It is interesting that a somewhat similar suggestion

has been made recently.⁴ However, the arrangement suggested in this reference would not give quite as good a pattern nor as much gain as it would if the size of the square were reduced and optimum phase lags used.³

The beam produced by the currents given in the above chart is maximum along the diagonal toward element 3, and for the two situations, $\lambda/6$ and $\lambda/3$ excitation wavelengths, the computer-produced power gain patterns are shown in Figs. 1 and 2.

⁴Bibby, "Unidirectional Antenna for the Low-Frequency Bands," *Ham Radio*, Jan. 1970, pp. 61-65.

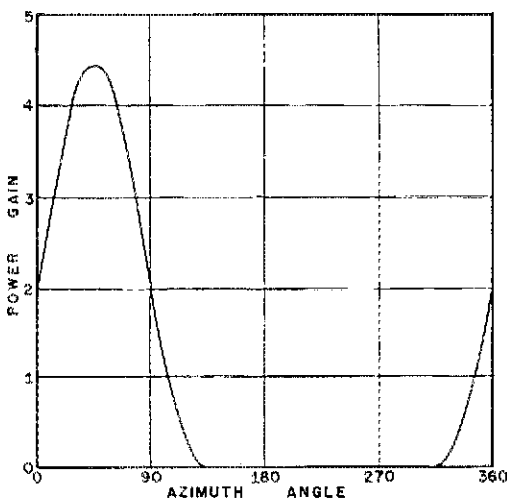


Fig. 1

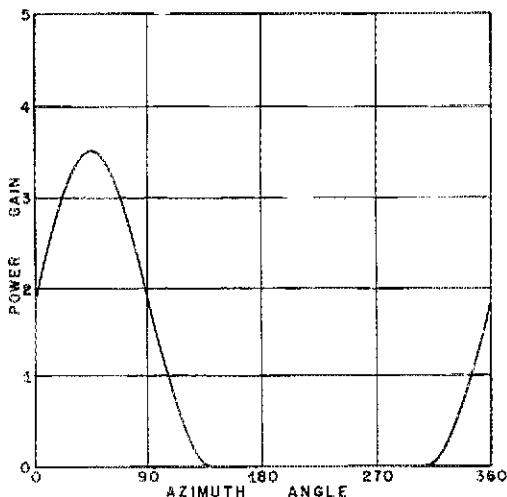


Fig. 2

Corner el. No. $N/6$ phase (deg.) $N/3$ phase (deg.)

1	0	0
2	-130	-80
3	-260	-160
4	-130	-80

*2532 Troy Road, Schenectady, NY 12309.

¹See, for example, Cousins, "80-Meter Vertical Beam Antenna," *Ham Radio*, May 1970, pp.26-27.
²Hy-Gain Electronics Corp. Engineering Report, "Amateur Phasing" (undated); available from Hy-Gain Electronics Corp., N. E. Highway 6, Lincoln, Nebraska, U. S. A.

²Atchley, "A Switchable Four-Element 80-Meter Phased Array," *QST*, March 1966, pp. 48-52.

³Lawson, "Simple Arrays of Vertical Antenna Elements," report in preparation. Will appear in a later issue of *QST*.

These patterns are particularly noteworthy for the substantial power gain on the "nose" of the beam (at 45 degrees or along the diagonal) and for the rejection over the entire back hemisphere of the pattern. These patterns were not found especially sensitive to either the exact current balance in the elements nor their exact phases, and therefore were used as the basis for constructing an actual square array for trial.

Array Construction

It was decided to construct the array from commercial antennas, and Hy-Gain Hy-Towers were chosen. Four of these were mounted in a square 42 feet on a side and quarter wave (at 75/80 meters) coaxial cables were run from each antenna element to a central control and switching box containing delay coaxial cables and two 4-pole-double-throw (antenna) switching relays, K1A and K2A. Only the 75/80-meter switching and measurement scheme will be described here; the 40-meter arrangements are quite similar. At the central switch box the relay circuit controlling the drive to each antenna is shown in Fig. 3.

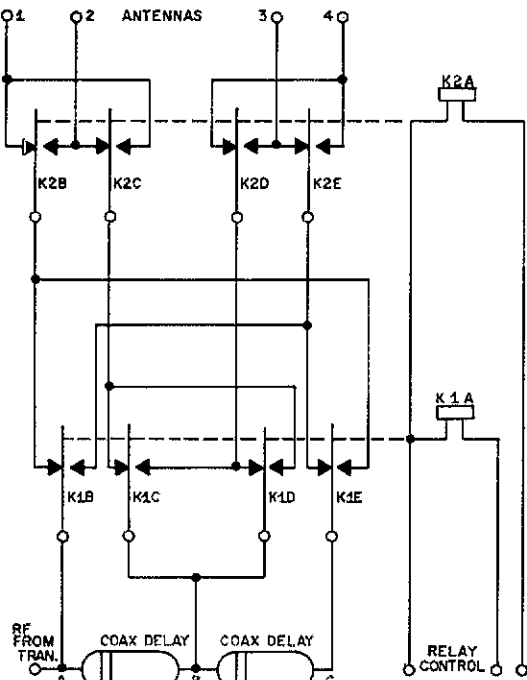


Fig. 3

Note that the incoming drive from the station transmitter, in undelayed form, A, is applied through the two 4pdt relays, K1A and K2A, to one antenna element (say, No. 1), a singly-delayed part B (about -130 degrees) is applied to elements 2 and 4, and a double-delayed part, C (about -260 degrees), is applied to element 3. Through proper excitation of the two relays this same excitation pattern can be moved around the square array, producing any one of four (diagonal) beams. The following chart explains how this is done.

Ry 1	Ry 2	Drive A	Dr. B	Dr. C	Beam Direction
off	off	No. 1	No. 2,4	No. 3	Toward No. 3
off	on	No. 2	No. 3,1	No. 4	No. 4
on	off	No. 3	No.4,2	No. 1	No. 1
on	on	No. 4	No. 1,3	No. 2	No. 2

The delay lines are made of series combinations of RG-8 (50 ohm) and RG-11 (70 ohm) cable to arrive at the correct delays, and also the correct impedances. It was found quite easy, although somewhat tedious, to arrive at the proper combination of cables. The big problem is to have a simple way of determining the currents and their phases, with relatively simple equipment. This task was solved by the use of a VTVM able to read 4-MHz rf voltages with reasonable (relative) accuracy, and the switch system of Fig. 4.

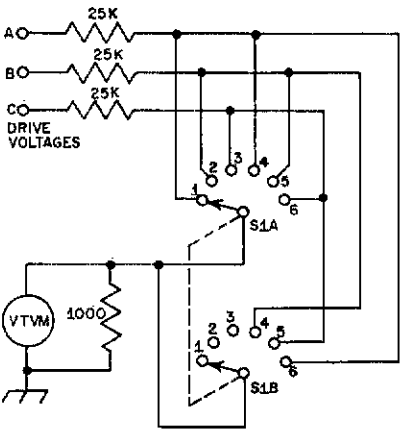


Fig. 4

There are six switch-selected positions connecting the VTVM to read a small sample of each of six selected voltages. All of these voltages are simple combinations of the drive voltages: the undelayed transmitter voltage, A; the singly-delayed voltage, B; and the doubly-delayed voltage, C. Remember that these voltages all appear (through the switch system of Fig. 3) at the inputs to the $\lambda/4$ connecting coaxial cables to the antenna elements, and can be directly related to the corresponding currents at the antenna elements themselves by the simple transmission line equation:

$$E = jIZ_0$$

where E is the input voltage,

I is the output current (antenna drive current)
 Z_0 is the characteristic impedance of the cable link.
 Therefore the system can be adjusted simply to the case where the voltages A, B, and C bear the same desired relationship as the currents specified earlier, namely:

- A = reference voltage
- B = amplitude A, phase -130 degrees
- C = amplitude A, phase -260 degrees

Referring to Fig. 4, it can be seen that the six

switch positions provide voltage readings as follows:

<u>Position</u>	<u>Voltage</u>
1	A
2	B
3	C
4	A + B
5	B + C
6	C + A

From these six readings it is quite easy to construct graphically the vector diagram of the three drive voltages A, B, and C. To do this, mark off graphically (at 0 degrees phase) vector A (magnitude = meter reading, switch-position 1) as shown in Fig. 5.

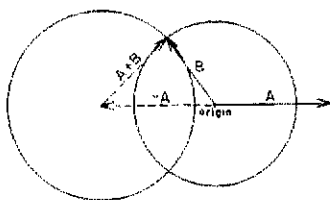


Fig. 5

From the origin draw a circle of radius B (locus of end of vector B), and from the end of vector -A (the image of vector A through the origin) draw a circle of radius A + B (also a locus of the end of vector B). The intersection of these two circles defines the vector B. Note that there are two possible intersections; choose the one consistent with the known (approximate) phase delay of B over A. In a similar fashion vector C can be located relative to B, and to check for consistency it can

also be determined relative to A. The author has found this procedure to be quite rapid, self-consistent, and accurate, usually defining the vectors to within 5 percent in amplitude and to a very few degrees in phase.

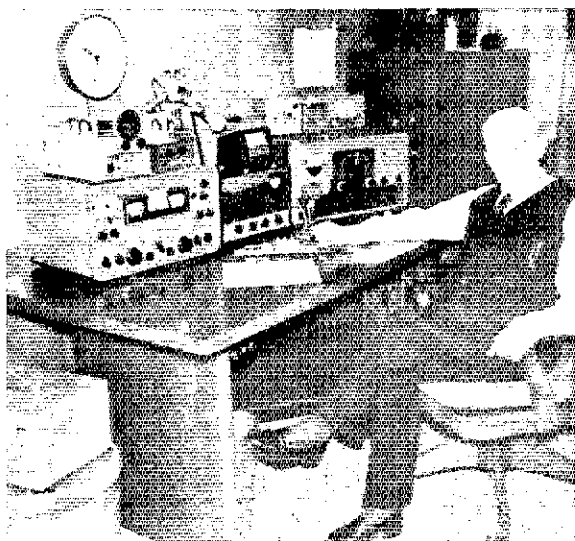
Using this procedure the drive voltages and phases were brought approximately to their desired values at a frequency of 3.8 MHz, and the array immediately demonstrated what the computer simulation had predicted, i.e., a pronounced diagonally-oriented beam with low side and back readings (typically down in practice 15 or more dB). The relatively good properties of the array, however, persist over only about ± 100 kHz due to (frequency-dependent) phase and impedance changes of the antenna elements. Some of the beam effect still persists down to 3.5 MHz, but for best performance at that frequency tuning readjustments really should be made.

Performance

The array has been in use for several years and has proved to be quite helpful especially in the reception of DX signals where the combination of low vertical angle radiation and horizontal directivity is particularly desirable. The transmitting effectiveness is also quite pronounced compared to a single vertical radiator, but is not generally quite as good as that from a single high inverted-V antenna recently erected. It is believed that this is entirely due to the relatively poor efficiency of the vertical array probably owing to insufficient grounding and lack of enough radials. For those who are either fortunate enough to be situated on high-conductivity ground, or who make the effort to provide exceptionally good grounding arrangements, this type of square array should prove to be a very effective performer.

QST

Strays



For the second straight year W4LHV has won a ham as a Christmas office party door prize.

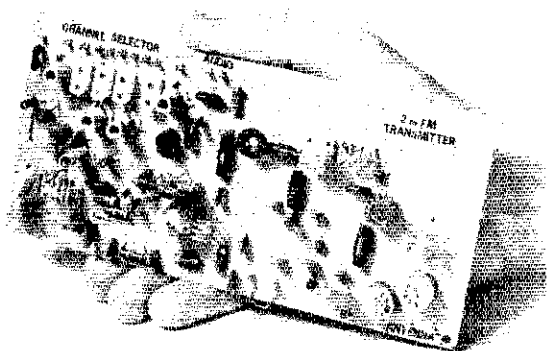
What's the elevation of the highest "home station" in the U.S.? WB0DBK's shack is at 11,200 ft. Any challengers?

After 40 years of operating with not more than 2-watts input, W4ZRJ has finally gone high power. He now has a new solid state transceiver running 5 watts input!

"CQ Kansas," a 5-minute program devoted to amateur radio and short wave listening, is broadcast each Saturday evening on radio station KFH (1330 kHz), Wichita, Kansas. The program host is KFH News Editor Mike McGee, WA0JPX.

Is W3SDX the oldest active amateur? Raymond received his Novice license at the age of 72 and became General class 10 months later. Now, at the age of 92, he is active on 6- and 2-meter phone and 15-meter cw.

Top view of the rf module showing its relative size. The crystal sockets and Vector push-in terminals for connection to the crystal switch are at the upper left. The coils near the crystal sockets are for adjusting the crystals to frequency. The oscillator is at the lower left, and the PA stage is at the far right. The small loop of wire at the lower center is a B-plus jumper.



An FM Pip-Squeak for 2 Meters

BY DOUG DeMAW,* WICER

WHETHER YOU'RE a would-be fm-er, or a person who has already explored the world of fm and repeaters, this little 2-watt solid-state transmitter can be the key to new operating enjoyment.

Those wishing to try fm for the first time can build this circuit-board project for a moderate outlay of "greenies," and the time required to assemble the transmitter is minimal enough to appeal to even the busiest of amateurs.

This little fellow has a sufficiently robust voice to provide good mobile service in most areas of fm activity, and it will serve well as a repeater "turner-oner" when used with a good outdoor antenna.

No need to scoff at the QRP aspect of this project, because here we have a piece of gear that can be operated from the 12-volt automotive system, a dry-battery pack (10 size-D flashlight batteries in series, or a 12-volt lantern battery), or a simple ac-operated 12-volt dc supply. This feature makes possible a variety of amateur applications, and noteworthy among them, emergency/portable operation.

RF Circuit

Four low-cost bipolar transistors are used in the circuit of Fig. 1. Q1 is the oscillator, which

*Technical Editor, QST.

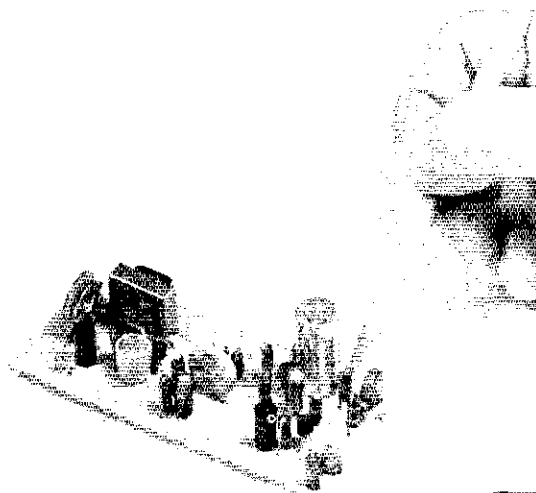
uses 18-MHz fundamental crystals ground for a load capacitance of 20 pF. Output from the first stage is taken at 73 MHz, a frequency multiplication of 5. The second stage, Q2, doubles the frequency to 146 MHz. The remaining stages operate as amplifiers at 146 MHz.

Frequency modulation is effected by applying audio to voltage-variable diode (Varicap) CR1. As the amplitude of the audio varies, the junction capacitance of CR1 changes, and this change pulls the crystal frequency above and below its preset frequency to provide fm. The amount of deviation, or swing, is determined by the audio level impressed across CR1. Normally, this will be set for 5- or 15-kHz deviation, depending upon the bandwidth in vogue for a given area. Approximately 1.5 volts of reverse bias is developed within the circuit and appears across CR1. This eliminates the need to provide back bias from the 12-volt line.¹

Crystals Y1 through Y4 are adjusted to the desired frequency by means of inductors L1 through L4. Approximately 1 kHz of shift is possible with the coil value given. If greater overall control of the frequency is desired, simply replace fixed-value capacitor C27 with an air trimmer of 30-pF maximum capacitance. Regulated voltage is supplied to Q1 (and to the bias

¹To establish a nominal value of varactor junction capacitance it is common practice to apply a few volts of reverse bias to the diode. This technique helps to assure a more linear change in capacitance when a sine wave is used to vary the capacitance of the diode.

Top view of the clipper/modulator board. The output transformer and deviation control are visible at the far left of the photo. A vertical mounting format is used when installing the resistors and capacitors. Electrolytics used in this model have their leads coming out one end to permit vertical mounting.



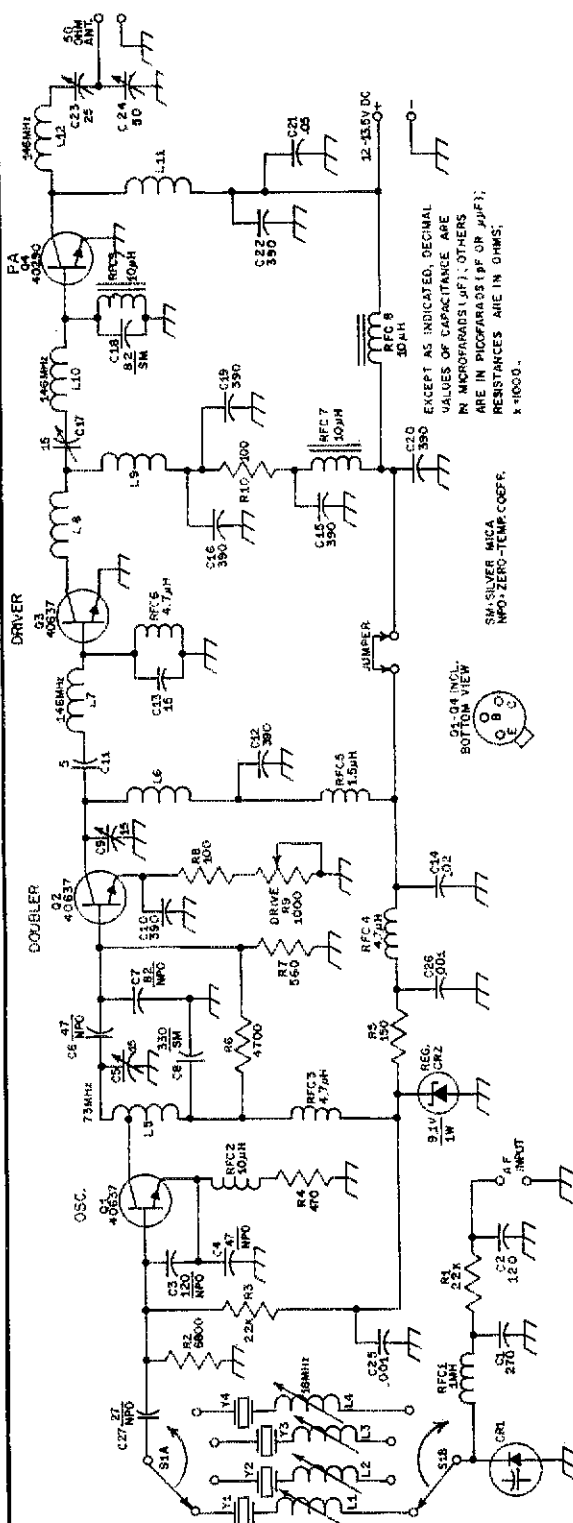


Fig. 1 — Schematic diagram of the rf section of the transmitter. Most of the parts are available from Allied Electronics (Catalog No. 710), Chicago, IL. Numbered components not given in the parts list are so labeled for circuit-board identification. Fixed-value capacitors are disk ceramic unless noted differently. Fixed-value resistors are 1/2-watt carbon.

- C5, C9, C17 — 1.7 to 14.1-pF pc-type air variable (Johnson 189-505-5). Compression trimmers or ceramic padders can be substituted.
- C24, C25 — Phenolic-base ceramic padder (Erie type 557 or equiv.). Cut off phenolic flange.
- C3, C4, C6, C7, C27 — NPO disk (Sprague N750).
- CR1 — Varicap diode, 82-pF nominal capacitance, 73.8 to 90.2-pF total range (Motorola MV839 or nearest equivalent).
- CR2 — Zener regulator diode (Motorola HEP-104 or equivalent).
- L1-L4, incl. — Pc-board variable inductor, 0.68-μH nominal (J. W. Miller 46A687CFC, J. W. Miller Co., 19070 Reyes Ave., Compton, CA 90221. Catalog available).
- L5 — 5 turns No. 16 bus wire, 5/16-in. i.d. X 5/8 in. long. Tap 1 1/2 turns from C5 and (1.1 μH).
- L6, L10 — 3 turns No. 16 bus wire, 5/16-in. i.d. X 1/2 in. long (.075 μH).
- L7, L8 — 6 turns No. 22 enam., close-wound, 1/4-in. dia. See text.
- L9 — 4 turns No. 22 enam., 1/2-in. dia., spaced to occupy 3/8 inch on form (.06 μH).
- L11 — 12 turns No. 22 enam., close-wound, 1/4-in. dia. (.0435 μH).
- L12 — 5 turns No. 16 bus wire, 5/16-in. i.d. X 1/2 in. long (0.14 μH).
- Q1-Q4, incl. — RCA bipolar transistor. Substitutes should have equal or higher voltage, wattage, and f_T ratings.
- R9 — 1000-ohm linear-taper pc-board carbon control (IRC type X-201, RT02B or equiv.).
- RFC1 — 1-mH pc-board rf choke (James Millen J302-1000).
- RFC2 — 10-μH molded rf choke (J. W. Miller 9310-36). See text.
- RFC3, RFC4, RFC6 — 4.7-μH molded rf choke (J. W. Miller 9310-28). See text.
- RFC5 — 1.5-μH molded rf choke (J. W. Miller 9310-16). See text.
- RFC7-RFC9, incl. — 10-μH low-Q rf choke. 4 turns No. 30 enam. wound on Amidon ferrite bead (Amidon Assoc., 12033 Otsego St., N. Hollywood, CA 91607).
- S1 — 2-pole, 4-position nonshorting phenolic or ceramic rotary switch.
- Y1-Y4, incl. — 18-MHz fundamental crystal cut for 20-pF load capacitance. International Crystal Co., .0025 percent commercial standard, F1-4 holder. High-accuracy .002-percent type preferred for best stability. FT-4 pc-board sockets used in this transmitter. Crystals from other manufacturers may work satisfactorily if ground for 20-pF load. (International Crystal Mfg., Inc. 10 North Lee, Oklahoma City, OK 73102)

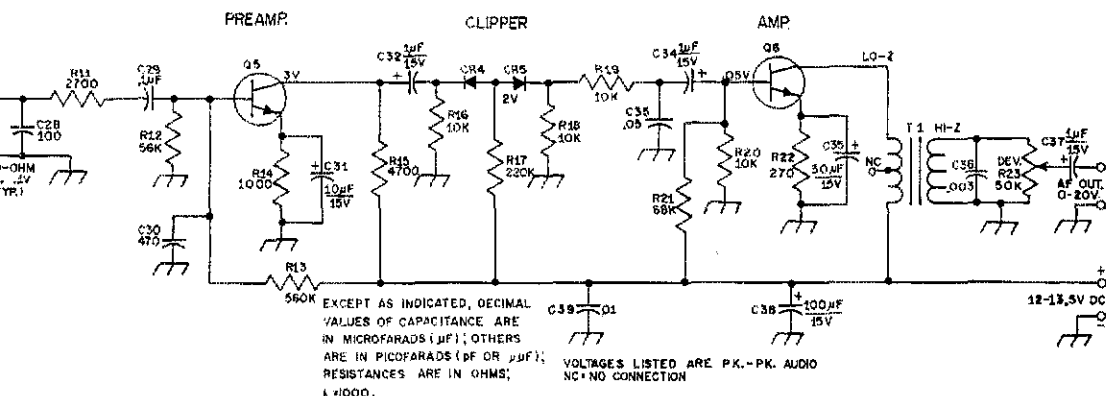


Fig. 2 - Schematic diagram of the clipper/modulator. Numbered components not listed below are for circuit-board identification. Capacitors are disk ceramic or paper. Polarized capacitors are electrolytic. Fixed-value resistors are 1/2-watt carbon.

CR3, CR4 - Silicon diode, 1N914 or top-hat rectifier suitable.

Q5, Q6 - Audio-type npn bipolar transistor, RCA 40231 or equivalent. Also, Motorola 2N4123 or MPS-A10 suitable.

R11 - See text.

R23 - 50,000-ohm linear-taper carbon control. Pc-board type 1RC X-201, R503B.

T1 - Miniature audio transformer, 10,000 ohm pri., 2000-ohm sec., c.t. not used. Radio Shack/Archer 273-1378 or equiv. Connect low-Z winding to Q6 collector.

10,000-ohm resistor and .01-μF capacitor used after the clipper diodes serve as a filter to reduce the harmonics caused during clipping. Output stage Q6 amplifies the clipped audio to a maximum level of 20 volts peak to peak. The deviation control, R23, is adjusted to provide the amount of frequency swing needed. A value of approximately 3 volts pk-pk is typical for 5-kHz deviation with the circuit of Fig. 1.

Construction Data

If you have built a commercial kit, you can assemble this transmitter easily. Circuit-board templates for the transmitter and modulator are available from ARRL for 25 cents and a large self-addressed, stamped envelope. A parts-placement overlay is included in the package.

Some of the inductors are wound on 1/4-inch diameter phenolic rod. Any low-loss rod material (Plexiglas or polystyrene) can be used, or, the coils can be wound on a 1/4-inch form, slipped off, and used as air-wound inductors. If this is done, put a drop of coil dope on each inductor to hold the turns in place. The large air-wound coils can be wound over a drill bit of appropriate size. Ferrite beads are used as cores for chokes RFC7, 8, and 9. Each choke has four turns of No. 30 enameled wire looped through its Amidon bead.³ The chokes, after being installed on the circuit board, are glued in place with china cement.

Glass-epoxy circuit board is recommended for the rf module. Low-cost phenolic board is suitable for the modulator. It is possible that a good grade of phenolic board would be acceptable for the rf strip, but this was not tried.

Heat sinks should be used on transistors Q3 and Q4. Small clip-on types are suitable. Wakefield Engineering Co. makes a wide variety of these devices. They are listed in most mail-order catalogs. Alternatively, homemade sinks can be made from 16-gauge aluminum or brass stock. (Information on making heat sinks is given in the construction chapter of recent editions of the ARRL Handbook.)

line of Q2) by means of Zener diode CR2. This measure helps insure against oscillator instability.

A drive control, R9, is connected in the emitter lead of Q2 to permit the operator to reduce power to the minimum amount needed. This measure helps to prolong the life of dry batteries during portable operation.

Some of the design ideas shown in Fig. 1 were borrowed from a surplus sonobuoy transmitter which provided good performance with a minimum number of stages. The tuned circuits serve as impedance-matching networks. The values shown here assure good efficiency and minimum spurious and harmonic output. Decoupling networks are included in the collector supply lines to further reduce the chance of spurious oscillations.²

The Modulator

Only a few peak-to-peak volts of audio are needed to provide fm. A two-stage audio channel is shown in Fig. 2. This circuit amplifies the microphone output to a suitable level for clipping at diodes CR3 and CR4. A small amount of forward bias is used on the diodes to permit clipping action at relatively low audio level. The

²It is common to encounter both vhf and low-frequency oscillations in transistor amplifiers if the dc leads to each stage are not decoupled. See QST, July 1970, p. 44.

³This type of inductor has low-Q characteristics, yet presents a high impedance at vhf. The low-Q feature aids stability by discouraging tuned-base-tuned-collector oscillation which might occur if high-Q chokes were used.

There is no reason why the builder cannot wind his own rf chokes for use in place of the encapsulated chokes listed in Fig. 1. A 1-watt 100K-ohm resistor body will do as the form. No. 26 or 28 enameled wire can be used to make up the inductance needed. The ARRL *L/C/F Calculator, Type A* can be utilized in combination with a dip meter to determine the correct number of turns. By connecting a low-value capacitor (5 or 10 pF) across the unknown inductance, then "grid-dipping" it, the resonant frequency can be checked against the inductance scale on the calculator to obtain the inductance value.

The transmitter can be housed in any metal box that suits the builder's fancy. The transmitter board measures 3 3/4 by 7 1/2 inches. The modulator dimensions are 1 3/4 by 4 1/2 inches.

Tuneup

Connect the modulator output to the audio input terminals on the transmitter board. Use shielded audio cable or small-diameter coax. Attach a No. 47 pilot lamp across the transmitter output jack. This will serve as a visual-indicator dummy load of approximately 50-ohms impedance. Adjust the drive control to nearly full resistance (low power). Plug in a crystal and apply +12 volts to the B-plus terminal of the transmitter module (negative lead to ground foil). Couple a wavemeter to L5 and adjust C5 for a maximum reading at 73 MHz.

The next step is to set the wavemeter for 146 MHz and couple it to tank coil L6. Tune C9 for maximum output indication. The same technique is used to adjust the tuned circuits of Q3 and Q4. Now, advance the drive control to obtain maximum power. The dummy load should light at this point. Retune each stage for maximum lamp brilliance. Alternately adjust the tune and load trimmers, C23 and C24, for maximum glow of the lamp. Normal operation should cause the lamp to light to full brightness or slightly more. At 13.5 volts one should be able to obtain above-normal lamp brilliance. Couple a wavemeter to the output tank and check for second-harmonic energy. Choose a setting for C23 and C24 that provides maximum rf output at 146 MHz with the lowest possible reading at the second harmonic. The wavemeter response at 293 MHz should be very low, but some energy will always be present.

Modulator Checkout

The circuit of Fig. 2 is designed for a low-impedance dynamic microphone (500 to 1000 ohms). If a high-impedance microphone is to be used, replace R11 with a 100,000-ohm unit. This will reduce the audio drive to Q5, thus preventing saturation of that stage. Also, the high-value resistor will give the high-impedance microphone a more suitable impedance to look into. Adjust R23 for the amount of deviation required. This can be done best by checking with another amateur who has an fm receiver of the desired bandwidth. The crystal can be rubbered to the

desired frequency by adjusting its series inductor. An on-the-air check by other fm amateurs can be useful during this step.

Final Comments

Some accessories for this transmitter will be described in subsequent issues of *QST*. Among the items being worked on is an SWR sensor/protective circuit, a 6- to 8-watt solid-state amplifier, and a mating solid-state high-performance fm receiver. Circuit-board templates will be offered, and the collection of modules will be ideal for construction of a complete fm transceiver.

Newcomers to fm should check locally to see what repeater frequencies are being utilized, then purchase crystals for use with that system. If no repeater is in use in your area, and if you plan to travel, crystals for 146.34 and 146.94 are the best bet since these are the national frequencies for 2-meter fm repeater use. There is considerable simplex (direct) activity in many regions on 146.94 MHz. Commercial-standard crystals should be ordered from a reputable manufacturer. "Rocks" of the high-accuracy, temperature-stable variety are used by this writer. Since crystal ovens aren't employed in this transmitter, high-quality crystals are preferable, especially for mobile operation.

A final word of caution: *Never operate this transmitter into a highly-reactive load.* The SWR should be no higher than 2:1 to prevent damage to PA stage Q4. The output circuit of Q4 is designed to work into a 50- to 75-ohm load.

Suitable substitutes for Q1, Q2, and Q3 are 2N4427 and 2N3866. A new RCA device, the 2N5913, is recommended as a substitute for Q4. In fact, this type was tried in the circuit of Fig. 1 and performed superbly. It is a rugged transistor that can tolerate severe mismatch without being damaged. The transistors called out in this article should be available from most industrial suppliers. If not, order them through your nearest RCA distributor. QST-

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Sorry, but no reprints of individual *QST* articles are available, nor are templates available unless *specifically* mentioned in the article.

• *Beginner and Novice*

A 10-Watt,

One-Tube

Transmitter

160 Through 20 – A Fun Project

BY LEWIS G. MCCOY,* WHCP AND
GUS WILSON,** WINPG

THE TRANSMITTER shown was designed with two objectives in mind: (1) to have good keying characteristics; and (2) to be as simple to duplicate as possible. The 6T9 is a dual tube consisting of a triode and a pentode. In this circuit the triode portion is the oscillator; the pentode half is the amplifier. While the rig is primarily for the Novice 80- or 40-meter operator, the transmitter will also work on 160 and 20 meters. Input power to the amplifier is on the order of 10 watts, and the measured rf output on the four bands is between 6 and 7 watts.

Circuit Details

A crystal-controlled Pierce oscillator circuit is used with the triode portion of the tube. Output from the oscillator is fed to the pentode section of the 6T9. A pi-network PA tank, designed to work into 50- to 70-ohm loads, is employed in the output of the transmitter. Plug-in coils are used to provide the desired band coverage. Fundamental-frequency crystals are required with the transmitter. When we use the term "fundamental" we mean that the crystal frequency is the same as the desired output frequency.

The transmitter will also cover 160 and 20 meters. We tried the rig on 15 meters but, unfortunately, all of the crystals we used produced a chirpy signal. Although there are plenty of such signals on the 15-meter band, we do not wish to add to the bedlam. Therefore, 15-meter operation is not recommended.

Cathode keying is used in the transmitter. When the cathodes of the 6T9 are opened by the key, no

current flows through the tube; consequently, no signal is generated. When the key is closed, the cathodes are grounded, the tube conducts, and a signal is generated and amplified. Components C4 and R1 work together as a filter which shapes the signal to eliminate clicks.

The power supply is shown in Fig. 1A. It uses a full-wave rectifier. Filtering is provided by C3, a 100- μ F capacitor. An alternate circuit for the power supply is shown at B. It uses a low-cost surplus transformer in a voltage-doubling circuit. The B-plus voltage is about the same with either circuit.

Getting The Parts

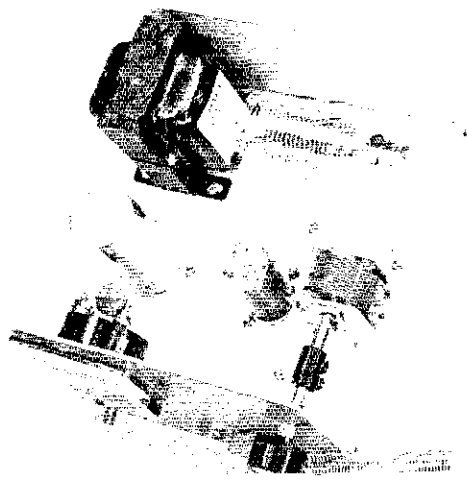
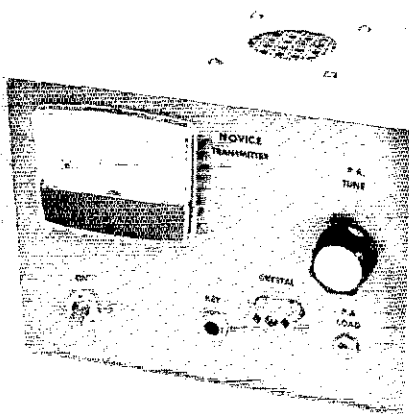
The biggest bugaboo in building gear these days is getting the parts. Even the best parts scrounger finds that it takes considerable searching for components for most projects. A recent article¹ covered this subject in some detail and it is recommended reading for anyone who likes to build his own gear. As to this particular

¹DeMaw, "The Ham Builder's Nightmare," QST, October 1970.

* Novice Editor

** Laboratory Technician, QST

The plug-in coil is at the upper right. The 6T9 and the plate tuning capacitor, C1, are immediately to the front of the coil.



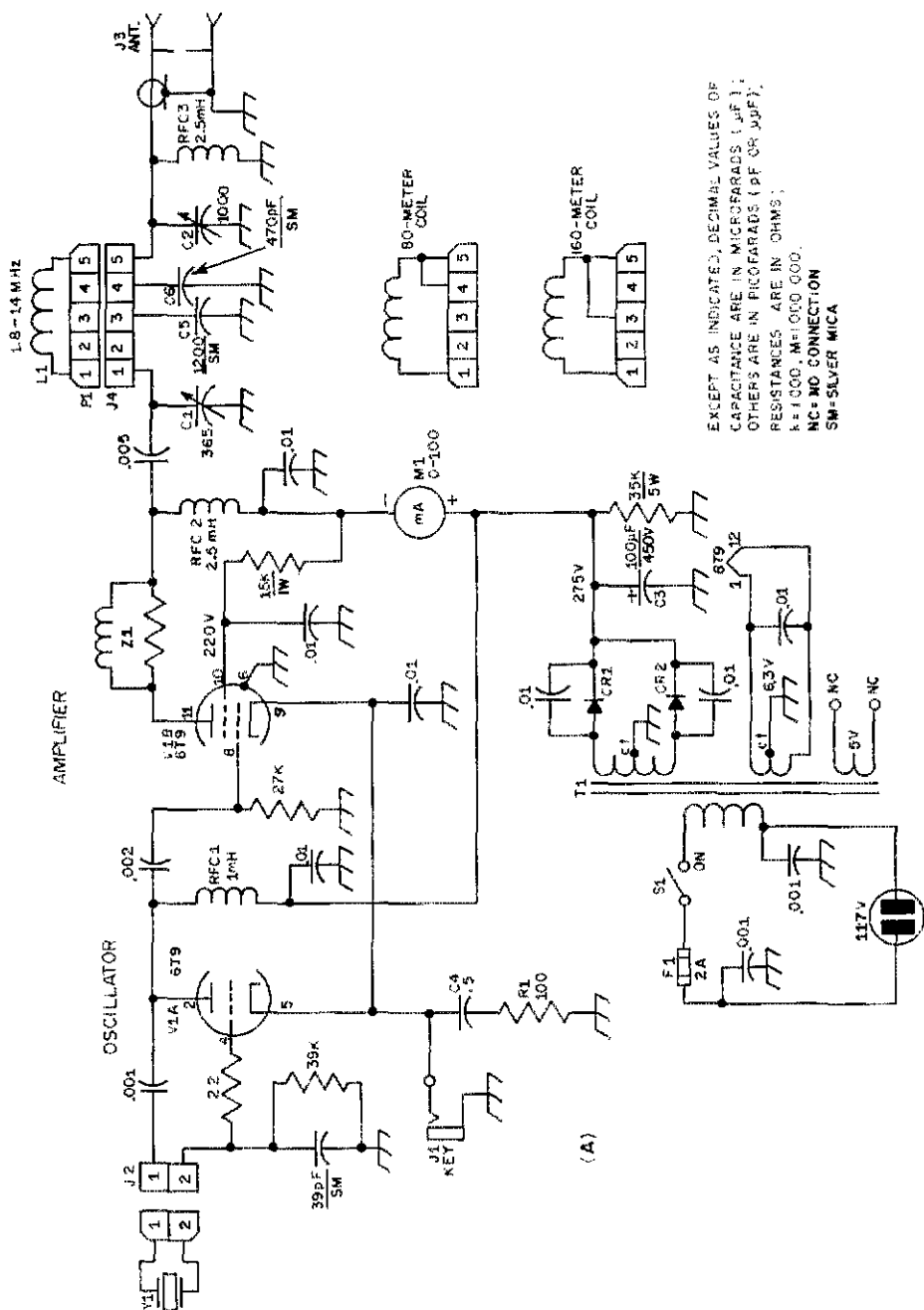
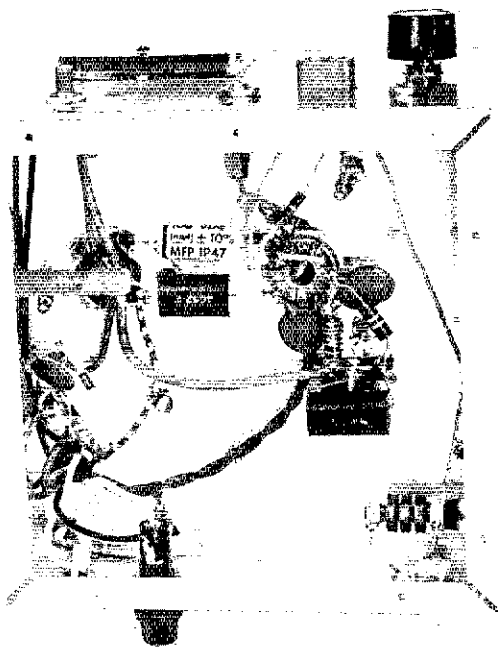


Fig. 1 - Circuit diagram of the 6T9 transmitter. Resistors are 1/2 watt unless otherwise stated. Capacitors marked with polarity are electrolytic. Shown at B is an alternate power supply circuit for use with the surplus power transformer T2 listed below.



This shows the component arrangement below deck. The power supply rectifiers are mounted on a terminal strip at the left. The tubular black units are rf chokes.

and C2 should bring the plate current up to about 40 mA at dip, and the lamp should light to nearly full brilliance. The transmitter is designed to work into 50- to 70-ohm loads, but slightly higher or lower impedances can be matched.

A simple antenna that will work with this rig is an end-fed wire. Make the antenna one-quarter wavelength long or an *odd* multiple of a quarter wavelength (65 feet on 80 meters, or 33 feet on 40 meters). Any odd multiple of a quarter wavelength will require low-impedance feed, and should work with the pi-network tank in the transmitter. Bring one end of the antenna directly to the output connection on the rig and install the other end of the antenna as high as possible. Ideally, however, the antenna should be a half-wave dipole cut for the band of operation, and erected as high above ground as possible. Alternatively, a center-fed Zepp antenna can be used with a tuner (Transmatch) to provide multiband operation with a single antenna. Information on numerous suitable antennas for the hf bands is given in *The ARRL Antenna Book*, and in *The ARRL Radio Amateur's Handbook*. The simple antenna described in the foregoing text may not provide optimum results.

In conclusion, many Novices may feel that they need more than 10 watts input to make contacts. Take our word for it, this little rig will provide plenty of long-haul action with practically any antenna system.

QST



March 1921

... Warner is obviously highly elated at the outcome of the recent Transcons. The boys really put on quite a show — lots of cooperation and good conditions. One message went from 1AW to the coast and an answer received in six and a half minutes. Key stations were 1AW, 9ZN, 5ZA, 6JD and 9LR. Real old timers remember them all.

... The UV 202 makes its appearance and it looks like we're all set to go cw. Also the 203 will be available in a few months. It is a re-design of the G.E. "U" tube. This may have been the CG1144.

... DeForest announces the Type OT-3 "Mid-get" radiophone and Clapp Eastham comes out with a double regenerative receiver. This has two complete tuning units, one for 200 meters and the other for 600.

... Philip Coursey, London, cables that no signals from us were received in England during recent transatlantic tests.

... We have a new department, "Calls Heard." In the January report 1AW, 1HAA and 2RK seem to dominate the list.

... There are ten pages of Operating News. I don't generally read this but note that Matty, 9ZN, handled 370 messages.

... Harry Copland, former R.A.F. pilot, flies to Florida from Maine. Hams along the way met him as he touched down and passed the word along to hams at the next stop. Harry had no rig but was 1OS.



March 1946

... We still do not have all our bands. K.B.W. writes at length on the difficulties of undoing the vast communications networks which sprang up during the war. The League is in close touch with developments and there is some hope that within a month all will be well once again. For the present, ten meters and such will have to do.

... Among many exciting wartime developments is the "Panadapter," a visual aid to amateur operation. Now that there is a relaxation of wartime restrictions, J. R. Popkin-Clurman, W2LNP, and B. Schlessel describe the device in considerable detail and tell how to use it and what it may be expected to do.

... My own impressions of the return to ham radio are in a short article titled, "The Opening of the Band."

... Ed Tilton, W1HDQ, has reason to suspect that we don't really have to have line-of-sight conditions to do pretty well on two meters. He describes numerous experiments with antennas, arrays and the like. He has proved that even "impossible" locations can be useful.

... Don Mix, W1TS, has a very extensive article on "A Low-Power 28-Mc Phone-C.W. Transmitter." The rig winds up with an 807 in the final. Complete with all necessary information, it is intended for the beginner on 10 meters. Lots of photographs and diagrams.

— W1ANA

Receiving FM

Basic Principles and New Circuits

Part 3

BY DOUGLAS A. BLAKESLEE,* W1K1K

Entertainment FM ICs

THE TV MANUFACTURERS represent a large potential market for IC producers. So, several limiter/detector/audio-preamplifier packages have been designed for use in entertainment products. Although developed for very wide-band fm detection (75-200 kHz deviation), these ICs are usable in amateur receivers. Design changes are necessary in a receiver to make up for the low level of recovered audio obtained when receiving 5- to 15-kHz deviation.

IC fm detector packages fall into two general categories. A typical IC from the first group requires an external transformer to accomplish the fm-to-a-m conversion. This unit consists of a multistage limiter, all of the components for a frequency discriminator except the transformer, and an audio preamp. A circuit example (using the RCA CA3043) is shown in Fig. 26A. Input sensitivity of this detector for 20 dB of quieting is about 100 μ V. A three-stage amplifier provides 80 dB of i-f gain. With an IC this "hot," parts positioning and circuit-board ground return paths become critical, if stability is to be maintained. A sample circuit-board layout for the CA3043, shown in Fig. 26B, provides proper ground returns.²¹

The limiter section of the '3043, Fig. 26C, consists of a differential amplifier, Q10 and Q11, fed from a constant-current source, Q12. Both inputs of the differential amplifier are used to insure equal limiting of the positive and negative signal excursions. Powering the "diff amp" from a current source that remains constant assures a "hard" limiting characteristic. A-m rejection is typically 60 dB when using the CA3043, an indication of the limiting ability of this monolithic IC.

The other approach to a TV fm detector also includes a multistage limiter but uses a *quadrature* or *envelope detector* to simplify the alignment task. A quadrature detector includes a phase detector, usually consisting of four to eight transistors which are part of the IC, and a phase-shift network comprised of an external LC circuit. A few esoteric models have been developed which use active components throughout and,

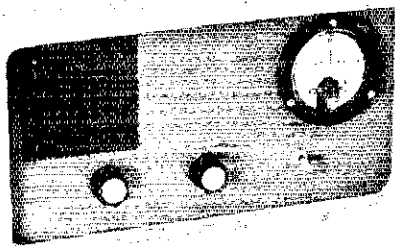


Fig. 25 — Front view of the complete receiver for 10-, 6-, or 2-meter fm. The unit is housed in an LMB 10 X 5 X 2-inch cabinet. Knobs are Kurz-Kasch S-748-1L. A description of this unit will appear in Part 4.

thus, require no external parts. The envelope detector, also known as the *differential peak detector*, is a newcomer which also utilizes an external LC circuit, as shown in Fig. 28A.²² Two peak-signal detectors are employed; the output of each is fed to a difference amplifier/combiner, providing linear fm to a-m conversion.

Quadrature and envelope fm detectors recover very little audio, even from wide-band signals. And, the amount of audio detected drops as deviation is decreased. A multistage audio preamplifier is included on the TV-type chips, providing about 20 dB of audio gain. Even with this preamplifier, however, high gain is required of the receiver audio amplifier. A breadboard version of the circuit (Fig. 28A) was constructed using a CA3076 i-f amplifier in addition to the CA3075 detector. Audio output from the detector measured 0.1 volt (after 25 dB of audio amplification within the IC) when detecting a signal having 15-kHz deviation. The '3075 circuit proved to be easy to work with and align. But, the '3076 was quite another matter, as this integrated circuit requires careful attention to ground-return paths if stable operation is to be achieved. The circuit-board foil pattern displayed in Fig. 28B is recommended. The first layout tried resulted in hf oscillation that could not be cured.

The PLL

Now that the *phase-locked loop* (PLL) has been reduced to a single IC package, this circuit is destined to revolutionize some facets of receiver design. The use of a PLL to find signals buried in noise²³ and to produce highly-stable, spurious-free hf oscillator signals²⁴ has previously been reported in *QST*. The complexity of the PLL has, no doubt, prevented a head-long rush by amateurs to experiment with this unusual circuit. However, the

²²Peterson, "High-Performance Integrated Circuits for High-Gain FM IF Systems," publication ST-4404, available RCA Commercial Engineering, Harrison, NJ 07029.

²³Burhans, "An I-F Tracking Filter for Weak-Signal Reception," *QST*, September, 1964.

²⁴Fischer, "An Engineer's Ham-Band Receiver," *QST*, March, 1970.

*Assistant Technical Editor, *QST*.

²¹Robe and Kaplan, "Design of High-Performance FM Receivers Using High-Gain Integrated-Circuit IF Amplifiers," publication ST-3373, available from RCA Commercial Engineering, Harrison, NJ 07029.

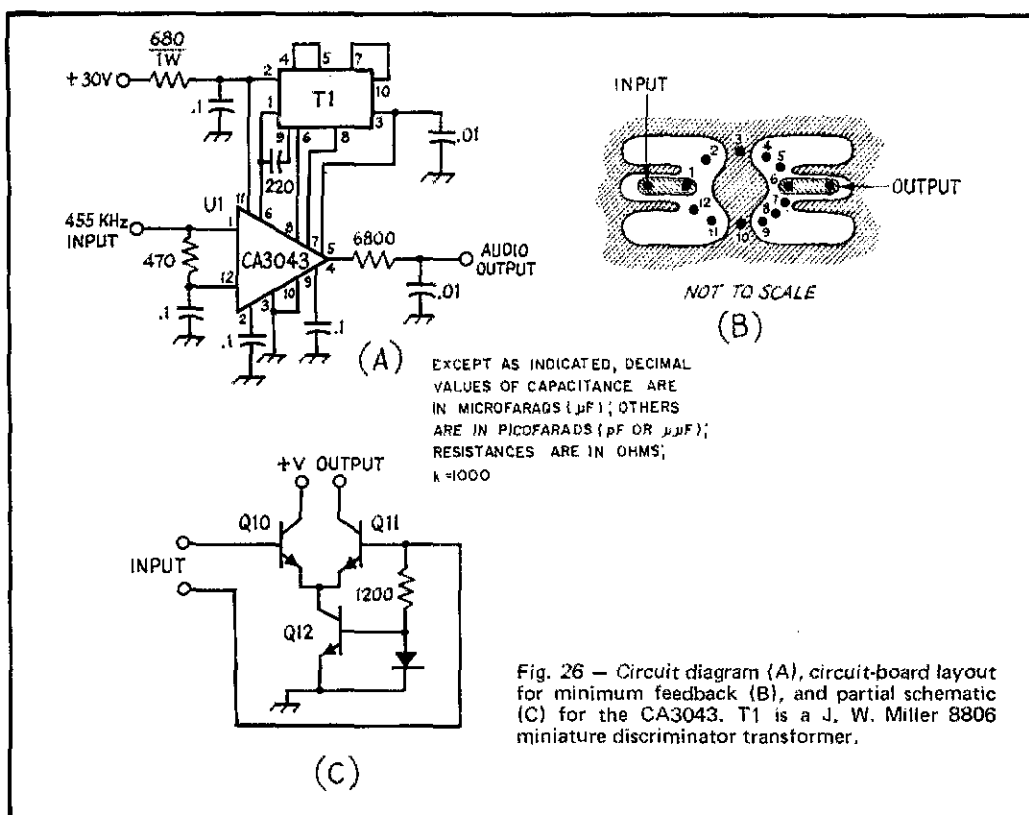


Fig. 26 — Circuit diagram (A), circuit-board layout for minimum feedback (B), and partial schematic (C) for the CA3043. T1 is a J. W. Miller 8806 miniature discriminator transformer.

introduction by Signetics²⁵ of a PLL in a single flat-pack IC, followed by Motorola and Fairchild (who are making the PLL in separate building-block ICs), allows a builder to get to work with a minimum of bother.

A basic phase-locked loop (Fig. 29) consists of a phase detector, a filter, a dc amplifier, and a voltage-controlled oscillator (VCO). The VCO runs at a frequency close to that of an incoming signal. The phase detector produces an error voltage if any difference in frequency exists between the VCO and the i-f signal. This error voltage is applied to the VCO. Any changes in the frequency of the incoming signal are sensed at the detector and the error voltage readjusts the VCO frequency so that it remains locked to the intermediate frequency. The bandwidth of the system is determined by a filter on the error-voltage line.

Because the error voltage is a copy of the audio variations originally used to shift the frequency of the transmitter, the PLL functions directly as an fm detector. The sensitivity achieved with the Signetics NE565 PLL is good — about 1 mV for

the circuit shown in Fig. 30. No transformers or tuned circuits are required. The PLL bandwidth is usually two to ten percent of the i-f for fm detection. Components R1-C1 set the VCO to near the desired frequency. C2 is the loop-filter capacitor which determines the capture range — that range of frequencies over which the loop will acquire lock with an input signal, initially starting out of lock. The equations for determining these component values are contained in Appendix B. The NE565 has an upper frequency limit of 500 kHz; for higher frequencies, the NE561, which is usable up to 30 MHz, can be employed.

For applications where both a narrow-lock range and a large output-voltage swing are required (the case when narrow-band fm is being demodulated) injecting a constant current into pin 8 of the NE565 will improve detector performance. This change, shown in Fig. 30B, will allow the VCO to track over a small frequency range while the control voltage will swing to near its maximum value.

²⁵Grebene, "A Monolithic Phase-Locked Signal Conditioner/Demodulator," Signetics Corporation, Sunnyvale, CA; Mattis and Camenzind, "A New Phase-Locked Loop with High Stability and Accuracy," Signetics Corporation, Sunnyvale, CA.

Fig. 27 — Breadboard version of the i-f amplifier using a KVG filter, CA3076 and CA3075.



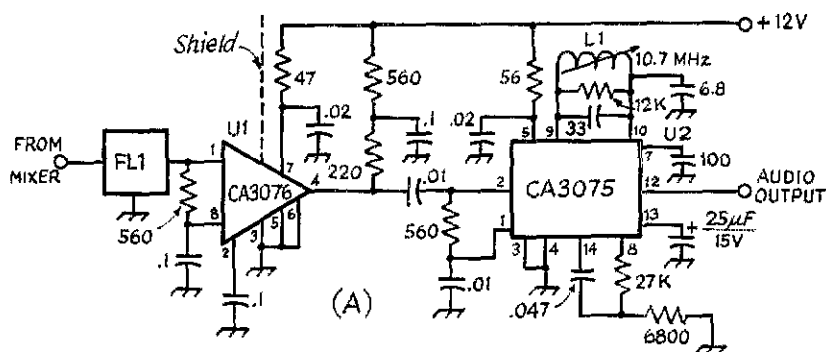
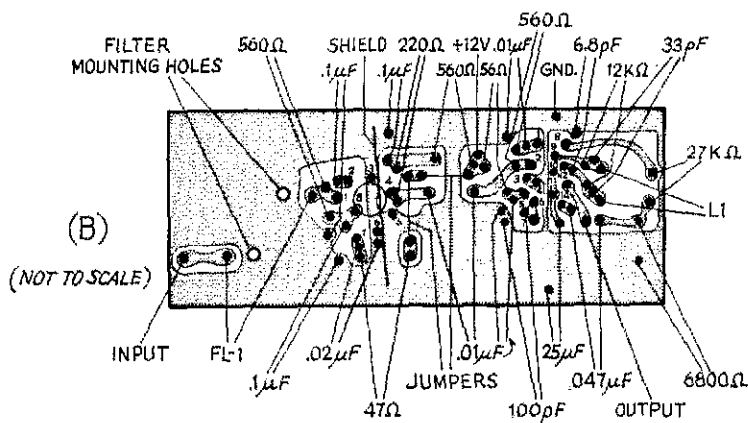


Fig. 28 - (A) Schematic diagram of the IC i-f amplifier/detector. L1 is a 4.24-5.20- μ H variable inductor (J. W. Miller 46A476CPC) and FL1 is a KVG XF-107B for narrow band, or XF-107C for wide band. (B) Circuit-board layout and parts placement.

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μ F); OTHERS ARE IN PICOFARADS (pF OR μ F); RESISTANCES ARE IN OHMS; k=1000, M=1000 000.



The other use of a phase-locked loop in fm reception is to generate the dozens of frequencies which are now in use by 2-meter fm enthusiasts. To equip a rig with crystals for all of the popular 146-MHz channels is expensive enough to warrant serious investigation of a PLL frequency synthesizer, which would require only one crystal. This subject is beyond the scope of this article, but readers wishing to experiment in this area will find basic design data and sample circuits in the manufacturers' application notes listed in Appendix C.

Squelch Considerations

Squelch circuits are generally classified as carrier operated and noise operated. Early commercial fm squelch designs used the noise-operated circuit, while later models in tube receivers combined the carrier- and noise-operated squelch in an effort to achieve extra sensitivity. Carrier signal levels were sensed by the voltage change produced across the grid-return resistor of

the limiter stage. However, the excellent quieting sensitivities of solid-state receivers have allowed a return to the noise-operated squelch, which can reliably be opened by a 0.1- μ V rf signal when the receiver designer employs the latest techniques.

A number of squelch circuits were described by Danz in *QST* for September 1969. All of the designs noted in this article, however, were intended for use with high-output detectors. Many of the newer detectors covered in Part II and Part III require a squelch circuit with high gain, such as shown in Fig. 31. Here, the output from the detector is split into two components by Q1, one of which is fed to the audio gate while the other is amplified by Q2. Only the noise component of the audio signal (frequencies above 5 KHz) is passed by L1C1 to the noise rectifier. The dc output of the noise rectifier is amplified by Q3. When noise is present, Q4 and Q5 will be held on by the output from Q3. When the receiver quiets, Q4 and Q5 will shut off, opening the audio gate. Duration of the squelch "tail" -- the length of time that the audio

Fig. 29 — Block diagram of a PLL demodulator.

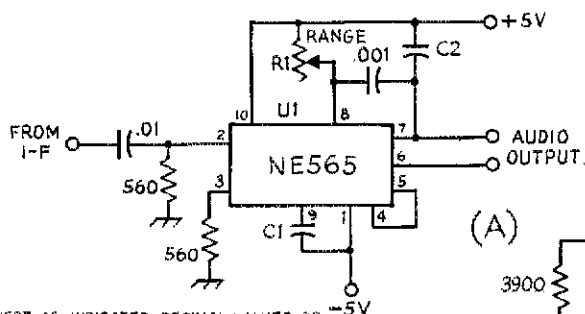
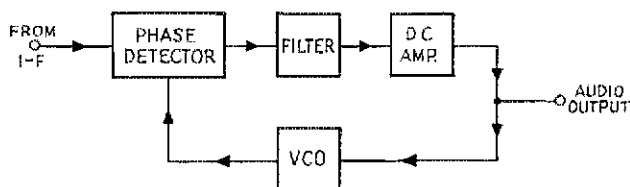
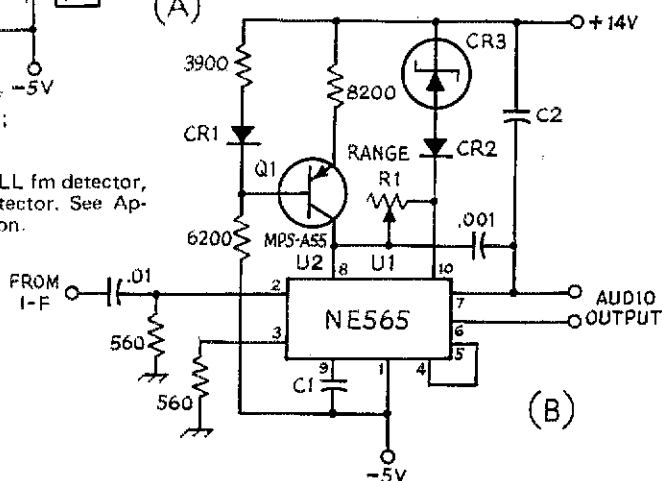


Fig. 30 — (A) Basic circuit of the PLL fm detector, and (B) improved narrow-band detector. See Appendix B for RC component selection.



AUDIO GATE

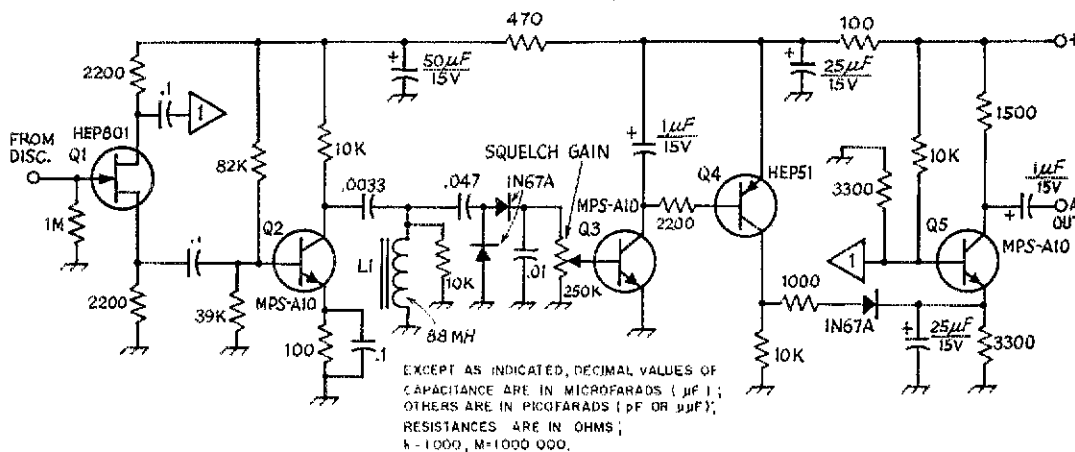
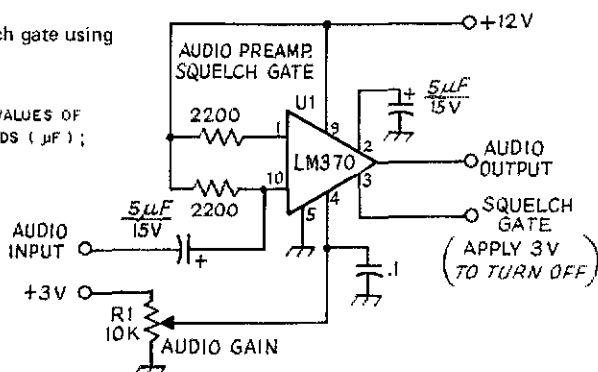


Fig. 31 --- Diagram of the high-sensitivity squelch. L1 is an 88-mH telephone loading coil.

Fig. 32 — An audio preamplifier/squelch gate using the LM370.

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); RESISTANCES ARE IN OHMS; $k = 1000$



gate remains open after the input signal disappears — is determined by C1.

The bandwidth of the noise amplifier does not have to be sharp — in fact, a broad frequency response is better. Manufacturers now tend to choose active RC circuits in place of more costly LC filters for tuning the noise-amplifier stage.²⁶ The design of RC active audio filters has recently been described in *QST* and *VHF Communications*,²⁷ but for amateur applications the ever-popular telephone loading coils can be employed.²⁸ Active filters can be constructed so that they take up very little space, but the toroid coils offer simplicity that is hard to beat.

For applications where high gain is required in both the squelch noise amplifier and audio preamp, a stereo preamp such as the RCA CA3048 and CA3053, Motorola HEP592, or GE PA239 can be employed. These ICs consist of two high-gain, wide-band audio amplifiers. One amplifier channel can be used as a tuned noise amplifier in the squelch circuit while the other section amplifies the audio signal. Another audio IC with obvious applications in fm receivers is the National Semiconductor LM370 (Fig. 32). Providing about 40 dB audio gain, the '370 has an electronic attenuator built in so that the gain of the device can be controlled by a dc voltage applied to pin 4.²⁹ This arrangement is ideal for trunk-mount rigs, as only dc voltage needs to be fed to the remote-control head. For squelch control of the preamp, a dc voltage (3 V) applied to pin 3 will attenuate the audio passing through the IC by 70 dB.

²⁶Giles and Paul, "Multiple-Frequency Reception with a Priority Channel," *IEEE Transactions on Vehicular Technology*, November, 1969.

²⁷Hayward, "An RC-Active Audio Filter for CW," *QST*, June, 1970. Schmitzer, "Active Audio Filters," *VHF Communications*, November, 1969.

²⁸See *QST* Ham Ads for sources.

²⁹Hirschfeld, "A Unique Monolithic AGC/Squelch Amplifier," publication AN-11, National Semiconductor Corporation, Santa Clara, CA.

FM Receiver Design

Until recently, fm receivers have followed the design shown in block-diagram form in Fig. 34. One or two rf amplifier stages and a double conversion frequency scheme were used. Greater band occupancy has inspired both commercial and amateur receiver designers to work on the dynamic range and strong-signal handling capabilities of fm receivers. As cross-modulation and overload effects are primarily caused by the rf amplifier and first mixer, a good deal of research has gone into the application of various solid-state devices for use in receiver front ends. The result of this work has been a vast improvement in fm receiver signal-handling capability.³⁰

Two devices, the FET and the hot-carrier diode, are responsible for the revolution in front-end circuits. Both devices can be operated to provide square-law response as mixers. The sensitivity of either type is such that the rf amplifier can be eliminated in many cases. Although the hot-carrier diode has been used by the amateur fraternity, the device hasn't been popular with fm receiver designers for two reasons. To insure linear mixing, the level of oscillator injection to a diode mixer must be at least 10 dB above the strongest signal to be received. Even with a balanced bridge of hot-carrier diodes, the power required from the local oscillator is considerable. Also, the diode mixer must be followed by a low-noise i-f preamplifier for best overall receiver noise figure.

³⁰McKee, "Receiver Intermodulation: Enforcing the Square Law," *IEEE Transactions on Vehicular Technology*, November, 1969.

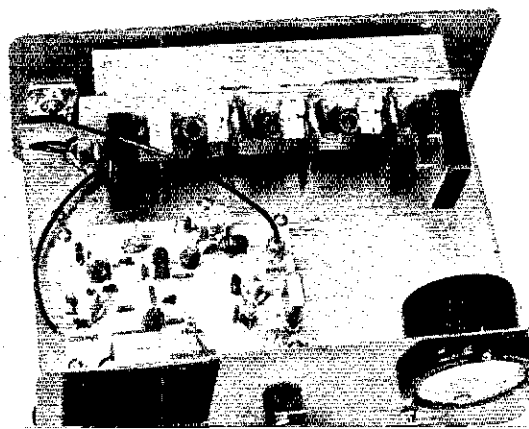
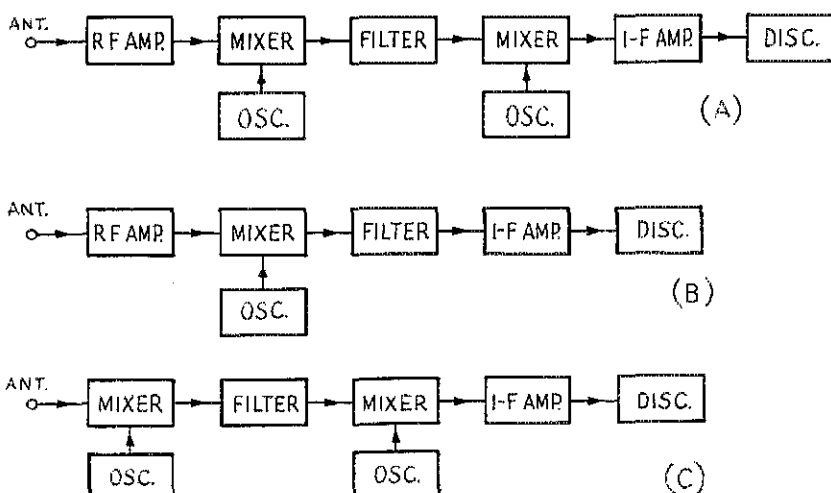


Fig. 33 — Top view of the receiver. The etched circuit board containing the front-end components is at the lower left, while the i-f amplifier/detector circuit board is bolted to the rear wall of the cabinet.



introducing a new area for cross-modulation effects to appear. FET devices exhibit a slightly better noise figure (by 1 to 3 dB), and thus, are usually chosen over hot-carrier diodes.

The first field-effect transistors to gain wide acceptance were the junction types (JFET). Though still the leader in the low-noise figure competition, the JFET also requires a rather large amount of power from the oscillator chain when used as a mixer. Early metal-oxide semiconductors (MOSFET) were easily damaged by static charges and voltage spikes, and were considered too delicate for mobile service. However, the development of the diode-protected dual-gate models has made the MOSFET as hardy as the bipolar transistor. Only one volt of oscillator injection is required to the high-impedance gate 2 of a typical dual-gate MOSFET mixer, which eliminates the injection level necessary for a JFET.

The designer has a choice of two basic approaches to the layout of a new fm receiver. He can use single conversion (Fig. 34B). But, to provide sufficient gain before the limiter, he must employ an i-f amplifier, and worse, use a bipolar-transistor mixer to achieve high conversion gain. Even with an rf amplifier stage, getting sufficient i-f gain with stability can be a problem. Alternatively, a dual-conversion scheme can be employed where sufficient overall gain can be obtained in the i-f stages. With this design, Fig. 34C, the rf stage can be eliminated if sufficient rf selectivity can be achieved before the first mixer, without seriously degrading the sensitivity of the receiver.

Appendix B

Design Equations for the NE565 Phase-Locked Loop

$$VCO \text{ free-running frequency } (f_0) \text{ in Hz} = \frac{1}{4R1C1}$$

(Note: R1 should be between 2000 and 20,000 ohms, with 4000 ohms about optimum.)

$$\text{Lock frequency range } (f_L) \text{ in Hz} = \pm \frac{8f_0}{V_{cc}}$$

$$\text{Capture range } (f_C) \approx \pm \frac{1}{2\pi} \frac{2f_L}{(3.6 \times 10^3)C2}$$

Fig. 34 — Block diagrams of the fm receiver designs discussed in the text.

Appendix C

For additional information on the design and construction of phase-locked loops, the following application notes, which are available without charge, present both the theory of and practical circuit designs for the PLL:

Signetics Corporation, 811 East Arques Avenue, Sunnyvale, CA 94086.

- 1) Grebene, "A Monolithic Phase-Locked Signal Conditioner/Demodulator."
- 2) "General Description of the NE560B/NE561B Phase Locked Loops," Application Memo D-66.
- 3) "A New Phase Locked Loop with High Stability and Accuracy," Applications Memo D-147.

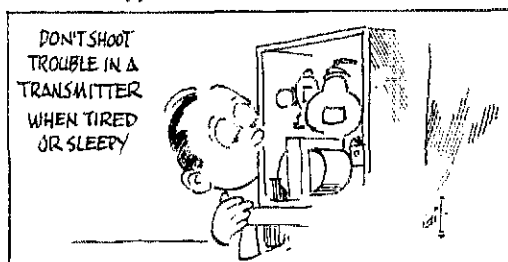
Motorola Semiconductor Products, Inc., Technical Information Service, Box 20912, Phoenix, AZ 85036.

- 1) "An Integrated Circuit Phase-Locked Loop Digital Frequency Synthesizer," AN-463.
- 2) "Phase-Locked Loop Design Fundamentals," AN-535.
- 3) "MTTL and MECL Avionics Digital Frequency Synthesizer," AN-532.
- 4) Nash, "Locking in on Phase-Locked Loops," *Motorola Monitor*, Vol. 8, No. 2, 1970.

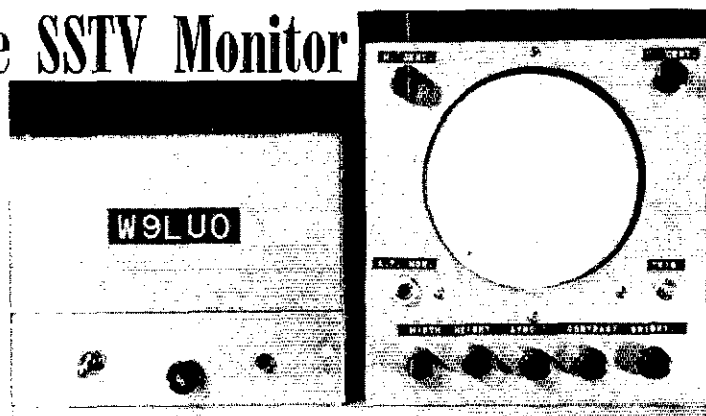
Fairchild Semiconductor, 313 Fairchild Drive, Mountain View, CA 94041.

- 1) "A Digital Frequency Synthesizer for an A-M and FM Receiver," TP-53.
- 2) "TV Receiver Tuning Systems of the Future," TP-52.
- 3) "A Navigation Receiver That Uses a Digital Frequency Synthesizer," APP-178.
- 4) "Frequency Synthesizer for a 27-MHz Citizens Band Transceiver," APP-144.

(Part 4 will appear in a future issue).



A Solid-State SSTV Monitor



BY ROBERT F. TSCHANNEN,* W9LUO

SLOW-SCAN TELEVISION presents an intrigue that is rapidly growing in popularity within the ham fraternity. While maintaining all of the DX potential available to conventional SSB transmission, it adds the facility of instantly transmitting picture information in the equivalent audio bandwidth used for voice transmission. Additionally, the pictures may be tape-recorded on a conventional audio tape recorder and played back any time.

The delightful feeling when first becoming acquainted with hf communications seems to repeat itself with the medium of slow-scan television. Many who have taken the route of conventional fast-scan television have found they are very lonesome when it comes to making contacts. This is not so with slow-scan, where activity and DX contacts are both realities.

One of the first items needed to begin in this field is a slow-scan monitor, such as the unit described here. The components are inexpensive and readily available.

Electrostatic vs. Magnetic Deflection

The pros and cons of electrostatic versus magnetic deflection are varied and many; however, a few general comparisons are interesting. Magnetically focused and deflected CRT's provide excellent resolution and may usually be operated at somewhat higher accelerating voltages than their electrostatic counterparts. The magnetically focused and deflected tubes require external components on the neck of the tube (yoke and focus coil); however, the deflection circuitry is ideally suited to being driven by solid state devices. Electrostatically-deflected tubes require no external components on the CRT, but need deflection voltages of several hundred volts peak-to-peak in order to produce a normal raster size on a 5-inch CRT. The sweep voltage necessary usually requires power-supply voltages from 400 to 600. Deflection is usually produced by vacuum-tube amplifiers

because solid-state amplifiers with adequate voltage capability are expensive. The approach used in the monitor described here is that of magnetic deflection and focus.

The Basic SSTV System

The SSTV system now used universally in amateur circles incorporates an fm-subcarrier audio channel. In this system an audio-subcarrier is modulated so as to deviate 1200 Hz during sync pulses, 1500 Hz at black level, and to a maximum of 2300 Hz at peak white. The shades of gray needed to constitute useful pictures are included in the 1500- to 2300-Hz region. Thus, at peak white the instantaneous frequency does not appreciably exceed that normally used for good voice communications. The signals are usually transmitted by modulating a conventional ssb transmitter with the fm subcarrier developed by a camera, flying-spot scanner, or recorded audio tape. When received on a conventional ssb receiver, the output signal is processed by the monitor to produce the slow-scan image.

Description of the SSTV Monitor Circuit

The monitor is simple, and consists of several limiters, a discriminator, sync and video detectors, video amplifier, and display CRT. The sync separator is followed by one-shot (monostable) multivibrators, discharge circuits, and deflection circuits. A power supply provides several different operating potentials and uses a pulse high-voltage system.

Here is a solid-state, magnetically deflected SSTV monitor that provides good picture quality and stable performance. The monitor utilizes a low-cost surplus 5FP7 CRT and a pulse-type high-voltage power supply that minimizes shock hazard.

*354 North Stewart Ave., Lombard, IL 60148

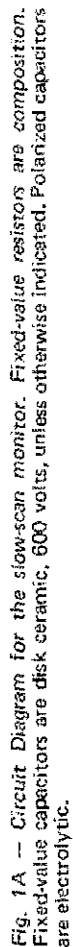
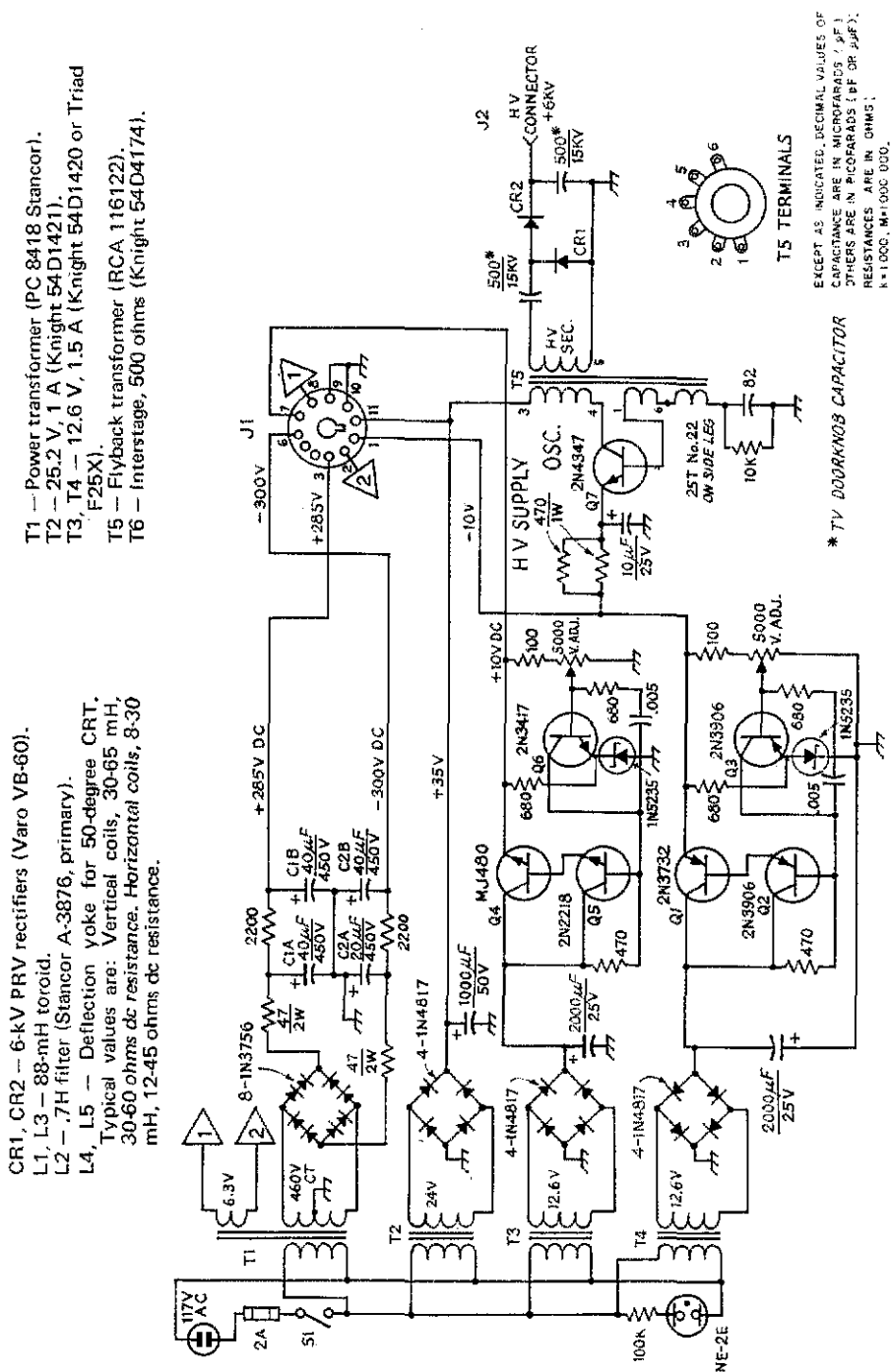


Fig. 1A — Circuit Diagram for the slow-scan monitor. Fixed-value resistors are composition. Fixed-value capacitors are disk ceramic, 600 volts, unless otherwise indicated. Polarized capacitors are electrolytic.

Fig. 1B — Circuit diagram of the power supply.



The circuits may be understood by referring to Figs. 1A and 1B. Transistors Q1 and Q2 provide limiting of any amplitude variations which may be present on the signal. The emitter follower, Q3, drives a simple discriminator that consists only of a parallel-resonant circuit. An fm-subcarrier input to the circuit results in a subcarrier output which is amplitude modulated. The signal splits at the output of the discriminator and is detected by two separate full-wave detector systems. (Note that full-wave detection doubles the subcarrier frequency, permitting more effective filtering of the video and sync signals from the subcarrier.)

The video detector output passes through a low-pass filter, and the video amplifier, before reaching the CRT. (It should be noted that dc coupling is used from the video detector to the CRT, and also that direct coupling is used all the way from the limiter through the sync amplifier, and through all of the deflection circuits.)

The sync system is designed to provide good performance in the presence of noise and other undesired signals. The 1200-Hz bursts which appear across the 1200-Hz tuned circuit in the collector of Q6 drive the full-wave sync detector and the sync clipper. Only peaks of the detected signal forward-bias Q8 so that sync pulses and unfiltered subcarrier appear at the collector of Q8. Separate horizontal and vertical integrators provide clean sync pulses to the two integrated-circuit monostable multivibrators. These multivibrators provide the discharge pulses from which the sawtooth sweeps are derived. The sync level control in the emitter of Q6 permits the operator to adjust the clipping level, in the event he has to cope with some unusual type of interference. In general the control can be set and left alone.

Early in the study of on-the-air performance of the monitor, I found that good noise immunity could be obtained only if direct coupling was retained throughout the sync and deflection system. For example, if additional charging paths are present in the sweep-generation system there will be a tendency for the trace to take several sweeps to stabilize after a burst of noise or interference. This condition is intolerable, particularly in the vertical deflection circuit where several sweeps would require a total time of 16 or more seconds. The 2- and 10- μ F capacitors shown in the discharge circuits must be tantalum or paper types.

The conventional aluminum electrolytic capacitor in this application has too much leakage.

The principle of operation of the horizontal and vertical sweeps is the same. The output of the monostable multivibrator provides a positive pulse. The tantalum timing capacitors charge until a positive pulse drives the discharge transistors, Q10 and Q16, into high conduction. This immediately discharges the capacitor and the process begins again. A sawtooth wave is, of course, the result. The junction FET transistors, Q11 and Q17, present high impedances at their inputs and do not discharge the sawtooth forming capacitors via their input circuits. By setting the operating point of the FET, centering of the trace is achieved. This scheme is simple and does not degrade the sweep linearity when used within the normal range of centering.

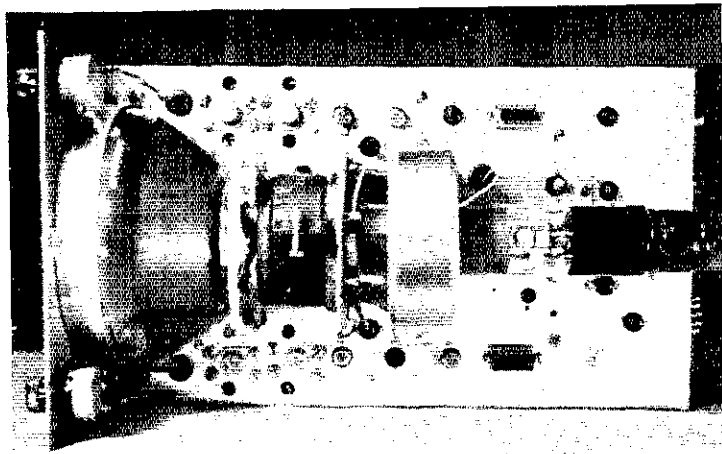
Complementary-symmetry transistors in the output system provide a convenient means of maintaining dc balance through the deflection coils. The two diodes permit both output stages to remain in conduction during the "overlap" region near the center of sweep. In other words, an offset bias between the two transistors is provided so that neither of the two transistors will cease conduction before the other takes over.

Deflection Yokes and Focus Coils

A variety of deflection yokes can be accommodated in a circuit of this type. The 5FP7 tube has a deflection angle of 50 degrees and therefore the preferred yoke should at least closely match the contour of the glass envelope. However, 70-degree yokes have been used with good success. The 50-degree yokes are available from old TV sets using CRTs of the 10BP4 or 12KP4 type. The 70-degree yokes are of the type used with picture tube types such as 17CP4, 161P4, 16RP4, 14EP4, etc. Several types of radars which made use of the 5FP7 tube are good sources for the yoke and focus-coil assembly.

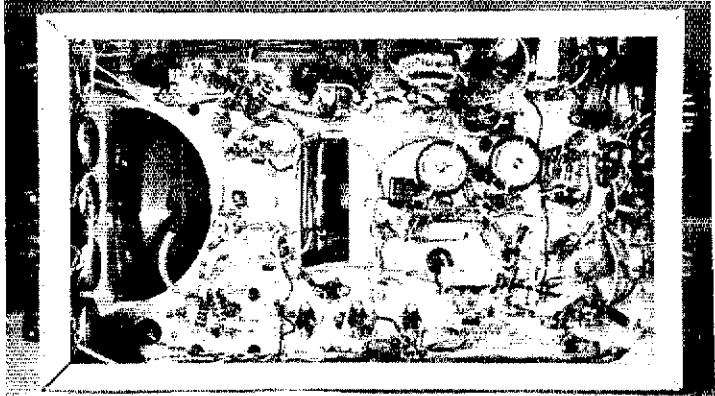
The focus coil used in the author's model is a Syntronic¹ Type F10. Also satisfactory for this application are units such as the "Focalizer" magnetic focus assembly made by Quam-Nichols. This type of unit was used in many early magnetically-focused TV receivers.

¹Syntronic Instruments, 100 Industrial Road, Addison, Illinois 60101.



Top view of the monitor showing the parts placement.

Bottom view of the slow-scan monitor showing the cutout for the CRT.



Power Supply

Many monitor units utilizing vacuum tubes have incorporated 60-Hz high-voltage power supplies that are lethal in nature because of the large amount of energy stored in the filter capacitor. The self-oscillating pulse-type supply used here permits operation in the 12- to 15-kHz region. This high operating frequency permits the use of small capacitors for adequate filtering. A flyback transformer from a solid-state television is readily adapted to the self-oscillating circuit. The only modification required is the addition of a few turns of wire on the side leg of the transformer. A solid-state doubler provides an output of approximately 6 kV.

Low-Voltage Power Supply Systems

Several voltage sources are required for operation of the monitor. The supplies of plus and minus 10 volts are stabilized by a simple regulator system. A 35-volt supply is used to operate the pulse high-voltage oscillator. Another bridge circuit provides plus and minus voltages on the order of 300 volts, which supplies the CRT and discharge circuits. The low-voltage supplies are conventional in design and use readily-available transformers.

Mechanical Details

Both the monitor and power supply chassis are 12 x 7 x 3-inch aluminum. A flat panel with CRT cutout is mounted on the front of the monitor chassis. A protective shield is used to cover the power-supply chassis. Eleven-pin connectors are used on each end of the low-voltage power cable and a separate cable is used for the high voltage.

The use of individual chassis for power supply and monitor is advisable since stray 60-Hz fields must be minimized. Several transformers are used in the power supply and it is desirable to have the flexibility of removing stray fields from the display device.

Adjustment

The design is such that if components for the tuned circuits are selected with reasonably close tolerance, very few adjustments will be required. The essential item needed in the adjustment is a SSTV signal. It is suggested that a tape-recorded SSTV signal be used, making it possible to replay the material as often as needed. The sync-level control is adjusted so that clean horizontal and vertical pulses are obtained at the outputs of Q9 and Q15. These pulses should be free of subcarrier. The pulse at Q9, of course, will appear only once in about 8 seconds. Clean positive-going pulses should also appear at terminal 6 of each of the integrated circuits.

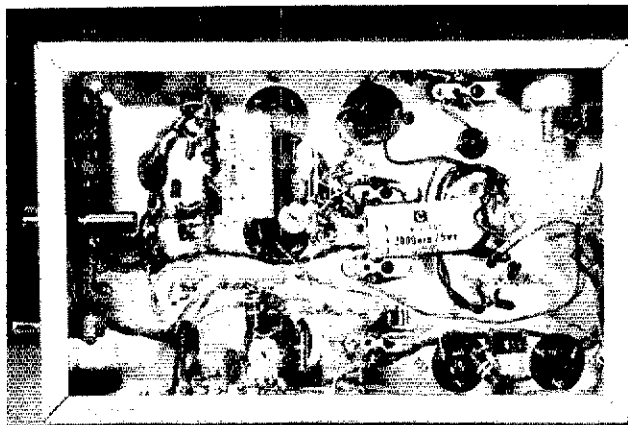
The height, width, and centering controls should be adjusted for a square raster centered on the face of the 5FP7. If excessive height and width are obtained, resistive loading across the horizontal and vertical yoke coils may be used. Starting values will be of the order of 10 to 15 ohms.

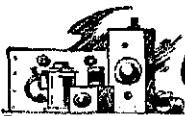
Conclusion

The slow-scan monitor described provides a stable, cool-operating, reliable monitor constructed from readily-available low-cost components and a surplus CRT and yoke.

QST

Underneath view of the power supply.





A Field-Day AC-Power Monitor

An Inexpensive Frequency and Voltage Indicator

BY JERRY HALL,* K1PLP

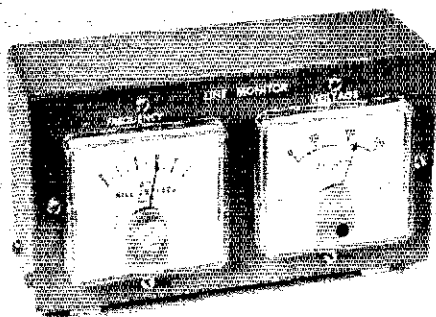
HERE'S A gadget that will be especially useful on Field Day outings or, for that matter, any place where portable ac power generators are put to use. In fact, the device is even handy to have in the ham shack if one wants to keep an eye on the power-line frequency and voltage.

The voltage indicator is a 0- to 150-volt ac meter. The frequency-indicating portion of the circuit uses a pulse-counting detector and a 0- to 1-mA meter. The frequency indication is virtually independent of the voltage amplitude for values above 50 volts, and when calibrated at 60 Hz its frequency accuracy in the range of 50 to 70 Hz is within one Hz or better, depending on the linearity of the basic movement.

The Circuit

The schematic diagram of the complete monitor is given in Fig. 1. M1, connected directly across the line, meters the voltage. In the frequency-measuring part of the circuit CR1 and CR2 are Zener diodes connected back-to-back. During the peak of a cycle of the line voltage waveform, depending on the polarity, one diode is forward-biased and will conduct. At this time the other diode, through its avalanche action, will conduct current in the same direction but will regulate the voltage at its rated value, 15 volts. R1 is the voltage-dropping resistor. As the polarity of the line voltage reverses, so does the action of the two diodes, and 15 volts across the pair is developed in the opposite polarity. The resultant voltage at point A in the circuit is almost a square wave. Its frequency is the same as that at the input, and the amplitude is 30-V pk-pk (15 volts from zero in each direction, positive and negative). C1 and R2 differentiate this signal to form positive

* Assistant Technical Editor, QST.



The frequency and voltage monitor. The device was connected to the commercial power line when this photograph was made. Parallax creates an apparent error in the meter indications shown.

and negative pulses at point B. These pulses are rectified in the full-wave bridge rectifier and the direct current delivered by the rectifier is metered by M2. R3 is used to calibrate M2.

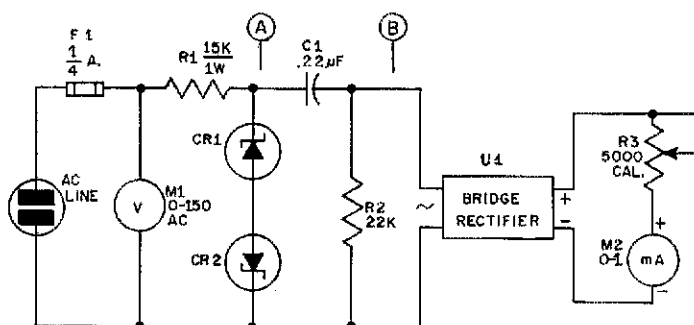
As the frequency increases, the number of rectified pulses per second increases, causing M2 to read higher. Conversely, a lower frequency produces a lower reading. The time constant for the differentiating circuit takes into account the loading imposed by the rectifier bridge and the milliammeter, and was chosen for a maximum frequency of 100 Hz.

Construction

Perhaps suitable meters, the most expensive items in the instrument, are available to the prospective builder from his surplus-parts box. But if everything must be purchased new, the cost can be held below \$16.00 even if a metal chassis box is purchased. By changing the values of C1, R2 and R3 from those shown in Fig. 1, almost any sensitive meter may be used for M2. However, a

The front-panel assembly of the monitor contains the complete circuit. During construction the two meters are first mounted on the front panel, and then a circuit board having a pattern and component layout to mate with the four meter terminals is mounted at the back of the meters. R1 and C1 are prominent at the near center of the board, with F1 visible at the left.

Fig. 1 — Circuit diagram of the ac power monitor. Resistances are in ohms, k = 1000. Components not listed below are for text reference.



- C1 — Mylar.
 CR1, CR2 — 15-V 500-mW Zener diode, 1N5245 or equiv.
 F1 — Pigtail or clip mounted.
 M1 — 0-150V ac (Shurite model 850 or equiv.).
 M2 — 0-1mA dc (Shurite model 850 or equiv.).
 R2 — 1/2W.
 R3 — Linear taper, low wattage. (Mallory type MTC 53L1 or equiv. may be used for circuit-board mounting.)
 U1 — Full-wave rectifier bridge, 50-V (Motorola MDA 920-2, HEP 175, or equiv.). Four silicon diodes of the same rating may be used instead, if connected in the full-wave bridge configuration.

meter having a 0-1 scale on the face makes it easy to obtain a direct-reading frequency indication, with 100 Hz represented by a full-scale reading. As shown in one of the photographs, an etched circuit board may be used to mount the parts, the board itself being mounted directly at the meter terminals. However, many other construction techniques are suitable. No particular precautions

are necessary in the construction except that for safety reasons care should be taken to keep all parts of the circuit isolated from any metal enclosure which may be used.

Adjustment and Use

The frequency meter may be calibrated from the commercial power line. Connect the instrument to the line and, while being careful not to touch any portion of the circuit, adjust R3 for a reading of 0.6 mA to indicate a frequency of 60 Hz. That's all there is to it!

When calibrated in this manner, even with the inexpensive meter shown in the photographs, accuracy of the frequency calibration was within 5 percent when compared with an electronic counter over the range of 20 to 100 Hz. Voltage excursions from 50 to 150 volts changed the indication on M2 by less than the needle's width. With an instrument such as this in use next Field Day, you'll *know* whether or not your generator is putting out the right voltage and frequency for your amateur equipment. QST

Strays

Beginning with the Spring 1971 edition, the *Radio Amateur Callbook* will also publish a supplement, available to those subscribers who have purchased the preceding issue and would like to update their directory without purchasing a complete new book. Continuance will depend on public response. Supplements will contain all new licenses, silent keys, as well as call letter, class and address changes that have taken place since the preceding issue of the *Callbook*.

Feedback

In *QST* for February 1971, page 19, Fig. 17, the correct transformers are Miller 8807 for T1 and T2, Miller 8806 for T3.

Photographs for the Eldorado frequency meters (Recent Equipment, *QST*, February, 1971), became switched accidentally at makeup time. On page 52, the photograph of the model 225 counter appears at the bottom of the page, while the model 1650 counter is shown at the top.

The caption on page 54 of January *QST* ("CW Communications for the Deaf") says that the CODE-COM set is for use by the blind. Actually, the device is designed for use by the deaf-blind.

Stolen Equipment:

The following was stolen from an American Red Cross truck in Wichita, Kansas: Drake R-4B receiver, Serial 11125G; T-4XB transmitter 16428R; Gonset Communicator II; and Gonset 2M VHF power amplifier. Anyone with information concerning this equipment is requested to contact the Wichita Police Dept., 115 E. William, Wichita, KA 67201, telephone 316-262-2611.

The following was stolen at Yonkers, N.Y. on January 2: RCA Personafone 150, Serial 20898, Model CPC J 1 PNH. Inscribed on the backplate was "PC PD 61." Information should be forwarded to the Penn Central Railroad Police Department, Metropolitan Region — Room 1750, 15 Vanderbilt Ave., New York, NY 10017, c/o Donald J. Parker, WB2FAK, Sergeant of Police, Shield No. 140.

A "Star Roamer" receiver was stolen from WB9CKG's car on January 9. The unit has no serial no.; however, the broadcast band was uncalibrated, the tuning coils were bent, and there were many scratches on the front panel. Anyone with information contact Richard Leitermann, 1847 Ludington Ave., Wauwatosa, WI 53226.

The ATR-166—A Homemade Transceiver for the 160- to 6-Meter Bands—Part 2

BY WILLIAM J. HALL,* K1RPB

AS MENTIONED before, it doesn't take an engineering laboratory to build a complex piece of equipment. The basic shack tools plus a few borrowed items can turn the trick nicely. All purchased parts should be ordered at the same time so that assembly can proceed without interruption. Once the parts are in hand, the sailing should be quite smooth. All of the planning is done and the builder is essentially putting together a custom kit.

Shielding

The first step in preparing the chassis is to mount the shielding. The detailed drawing that was previously prepared (see Part 1 of this article) is used to locate and fabricate the No. 20-gauge aluminum or brass sheet stock shields. This layout is reproduced in Fig. 5. In cutting each piece of shielding to size, be sure to include an additional 1/2 inch on each butting edge. The extra length is bent at a 90-degree angle as a mounting flange. There really isn't much of a trick to bending sheet metal. This is done by scoring the sheet metal with a hacksaw blade or can opener along the bending line. The bending is done in a vise or over the edge of the work bench. The bends should always be made with the scoring line on the inside of the bend. If the score is on the outside corner, the bend can crack.

A 1/2- or 3/8-inch grommet hole should be drilled in the shielding corners or near-butt flanges. This will provide access for power and switch wiring. Connections carrying rf should be made through 1/8-inch holes in the shielding. Only shielded coupling cables should be routed through the power access holes. Again, the location of these holes can best be determined during the planning stages of the project. All of the compartment shielding must be mounted before proceeding to the next step. Some 6-32 hardware is used for this purpose. With all the shielding in place, the chassis is punched, drilled and cut to the plan drawings. Tube sockets, controls, power relays and the power supply components are then mounted.

Power Supply

Consider the power supply as a wholly separate substructure of the transceiver. All of its components are mounted within its own compartment, except for S1, S3, S4, the RF GAIN control and the CW GAIN control, which are mounted on the front panel. S2 allows you to turn on the filament supply for the VFO which runs continuously, if desired. A number of terminal strips are bolted to the compartment shielding and

Part 1 of this article described the design features of K1RPB's transceiver and discussed the planning that needs to be done prior to starting the actual construction work. Part II covers the fabrication and alignment of the unit.

are used as output terminals. Each lug should be marked or identified clearly to aid in making subsequent connections. Once the power supply is built, it should be tested thoroughly. Each terminal voltage should be measured to see if it agrees with the values indicated on the schematic diagram, Fig. 2 in Part I.

Front Panel

Holes for the controls, switches, and the dial are cut in the front panel according to the planned layout. Special care must be taken in drilling the bottom row of control shaft holes to make sure they correspond with the midline of the front lip of the chassis. At this time the controls and dial are mounted on the panel, and the panel is mounted to the chassis. A pair of side-panel brackets is used to add rigidity to the assembly. S3 and S4 can now be hooked up along with the RF GAIN and CW GAIN controls. Again, the system voltages are checked out before proceeding.

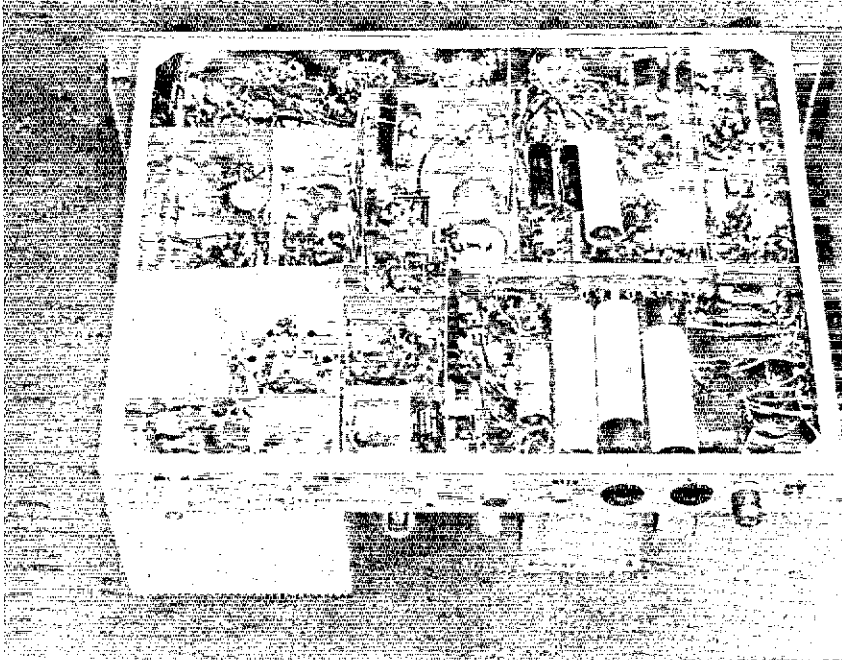
VFO

The heart of the ATR-166 is, of course, the VFO. The circuit is basically a Hartley type tuned to 2.5 MHz in the grid/cathode circuit. This frequency is doubled in the output tank to give the desired 5-MHz signal. The design concept of tuning the input to half the desired output is a trick clearly spelled out in the *ARRL Handbook*. The author learned about it the hard way. If the input and output of a VFO are tuned to the same frequency, excessive pulling can occur when tuning the output tank. Any variation in the load to the VFO can have a similar effect. Doubling in this stage usually eliminates these problems.

The VFO is constructed in a homemade, heavy-gauge 4-inch-cube aluminum box, mounted on four 3-inch aluminum pillars. The box is made in the same manner as the shielding discussed previously. The grid inductor, L12, is closely-wound No. 22 wire on a high-quality 3/4-inch slug-tuned ceramic coil form. Several coats of marine varnish are applied to rigidly fix the wire to the form. A frequency-shift network (additional inductance) is diode switched into the circuit to compensate for the difference in frequency between the lower- and upper-sideband crystals in the balanced modulator. Without this network, a

*Prospect Hill Road, Brimfield, MA 01010.

Fig. 4 — Underside view of the transceiver. Details on the fabrication and assembly of the shielding is given in the text.



3-kHz shift in transceiver frequency would occur when changing sidebands. A 1-pF trimmer capacitor is used in the grid circuit to adjust the calibration of the dial; a standard subminiature tuning capacitor, with all but one set of the stator and rotor plates removed, does the job.

Another feature of the VFO is the use of dc voltage as the filament supply for the 6AU6. This little refinement virtually eliminates 60-Hz fm — often heard on the transmitted and received signals when using a hot-cathode oscillator. The most critical components of the VFO are, of course the tuning capacitor and the dial drive. The tuning capacitor must be of the double-bearing type and of high-quality construction. Direct coupling to the dial is not recommended. A better scheme is to use fine-toothed Boston gears with at least a 3:2 reduction ratio. In this way, only the mid portion of the capacitor range is used, and end-effects are minimized.

On completing the VFO construction, the assembly is mounted on the chassis and positioned to assure solid meshing of the gear teeth. Power and signal leads are brought out through a grommet in the bottom of the enclosure, and connected through S6 back to the power supply. The dial is set so that the plates of the tuning capacitor are about 3/4 meshed. With power applied, a wire probe (connected to a receiver antenna terminal) is held close to the 6AU6. The receiver should be tuned to approximately 5 MHz. Once the signal is located, L12 should be adjusted so that the VFO output is as close to 5 MHz as possible. L14 is then peaked to provide maximum output. On completing the transceiver, the VFO is given a final "touch up."

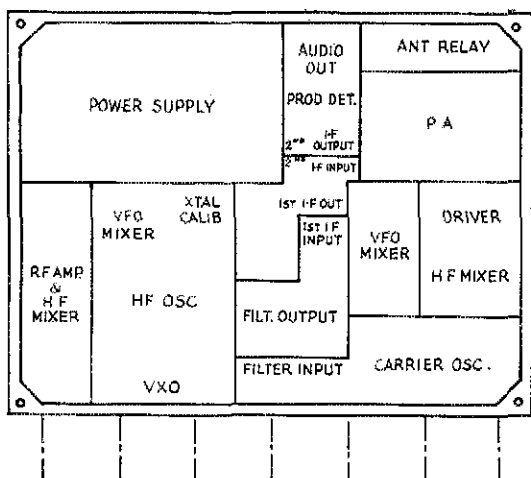
Receiver

The plan of attack with the ATR-166 was to begin the major wiring in the receiver section first.

Beginning with the audio output stage, work progressed forward toward the antenna input. This method has the advantage of allowing the builder to test each stage as it is completed.

V10, the 6AQ5 audio output stage, is first wired in. Power is turned on, and the grid (pins 1 and 7) is probed with a source of audio voltage. Lacking a signal generator, the author used a bit of the 6.3 filament voltage and touched it to the grid pin. A loud buzz in the speaker assured that the stage was working. V9B, the audio preamplifier, is similarly checked out. Here, an insulated screwdriver touched to the grid pin can provide the test signal. The detector, V9A, is wired with the cathode connected to S5 as indicated in the schematic diagram. The switch is placed in the A-M position to test the detector and i-f amplifiers. V8, the second i-f, is then wired. The output circuit of this stage must be completely isolated from the input. This is done with a shield which is placed across the middle of the tube socket. The output coil, L9, is mounted inside an empty i-f can and located above the chassis. With the detector and second i-f powered up, these stages can be tested. A short piece of insulated wire (2/10 ft) is connected to the grid (pin) of V8. If everything is working well, one should be able to hear 3.4-MHz signals coming in. Actually, it's quite a thrilling moment. At this time, a 3.4-MHz signal from a grid dipper should be loosely coupled to the grid lead, and the output coil (L9) peaked up. The first i-f amplifier, V7, is wired to the control relays, K1 and K2, and tested in the same manner. With this stage running, i-f signals will be considerably stronger.

At this point, the cw, ssb and a-m crystal filters are wired in through S5. Next, V16, the 7360 balanced modulator, is installed. Considerable care must be taken in winding L19 to assure good balance in the output of this stage. The oscillator



function of this circuit only is tested at this time. A wire connected to the antenna terminal of a receiver tuned to 3.39 MHz is capacitively coupled to the cathode of V9A. With the power on, a clear signal will be heard when S8 is switched in the LSB and USB positions.

This concept of building, then testing, applies to the VFO mixer, V3A. Here, an 8.4-MHz signal is applied to the grid lead with the grid dipper, and should again result in an audible signal in the speaker. The hf mixer, V2, is wired but cannot be checked out until the first subassembly, the hf oscillator, is put together. For the sake of example, 20-meter operation will be assumed.

The hf-oscillator module is constructed inside a Vector C 10N 8-pin plug-in assembly. A piece of 10-mil thick brass shim stock (or piece cut from a tin can) is mounted on the standoff post and soldered to the lugs on same post. The bottom skirt is soldered to pins 1 and 4 of the octal plug, and pin 8 of the miniature socket is soldered to the top of the shielding. Holes are drilled to mount inductors L4 and L5. All grounding connections are made directly to the shielding. On completion, the input and output circuits are grid-dipped to

Fig. 5 — Shielding arrangement on the bottom side of the chassis.

22.9 MHz. The octal socket mounted on the chassis is wired, and the hf-oscillator module plugged in. Again, a general-coverage receiver, tuned to 22.9 MHz, can be used to detect the oscillator output. If no signal is found, the slug in L4 is adjusted until the circuit goes into oscillation. L5 is then peaked for maximum output. At this time a 14.5-MHz signal, applied to the grid of V2, the hf mixer, should result in an audible signal in the ATR-166 speaker.

The rf-amplifier module is constructed in much the same manner as the hf oscillator. Inductors L2 and L3 must be peaked after the module is plugged in. The preselector capacitor, C10, is set at about 20-percent of mesh. A 14.5-MHz signal from the dipper can be used for testing. Construction of the 100-kHz calibrator, and wiring of the rf amplifier input to the antenna T-R relay, completes the construction of the receiver section.

Transmitter

The transmitter construction is in a forward direction: beginning at the speech amplifier, proceed up to the PA. An auxiliary receiver comes in handy for testing, when fitted with a signal probe made from a piece of coax. A small 2 to 3-turn loop is soldered on one end of the line, and the other end is connected to the receiver input.

Wiring of the speech amplifier and balanced modulator is completed up to and including hookup of L19 and L20. The rig is turned on (with S6 in the closed position) and the test receiver tuned to 3.4 MHz. S8 is switched to the upper or lower sideband position. A carrier will be heard in the receiver when the probe is brought near L19. With a microphone plugged into the ATR-166, and the MIKE GAIN turned up, speaking into the mike should produce a clean a-in signal. Balancing the 7360 comes later.

V17, the ssb amplifier and cw oscillator, is installed and connected through the filters and the first i-f amplifier. With the receiver probe near L10, the ATR-166 is turned on with S8 and S5 in the CW position, and S6 is closed. The 32-pf trimmer across the cw oscillator crystal is adjusted for maximum output. S8 and S5 are then placed in the upper and lower sideband positions, respectively, and the carrier is balanced out with the 5000-ohm BALANCE CONTROL R8, and the 15-pf differential capacitor across L19. The crystal frequencies can now be set properly on the slope

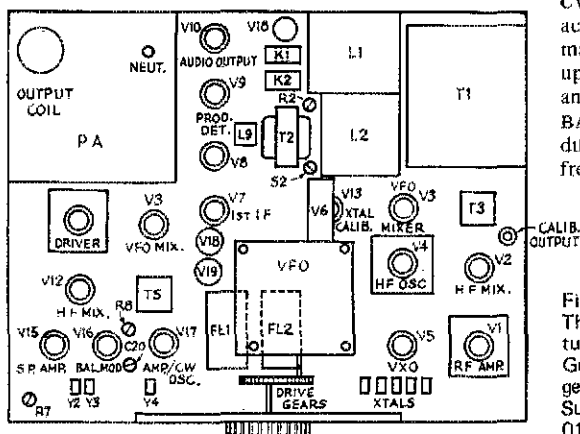


Fig. 6 — Chassis layout for K1RPB's transceiver. The gears used to couple the dial to the VFO tuning capacitor are manufactured by the Boston Gear Works, part Nos. G-142 and G-145. These gears are available from Standard Industrial Supply, 154 Wayside Ave., Springfield, Mass. 01089 or any Boston Gear distributor.

the crystal to lower its frequency. If the reverse is true, the upper-sideband crystal frequency should be brought down with the trimmer. After the crystal frequencies have been set properly, the CARRIER-BALANCE control is again adjusted for a null.

Neutralizing the final amplifier is the last adjustment required on the transmitter. The power source to the plate and screen of the PA is temporarily disconnected. A 50-ohm composition resistor is placed across the antenna terminals, and the probe from the receiver is coupled to this dummy load. The ATR-166 is turned on and keyed in the cw position. A signal will be heard at 14.5 MHz in the receiver, and the TUNING capacitor should be set for minimum signal. The neutralizing capacitor, C21, is adjusted with a short insulated screwdriver until the signal to the receiver is minimum. Then the dummy load can be disconnected and the power to the plate and screen circuits reconnected.

Calibrating the VFO requires a great deal of patience. First, it should be said that the VFO tunes backwards. That is, when the plates are meshed, (output = 5.0 MHz) the transceiver is tuned to the high (14.5-MHz end of the band and vice versa). The crystal calibrator is used as a frequency marker. The proper amount of band set and bandspread are established with L12 and the 25-pF trimmer capacitor. Tuning through the range, the reader will probably note that the scale is compressed at the lower end of the band. This can be corrected by carefully filing the rotor plates

March 1971

Technical Correspondence

MORE ON THE "FIVE FOR FIVE" ANTENNA

Technical Editor, *QST*:

Regarding the "Five For Five" article in *QST*,¹ let the unwary not be led astray by the statement in the last paragraph, "The antenna hasn't been tried on 10 meters, it might even work there too." It certainly won't work with the present feed system as shown in the article.

The reason it works on 21 MHz as shown is because the quarter-wave bazooka balun stub is $3/8\lambda$ long at 21,260 kHz, and the capacitive reactance of the stub tends to cancel the inductive reactance at the feedpoints on this frequency. Use of RG-11/U instead of RG-8/U coax as originally shown should give a lower SWR on both the 14-MHz and 21-MHz bands. RG-8/U was used because that was the only feed line available here when the beam was put up. I didn't worry about the small SWR because my home-built linear amplifier has variable input and output capacitors in the pi network, along with a continuously-variable rotary inductor. This permits the amplifier to be loaded properly with no ill effects. (Most commercial amplifiers designed for a 50-ohm load only give little leeway in this respect.) However, on the 10-meter band the bazooka stub is a half wavelength, a direct rf short circuit across the feed points for 28 MHz.

Antenna charts seem to indicate that the beam as built would have some gain and directivity on the 10-meter band. The spacing would be 0.2λ and the phasing 270 degrees. To try for 3-band operation the antenna would have to be straight coax-fed (preferably with RG-11/U) without the bazooka balun and then through a Transmatch at the transmitter end of the line. An open-wire feed line and an antenna tuner would be even more preferable.

Another version of this little beam is being built to go up this spring. It will have open-wire feed line for the elements instead of 300-ohm Twin-Lead, and homemade 4-conductor open-wire feed line from the antenna to the antenna tuner. The writer would be interested in hearing from anyone who tries this beam on all three bands with tuned feed lines. — J. E. Kear, K4MI, 2401 E. Fourth St., Greenville, NC 27834.

IMPROVISE AND SAVE MONEY

Technical Editor, *QST*:

I really enjoyed the article in *QST* about "The Ham Builder's Nightmare."² I think you have left out a few things in the article though. I am a ham with a very limited budget. I have to improvise an awful lot. Here are some ideas to make more parts available (I mean the *make* literally).

You left out the obvious by not saying that you can parallel resistors and capacitors to get the needed value. Parts that exceed the voltage and current ratings can also be used. In other words,

¹Kear, "Five For Five," *QST*, January, 1971.
²DeMaw, "The Ham Builder's Nightmare," *QST*, October, 1970.

make use of your formulas for series and parallel resistors, capacitors, and inductors. [Doesn't everyone do this? — Editor.]

I would hate to try to list the things I have used for coil forms but here are a few suggestions: spools, bobbins, dowel rods, hair rollers, shotgun shells, ball-point pens, mailing tubes, and bolts (these may even wind nicely if threaded). I have used nuts as forms for toroid coils (they come in so many sizes they can be used in quite a few places, and they don't break when dropped). 1-f transformers yield a good batch of coil forms, both slug-tuned and not. The insulation of the inner conductor of coax is good coil-form material too.

Here are some guide lines for capacitor use. Frequency-determining circuits should use NPO ceramic, mica, or silver-mica capacitors for good stability. Below 100 MHz bypass capacitors can be almost any type that will take the voltage. Unless you need to pass ac or rf power, blocking capacitors can be almost any type too. Moreover, the value of the capacitors (in all but the frequency-determining circuits) can vary as much as 20 to 100 percent on the high side. Power supplies can be filtered by capacitors which are as much as 20 percent low to 400 percent high.

The list of money-saving ideas can be extended by remembering you can alter parts. Capacitors that are ceramic can be cut or chipped to remove some of the ceramic in order to make them smaller in capacitance. For fine changing, sandpaper can be used. This applies to composition resistors, too. Variable capacitors can be made to have less capacitance by taking out plates. Meters that have a limited range can usually be extended in range with meter shunts made from toaster or heater elements. This Nichrome does not take solder, so use crimp connectors. Meter shunts may be made from magnet or insulated hookup wire if a low resistance is necessary. It sometimes takes only 4 or 5 inches of wire to do the job. Of course a voltmeter may be extended in range by using series multiplier resistors.

Tank coils can be made with No. 14 wire or copper tubing. Silver plating can be done by using silver chloride (1 part), cream of tartar (2 parts) and table salt (2 parts), made into a paste. Clean the metal first. Put on the paste, rub it into the metal, and wipe it off. Spray with clear lacquer. Be careful in vhf and uhf work, though, because the lacquer may add some capacitance, and can degrade the dielectric properties of a component.

Now for those who must order parts for projects, here are some hints. Check with places that are going out of business for one reason or another; parts can be found really cheap in many cases. But be prepared to take a whole group. They may not all be useful immediately, but may prove invaluable at a later date. This same thing applies to obsolete stock. A merchant may be willing to part with it for a fraction of the original cost. In other words, keep stocking your junk box.

These are only a few suggestions for the ham who wants to build. If a person has an idea and a lot of time he can spare, some pretty far-out things can be put to use in ham gear. — Ronald W. Folkert, WN0BHG/N0QTC, 135 Lewis St., Rockwell City, IA 50579.

RF-TRIGGERED RECEIVER MUTING CIRCUIT

Technical Editor, *QST*:

I recently constructed the dual-triode T-R switch shown on page 572 of the 1970 *Radio Amateur's Handbook*. It works FB 80 through 10

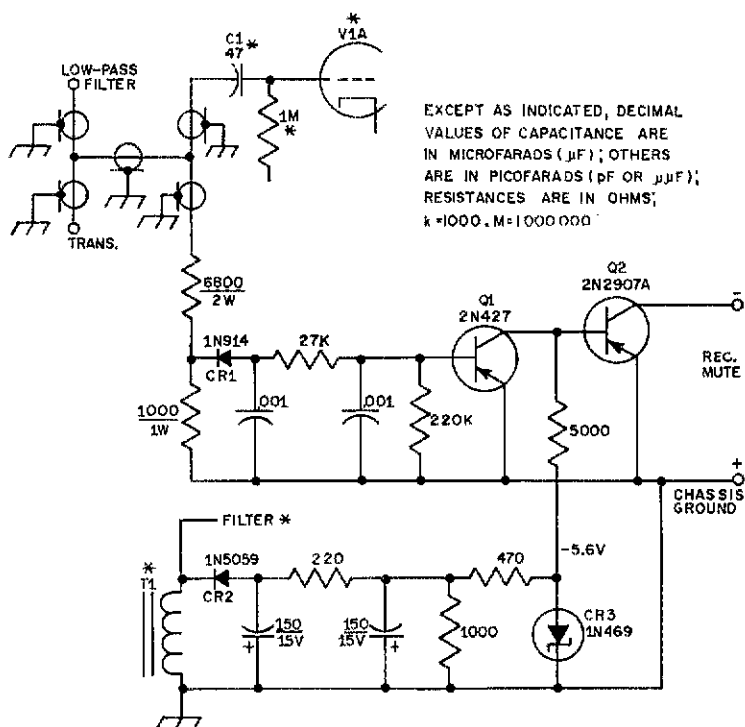


Fig. 1 — Rf-triggered receiver-muting circuit. Unless otherwise specified, resistors are 1/2-watt composition. Polarized capacitors are electrolytic. Parts marked with an asterisk (*) are those of the original T-R switch as shown in the ARRL Handbook.

- CR1 — Silicon diode, PRV 75 or greater.
 CR2 — Silicon rectifier, PRV 200 or greater, 1 A.
 CR3 — Zener diode, 5.6-V, 200 mW or greater.
 Q1 — Germanium pnp switching transistor, 30-V, 175-mW.
 Q2 — Silicon pnp high-speed switching transistor, 60-V, 1.8-W.

meters, just as it is supposed to! But — I still had to contend with a clattering relay for muting my Drake R-4B receiver. So I designed the rf-triggered receiver muting circuit shown in Fig. 1 and added it within the existing T-R switch box. Full break-in cw is now a real pleasure; no relay noise.

Perhaps I "went overboard" in the design by using the 2N2907A and 1N469 devices, but suitable substitutes are numerous. — William S. Cronan, III, WA6NPB, 9056 Willowgrove Av., Santee, CA 92071.

ADDITIONAL TIPS ON TOWER SAFETY

Technical Editor, QST:

While glancing through the February 1970 issue of QST I noticed an article on tower safety.³ Having installed quite a few towers around the Louisville and Indiana area, I think I can add some helpful do's and don'ts.

One hazard I found common is the sun. *Never climb a tower while facing the sun.* You can't see,

and may have a tendency to miss the next rung with the hands. After you get used to climbing a tower, you tend to climb faster than normal. Thus, when a rung is missed, you fall that much sooner.

Don't try to be a superman and install tower sections by yourself. I have seen this done, and have seen lucky people get off with only a strained back or a pulled muscle.

When pulling up tower sections, fasten a safety rope from the sections already installed to the section being placed, after it nears the top. If you have ever seen a tower section come down from 80 feet and hit a roof that is only 20 feet high, you will understand why the safety rope is important. Anyone else on the tower guiding the section is going to be hit, also.

Keep small children and onlooking adults away from the bottom of the tower. Falling wrenches and other tools can cause bodily damage or death when dropped on a person.

When installing rotors be sure the control box is unplugged from the mains. Small children like to see the indicator move. You can imagine what happens when the rotor starts turning and your hand gets caught between a wrench and that moving U bolt.

When you fasten your safety belt, make sure it is below a step and not above it. I saw one fellow installing a tower with just the three legs extending up. He fastened his belt around them. When he stood up straight the belt slid up the tower and came off. Luckily he caught himself before he fell.

Ham radio is one of the most rewarding hobbies a fellow or lady can get into. Let's keep it safe. And by the way, fellows, I like a beer myself, but let's drink something else until all the high work is fully completed. When you have a job successfully completed with no accidents, then is the time for celebrating. — Sandy Roman, WN4SRX, 236 Clover Lane, Louisville, KY 40207.

³Walrod, "A Sturdy 80-Foot Mast," QST, February, 1970. Also see Nose, "A Simple Safety Feature for Crank-up Towers," QST, March, 1970.



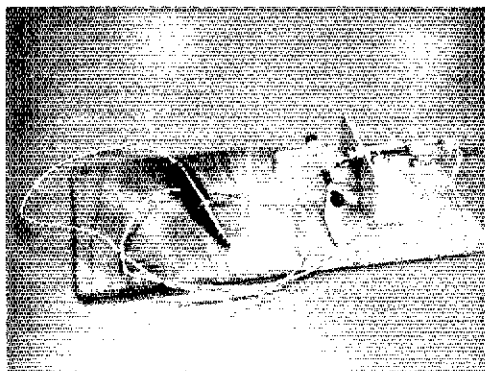
Hints and Kinks

For the Experimenter

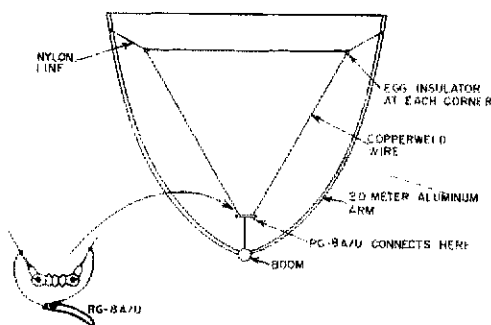


SIDE-SWIPE SPEED KEY

An inexpensive keyer paddle can be constructed easily. Shown here is a Switchcraft type 3006 switch used with a paddle to allow the operator to send straight-key cw with a side movement of the arm and fingers. The amount of effort required to send the higher speeds is greatly reduced.



The switch was wired to key a transmitter by pushing the paddle in either direction. If desired, the wiring could be changed to allow keying an electronic keyer. I used an aluminum paddle which was screwed to the switch arm in place of the knob. A pair of guitar picks glued on the existing knob would serve the same purpose. Total cost of the unit is less than \$4. — *Jim Mohr, WA7NYR*



THE DELTA LOOP ON 15 OR 10 METERS

A 15- or 10-meter wire loop can be suspended inside a 20-meter loop. The wire should be supported by nylon rope. An insulator is placed at the bottom of the loop and the coax is attached directly to the wires without the use of any special matching device. Performance of the 15-meter wire is good and the SWR is low. — *Joseph Q. Wheeler, K5EVK*

REMOVING SOLDER FROM OLD CONNECTORS

When cleaning old coaxial connectors, it is sometimes difficult to remove the solder from inside the collar hole where the braid was attached. By clamping the connector in a vise and choosing the proper bit size, the hole can be drilled out easily. This procedure also eliminates the possibility of flowing solder over the connector thread. — *John Irwin, WA9ZCM*

QUICK REPAIR OF HIGH-WATTAGE BLEEDER RESISTORS

If an adjustable wirewound power resistor opens, it can be repaired quickly by clamping the point where the wire has broken with a screw-type automotive hose clamp. These clamps are usually available at gas stations and hardware stores. Adding the clamp might reduce the resistance by a few ohms. — *Ernest L. Dawson, W2DTF*

WWV ON DRAKE RECEIVERS

It is possible to receive the 5-MHz transmissions from WWV on a Drake R-4A by setting the band switch to 3.5 MHz, the tuning dial to 3.6325 MHz, and the preselector to 40 meters. The second harmonic of the VFO beats with the 5-MHz WWV signal to produce a signal at the first i-f. — *Donald R. Stickle, K20XP*

MARKING ETCHED CIRCUIT BOARDS

Etched circuit boards can be neatly marked with component designations and polarities by using waxy rub-on transfer letters. Alphabets of various sizes can be bought at art supply stores. The waxy letters act as a resist, leaving the marking in the copper after the board is etched. I always include W91WI in a corner of the board to show who made it. — *Julian Jablin, W91WI*

CLEANING EXTERNAL-ANODE TUBES

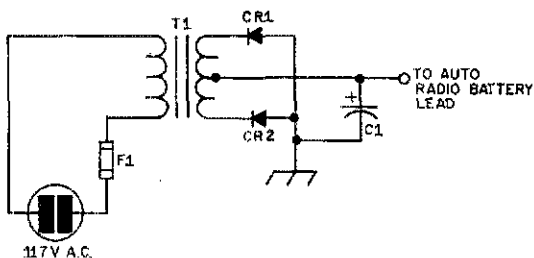
Recently I purchased a batch of 4CX250Bs for a very low price. The tubes, while used for various periods of time, were quite good electrically. The only problem was that the silver-plated parts were badly tarnished. Since I wanted to remove the tarnish, some cleaning had to be done.

I started with a wire brush followed by the use of some silver cleaner. After spending considerable time on the first tube (I have 18 of them!), I decided some other method was in order. Then I remembered a silverware cleaning demonstration I saw a few months back. Why not use the same idea with tubes? Since 4CX250s are designed to operate at temperatures in excess of 225 degrees, they can be boiled to aid the cleaning process.

After placing a large piece of aluminum foil in the bottom of a pot, I added 10 teaspoons of bicarbonate of soda to a quart of water. Then the tubes were placed in the pot and the solution was brought to boiling temperature. While the tubes were still warm, they were removed. Regular silver polish was then used to brighten the finish. — *J. G. Botts, K4EJQ*

117-VAC OPERATION FOR CAR RADIOS

A simple power supply can be constructed and installed permanently in the car to allow operation of the radio on either 117 Vac or 12 Vdc. No switching is necessary. Just plug in the ac cord when 117-volt operation is desired. — *WINPG*



Schematic diagram of a simple power supply for operating a car radio on 117-Vac. The output of the supply can be permanently attached to the battery lead connection on the radio.

C1 — 500- μ F, 50-V electrolytic.

CR1, CR2 — 100 PRV, 2.5-A diode.

F1 — 2-A fuse.

T1 — 25.2-V, 2-A filament transformer (Triad F-41X).

PLASTIC TUBING FOR QUAD ARMS

Shown in the photograph is a two-element three-band quad built with inexpensive materials. The tubing used in this model is 3/4-inch PVC plastic purchased from Sears and Roebuck. The cost is less than one dollar per ten-foot length. On each spreader arm, ten feet from the boom (one full length of tubing), a plastic tee connector is attached for the purpose of holding a crosspiece. Then an additional section of pipe is added to the spreader arm to make up the required length for 20 meters. The two top 7 1/2-foot cross sections are split at the center and are connected with a 14 1/2-foot-long pipe. At the center of this piece is a tee connector which fits the extended mast. The additional support from the mast eliminates spreader-arm twisting.

A spacing between elements of 0.12 wavelength is used to keep the input impedance of the driven

element in the area of 50 ohms. The ends of the spreaders support the 20-meter elements while the 10- and 15-meter elements are strung on the cross-support members.

Mechanically, the entire quad is very flexible. The arms tend to bow but this doesn't seem to create any problems. One of the interesting features of PVC tubing is that water will not adhere to its surface. Low temperatures have no noticeable effect on the tubing either. — *Roger Kaul, W1FLM*

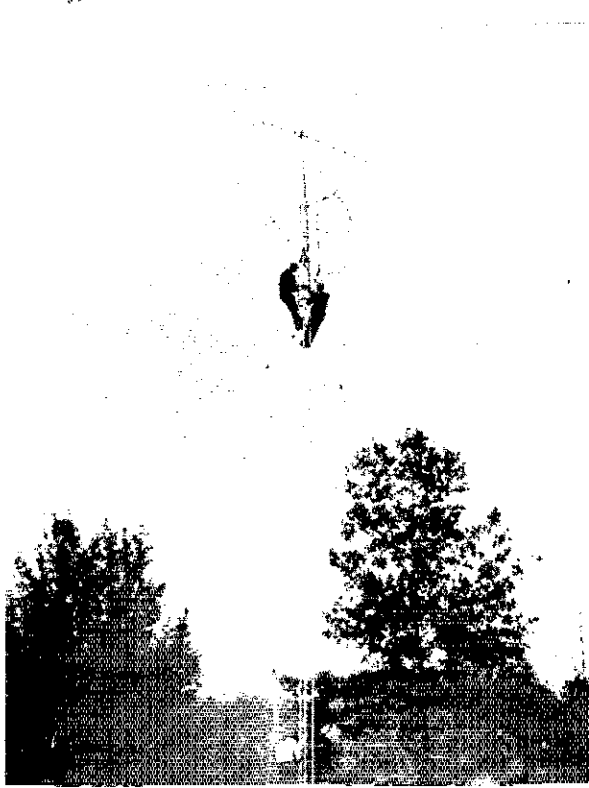
ETCHING METAL PANELS

Decal labels on radio equipment often wear and peel off quickly, particularly on test equipment subjected to constant use. Etched labels, on the other hand, provide permanent identification of control knobs and dials.

To etch a steel panel, pour hot paraffin over the area to be labeled. When cooled, letter the label into the paraffin with a sharp pointed instrument, scraping the metal clean to form the letters or numerals. Neat lettering can be insured by using a lettering guide from a stationary store. Remove any wax shavings with a fine brush and place a drop of hydrochloric or nitric acid on each letter with a medicine dropper. Several applications of acid may be necessary to obtain the desired depth. When etching has been completed, wash the panel with cold water and peel off the remaining wax. The etched characters can be filled with paint or nail polish.

The necessary acids can be obtained in small quantities at most drugstores, but are highly corrosive and should not be brought in contact with the skin. Containers should also be properly labeled and have tight plastic or rubber caps. — *Joe A. Rolf, K5JOK*

The entire mechanical arrangement can be seen here. Plastic cross-bracing is used to help support the spreaders. W1FLM is handling the ropes at the base of the tower while K1DPB (right) and W1FBY start tightening the hardware topside.





Recent Equipment



To acquaint you with the technical features of current amateur gear.

Curtis EK-39M Mnemonic Electronic Keyer

WEBSTER DEFINES a *mnemonic* article as something intended to assist the memory, such as a string tied around the finger. A mnemonic keyer has recently been added to the line produced by Curtis Electro Devices. The EK-39M keyer does have the power of recollection for sending a Morse-code message, as it contains an automatic solid-state message generator, in addition to a deluxe electronic keyer.

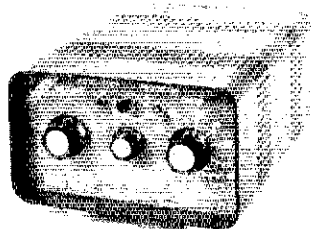
The basic keyer is iambic, providing for an interchange of dots and dashes when used with a squeeze-keying paddle, or for dot insertion when used with a single paddle. A single read-only memory (ROM) IC, made at the factory to the customer's specifications,¹ can contain as many as 252 bits of information, each bit being equivalent to the duration of one dot in time. A front-panel PROGRAM switch enables the operator to select any of three message formats from the memory.

Automatic Message Memory and Programming

To understand the programming capabilities for the automatic message, it is easiest to think of the 256-bit memory as being divided into three parts, which we'll call X, Y, and Z. If keyed straight through the memory from start to finish, the code would be sent as XYZ, in sequence. However, to obtain the flexibility offered by the mnemonic keyer, this sequence is never sent (unless a modification is made to the memory-logic board). Instead, the PROGRAM switch is used to select sequence A, which is XZ from the memory, or sequence B, YYZ, or sequence C, which is Z alone. Part X of the memory is limited to 64 bits,² and for typical operation might be CQ CQ. Part Y of the memory is limited to 60 bits, and might be set up as CQ DX. Part Z may be as long as 120 bits. For this portion of the message, most amateurs would want DE followed by their call followed by a K, such as DE K1PLP K. If the letter, K, is included at the end of the message, the amateur call must contain not more than 86 bits. Lengthy amateur calls such as WBØJQY can be included only by omitting the K at the end of the message.

¹For those amateurs who prefer to construct their own memory, Curtis also offers the EK-39MK Diode Memory Kit, a do-it-yourself diode matrix message memory. When completed, this kit is an exact equivalent to the custom-made ROM IC. Assembly requires no knowledge of logic techniques or Karnaugh maps.

²A message generator for the home constructor, operating under somewhat the same principles as that section of the EK-39M keyer, was described in QST for June, 1970, Table 1 on page 12 of that issue shows the durations of international Morse code characters in bits.



With the custom memory constructed as indicated above, the following messages would be transmitted.

PROGRAM switch at A: CQ CQ DE K1PLP K
PROGRAM switch at B: CQ DX CQ DX DE K1PLP K
PROGRAM switch at C: DE K1PLP K

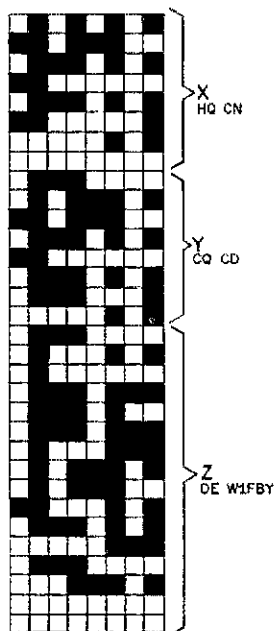
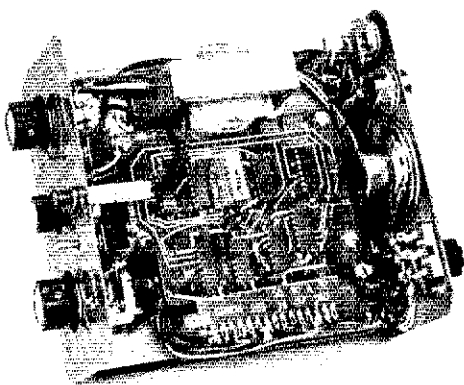
Further flexibility is provided in the EK-39M keyer by an AUTO-STOP switch which has three positions. In position 1, the message selected by the PROGRAM switch is sent once when it is initiated. In position 2 of the AUTO-STOP switch the selected program, when it is initiated, is transmitted over and over, without pause. In position 3, the program is transmitted over and over, but at intervals of approximately 10 seconds.

Provision is made on the rear panel of the keyer for a 4-wire cable connector to be attached (cable and assembled connector are supplied). Three of these wires are used for the ordinary dot, dash, and common connections to the keyer paddle. The fourth wire, when momentarily placed in contact with the common wire, initiates the automatic message according to the format determined by the positions of the PROGRAM and AUTO-STOP switches. Once the automatic sequence is initiated, it is self-completing. However, the message may be interrupted at any time by actuating the paddle and sending a dash. In fact, sending a dash from the paddle is the only way by which operation of the EK-39M may be taken out of the automatic mode.

Operation and Testing

The device has a speed control calibrated from 8 to 50 wpm, and a volume control is incorporated in the built-in monitor. Additionally, a weight control is located conveniently on the front panel. The operator is thereby able to vary the weighting or speed and change the monitor volume to suit the operating conditions. The weight and speed settings affect both automatic- and manually-sent messages, so there is no change in the "fist" when going from one to the other.

Inside view of the Curtis keyer. The read-only memory is the white 16-pin IC visible at the approximate center of the instrument. The slide switch at the lower right selects either relay or transistor keying for the transmitter. There are connectors on the rear panel for a message-start switch, transmitter keying line, straight key, keying paddle, and the ac cord. Connecting plugs are supplied with the device.



Example of memory organization. The memory is arranged as 32 eight-bit words. Each square represents one bit, a dot if filled or a space if empty. Three adjacent filled squares represent a dash. In effect, the memory is scanned bit by bit, beginning at the upper right corner and progressing to the left and down. Address lines connected to the keyer's memory-logic circuits select one of the 32 words, and the 8 bits of the word are available simultaneously at eight mutually independent outputs of the memory. On the memory-logic board, an 8-bit multiplexer, which might be called an electronic commutator, scans the word bit by bit at a rate determined by the setting of the code-speed control. The signal from the multiplexer is the keying waveform.

The complete memory message selected for our tests was HQ CN CQ CD DE W1FBY K. This sequence allows suitable portions to be selected during an ARRL Communications Department (CD) Party. By selecting the 1 and B AUTO-STOP and PROGRAM switch positions, the operator can initiate a CD Party call: CQ CD CQ CD DE W1FBY K. Program A produces a CD Party exchange: HQ CN DE W1FBY K. Program C can be used for "tail ending" with just DE W1FBY K. The number 2 position of the AUTO-STOP switch will continuously repeat message A, B, or C. Because a K is used at the end of our message, the number 2 position is of no value. Operationally, AUTO-STOP position 3 is suited only to message B. The message generator, on activation of the initiate switch in this last mode, will go through the B sequence, pause for about 10 seconds and then repeat the B message again. Repeating will go on until the switches are placed in some other mode or a dash is sent on the paddle. This 10-second off time can be used to tune around the operating frequency, listening for callers. If the operator doesn't disable the automatic message, the machine will start calling CQ again. This really keeps the operator on his toes!

Interference from rf is nonexistent with this keyer. Additionally, critical tests indicated that line-voltage transients don't appear to bother it either. The keyer was operated for 15 hours

continuously during the October 1970 CD Party, keying a Heath exciter which was driving a 1-kW amplifier.

One characteristic of the automatic message generator, in our opinion, does create an operational problem. As we mentioned earlier, a dash *must* be sent first after an automatic message is completed for the electronic keyer section to operate. In the event a station responds to an automatically sent CQ and his call starts with a dash, such as K1PLP, there is no problem. But if W1FLM or VE7BDJ calls, the first dot of the prefix cannot be sent until after a dash is sent to clear the automatic function. Flipping the AUTO-STOP and PROGRAM switches to other positions is of no avail. The authors found this problem objectionable and installed an EXTERNAL CLEAR switch mounted next to the key. With this addition, the operator just taps the CLEAR switch to interrupt the automatic message, or after an automatic message is completed. Then, the first element sent manually may be either a dot or a dash.

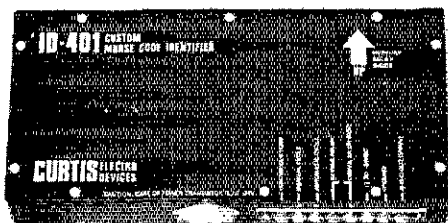
In addition to the features already described, the FK-39M has a standard phone jack located on the rear panel for connection of a straight hand key. When operating the hand key just a bit faster than the setting of the front-panel SPEED control, keying assistance is provided by the keyer. The dots and dashes tend to be self-completing,

although the key must be opened and closed to initiate each new code element. Advancing the SPEED control to a much higher speed will result in a keyed output which follows the "fist" exactly.

With a slide switch on the rear panel, the operator may select either transistor keying or reed-relay keying at the output of the device. For solid-state keying, the open-circuit voltage at the keyed terminals of the transmitter must be negative and not greater than 150 volts with respect to chassis ground, and the keyed current must be less than 50 mA. The relay is capable of keying 10 VA at not more than 750 mA or 200 V, but a resistor is used in the relay-keying circuit to prevent sticking of the relay. This resistor limits the current capability to 50 mA.

Model ID-401 Custom Repeater Identifier

Curtis also manufactures a custom Morse-code identifier suitable for code identification of repeaters or other unattended transmitters. This



The ID-401 custom Morse-code identifier. Measuring 11 1/4 x 5 3/8 x 1 5/8 inches, the identifier is made for mounting on a vertical panel. The audio sine-wave output is adjustable in pitch and amplitude.

The ATR-166

(Continued from page 45)

down on the "least-mesh" end. Any metal filings should be removed. This operation is time consuming and will require at least a dozen tries before the dial linearity is perfect. It is well worth the effort, however. Next, L13 must be set to give the proper shift when switching sidebands. This is done by setting the dial to 14.2 MHz, turning on the calibrator and rocking S8 between the USB and LSB positions. L13 is adjusted until the tone coming through the speaker is the same in either position.

With the ATR-166 hooked to a dummy load, the transmitter should be tuned and loaded in the CW position with about 1-mA drive on the PA grid. With alc level control turned off, normal speech into the microphone should show a flicker in grid current. Adjust the MIKE GAIN to bring this condition about. Flat topping in the final will be evident when checking with an oscilloscope. The alc no amount of shouting will result in any detectable grid current.

Curtis EK-39M Mnemonic Electronic Keyer

Height: 3 1/8 inches.

Width: 5 1/2 inches.

Depth: 7 1/4 inches.

Weight: 3 pounds.

Power Requirements: 100 to 125 volts ac, 50 to 60 Hz, 9 watts. (Also available for 220-V ac operation.)

Price Class: Keyer without custom memory, \$180. Custom memory, ROM, \$60; memory kit, \$50.

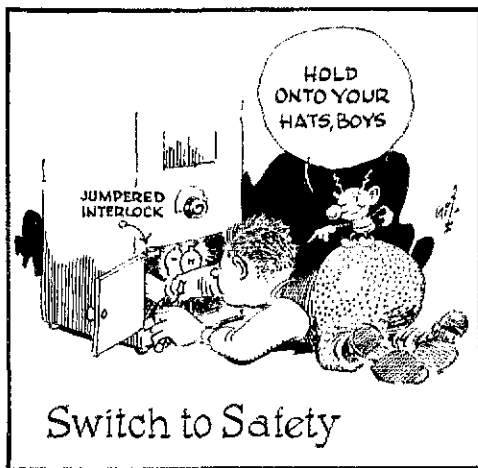
Manufacturer: Curtis Electro Devices, Box 4090, Mountain View, CA 94040.

identifier, model ID-401, has some of the same features as the EK-39M such as monitor and code-speed controls, but does not include provisions for manual keying. The memory capacity of the ID-401 is 127 bits. Selling in the \$130 price class including custom programming of the memory at the factory, the ID-401 operates from 12 to 28 volts dc in temperature extremes between -40 and +60 degrees Celsius. This device provides both audio-tone and keying-relay outputs. When in operation with an fm repeater the instrument transmits the station call letters in mow on initial activation and every three minutes thereafter, as long as the repeater is being used. A final identification is sent after activity has ceased. - K1PLP and W1FRY.

[EDITOR'S NOTE: Just before QST press time it was announced by Curtis that a production change is being incorporated in their model EK-39M keyer to facilitate clearing the automatic message function. The change permits either a dot or a dash to be sent from the paddle to effect a switch from automatic to the manual mode. Information for modification of earlier production models is available from the manufacturer.]

That completes the construction of the ATR-166. Modules can now be built for any or all the other bands. And, the reader can then expect to enjoy countless happy hours with this very flexible "shack in a box".

QST



How To Boil A Frog

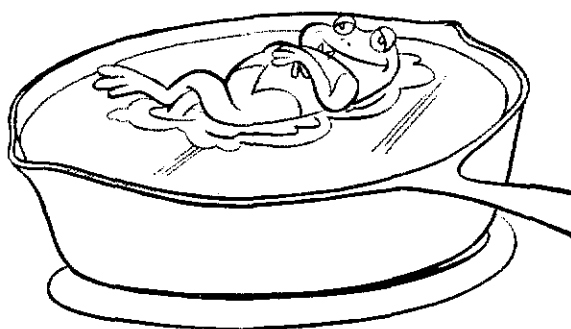
THE PROPER way to boil a frog and have him happy and content all through the process is to give the heat to him a little at a time. If you bring your water to a boil and pitch your frog into it, he'll jump out when the heat strikes him — that is, if he's an intelligent and lively frog. So put him into lukewarm water. He'll relax and take a nap.

When he wakes up, the water will be warm, but not yet really hot. Mister Frog yawns and goes back to sleep. Then you increase the heat, but always by slow degrees with no sudden or sharp changes. Finally the water is really hot, your frog is boiled — and he never knew it was happening. This is called the subtle approach, and the old frog, smart as he is, falls for it.

A great many people are boiled by another subtle method every year, not in water, but in accidents. They are slowly, degree by degree, brought to the point of an accident. That's the way most accidents happen — by degrees.

Take automobile accidents, for example. The majority of these can be traced to a lack of attention or carelessness. People drive the same roads at the same hours of the day to and from work 5 and 6 days a week. The drive becomes routine, they become careless, and presto, an accident! The same thing happens in the home and at work. Accidents build up by degrees.

Unfortunately amateurs have been boiled by this subtle method, brought to the point of an accident, a process which has perhaps taken as long as 20 years or as little as an hour.



For example, in the course of trouble-shooting a piece of gear, you will usually do a bit of probing around with the power on. The B+ and AC wiring are carefully avoided at first, but there are darn few of us that haven't eventually gotten shocked. The key point here is *eventually*. You eventually got into trouble. The chances are very good that if you did eventually get into trouble and that you still do work on potentially dangerous equipment, devices, or structures, then good friend — we are eventually going to read your name and call in Silent Keys.

The only way to keep the "eventual" from occurring is to either switch to a hobby like stamp collecting or switch to safety. Recognize the hazards of your hobby; learn how to avoid them, and practice safety. Practice safety consistently, not just when the odds get poor, for we all know that every gambler eventually beats the odds.

Amateur radio is not a dangerous or risky hobby. For your own safety, don't let it become dangerous or risky as the result of carelessness. **QST**

This article is based on an original story by W. J. McPhillips, Safety Supervisor, Union Railroad, by permission from the Union Railroad and Transmission and Distribution magazine. — W. M. Fugate, W8IYD

QST ————— QST ————— QST

Strays

In December, three officers of the New York Radio Club and their wives were invited into the Presidential Suite of the Waldorf-Astoria in New York, where they were received by His Highness, King Hussein of Jordan, who has the call letters JY1. He is an active ham, working 10, 15, and 20 meters regularly, and spoke about his hobby and answered questions for over half an hour. Those in picture, from l. to r. in front row: George Kiener, W2TOV, President of New York Radio Club; Joel Glassman, W2FPE, Treasurer; H.R.H. King Hussein, JY1. Top row: Mrs. Kiener; Arthur Greenberg, W2LH, Chairman; Madeline Greenberg, W2EEO, Secretary; and Mrs. Glassman.



Midlatitude Intense Sporadic-E Propagation *In Two Parts*

Part II: Cloud Tracking from Amateur Observations

BY MELVIN S. WILSON,* W1DEI/W2BOC

A MODEL OF intense E_s over the eastern half of the United States has been constructed from data available for June 20, 1968. This was an exceptionally active day, with intense E_s spread widely over the North American continent. Though reports are available from Alaska and VE8 to Puerto Rico, and California to New England, this analysis will concentrate on Eastern USA. The 50-MHz band was open most of the day. There was propagation on 75 MHz for more than 7 hours, 100 MHz for 5 hours, and 144 MHz for over 3 hours. The highest frequency propagated was not determined, but more 2-meter contacts were reported for this one day than for all previous 144-MHz E_s openings combined.

Intense E_s was observed at 50 MHz during the morning, in the eastern Carolinas and off the coast. The birthplaces of these clouds are thought to have been off the coast, though their precise locations cannot be determined from available observations. Probably they were along a squall line extending from about 100 miles east of Charleston, S.C. to a point at least 300 miles east of Hatteras, N.C. These generators formed clouds responsible for the northern end of double-hop skip from the Northeast to Puerto Rico.

About 1100 EST the clouds generated off the coast began to intensify, and their lifetime extended. The first had been blown inland over South Carolina by 1200, drifting northwest at about 175 mph. Identified cloud tracks, and the position of the lead cloud in each track, are shown with time in Fig. 10. The clouds are very small; they could not be shown in scale on a map of this

kind. Most of the lead clouds failed to support 50-MHz oblique propagation after reaching a position greater than 41 degrees north latitude, at about 1500 EST, as seen in Fig. 10-A. A possible exception was the lead cloud on track 2, which may have reached a position 130 miles east of White River, Ontario, at 1830 EST. Only one isolated data point marks this position. The last cloud on this track did not dissipate until after 1800 EST, when located about 50 miles southwest of Toronto.

Many distinct clouds were identified on these tracks: 2 on track 1, 3 on track 2, 3 on track 3, and 6 on track 4. All appeared to drift at the same speed, and the distance between clouds on the same track did not change during their lifetime. The last cloud of this series was short-lived but very intense, and it supported 100-MHz propagation until about 1900 EST, when positioned about 50 miles north of Charleston, S.C. Longer-lived clouds from the southeast reached 35 degrees north latitude as early as 1900 EST, the last arriving over North Carolina about 2130, as shown by the second and fourth tracks in Fig. 10-A.

Four new birthplaces developed at about 1500 EST, near Wytheville, Virginia; Asheville, North Carolina; 70 miles west of Knoxville, Tennessee; and 50 miles north of Memphis; and 50-MHz propagation was supported by all four. Tracks of clouds from these "generators" are shown in Fig. 10B, with the position of the lead cloud at specific times given in EST. (Eight older clouds were present at this time, from Ohio and western Pennsylvania down to the Carolinas.) The four birthplaces were to generate very intense E_s clouds. The Wytheville generator was first, and backscatter was reported on 50 MHz by 1600 EST, by which time TV Channel 2 was also active. By 1630, the muf had reached 100 MHz. Short skip at this frequency was the result of multiple clouds.

The Asheville generator was slower in developing, but it reached a muf of 100 MHz at 1700 EST. These two made possible anisotropic propagation at 144 MHz as early as 1745, though the muf of any one cloud did not reach 144 MHz until 1845, when the Asheville generator moved, at 20 to 25 mph, southeast to the vicinity of Greensboro.¹ The intense E_s clouds generated near Asheville drifted northwest, some remaining very intense until reaching southern Ohio. These made anisotropic two-cloud 144-MHz propagation possible from Sault Sainte Marie, Ontario, to southern

It should be noted that the slow southeasterly drift mentioned here is for the cloud source, or birthplace. Movement of the E_s clouds themselves is in the opposite direction, at much higher speed.

*17 Van Cortland Drive, Pittsford, NY 14534.

In Part I the author summarized what is known of the nature of vhf propagation via intense E_s clouds, long a mysterious phenomenon, almost totally unexplained until recent years. Here he shows how E_s clouds can be tracked from oblique propagation data reported by amateur observers, and applies his methods to plotting cloud sources and movements, for one of the wildest days in the long history of amateur vhf communication by this intriguing medium.*

*QST, December, 1970.

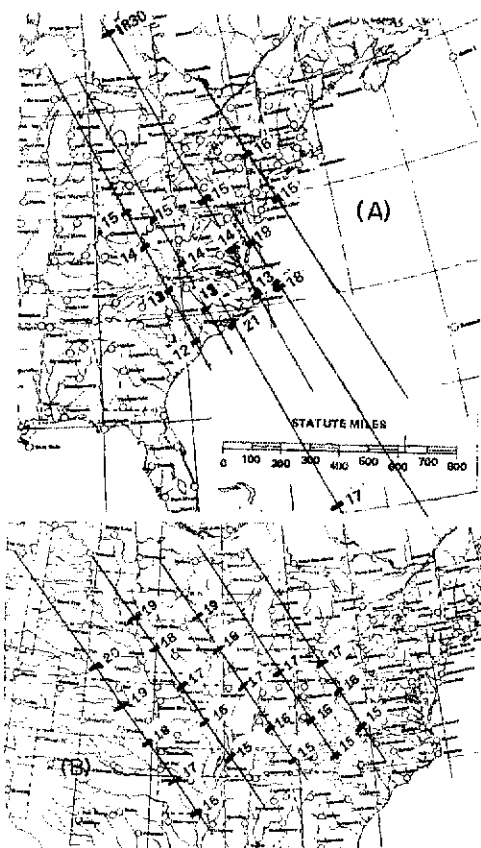


Fig. 10 — Cloud tracks of intense E_s generated off the Atlantic Coast during the morning (A), and inland in the afternoon (B), of June 20, 1968. This information was plotted from amateur observations on the 50- and 144-MHz bands, and from TV and FM DX reports. Numbers beside the tracks are times in EST.

1930 the muf dropped below 100 MHz, and after 2045 no further reports of 50-MHz propagation were received that could be traced to these clouds.

The birthplace north of Memphis, observed by 50-MHz propagation at 1500 EST, began to support skip on the low TV channels by 1600, 72 MHz by 1615, 100 MHz by 1630, and 144 MHz by 1745 EST. By this time (1745) skip was short at 72 MHz. The muf dropped below 144 MHz about 1945, although it continued above 100 MHz until about 2100, and above 50 MHz until 2130. This generator also appeared to move to the southeast at 20 to 25 mph. The clouds generated drifted to the northwest, and some lasted until 2300 EST. Data show a possibility of enhancement of the muf as the clouds moved over southern Iowa, along a weather front, suggesting a mechanism of intensifying clouds already formed. From 2030 to 2130 the muf was well above 100 MHz, and skip of 650 miles was reported, but no 144-MHz propagation was reported. The muf dropped below the low TV channels by 2215, and below 50 MHz by 2230, terminating the double skip from the East to the West Coast.

Florida. About 1945 the clouds began to dissipate, and by 2015 transmission on 144 MHz had returned to anisotropic two-cloud propagation. It remained so until about 2045, when the muf dropped below 100 MHz. Reports after this time on 144 MHz were the result of enhanced-scatter propagation. The muf dropped below the low TV channels after 2215, and below 50 MHz at about 2300 EST.

The lead cloud from the third generator, west of Knoxville, was observed at 50 MHz at 1500 EST. It was tracked to a point 50 miles west of Charles City, S.D. until data were lost at about 1900. This lead cloud supported 100-MHz anisotropic propagation at about 1700, when east of Springfield, Illinois. There is no evidence that the muf of clouds on this track ever reached 100 MHz, though some did produce short skip and backscatter at 50 MHz.

Short skip, about 700 miles, on 100 MHz was of the two-cloud type, with clouds over Davenport, Iowa, and north-central Missouri, at 1900 EST. By

Fig. 12 — Channel 4 reception of WTVY, Dothan, Alabama, started abruptly just before 1500 EST. Strong interference from WOAI, San Antonio, Texas, came in at 1505. A short burst from KARK, Little Rock, Arkansas, appears at 1646. Such recordings can provide evidence of the position and movement, and even the size of E_s clouds.

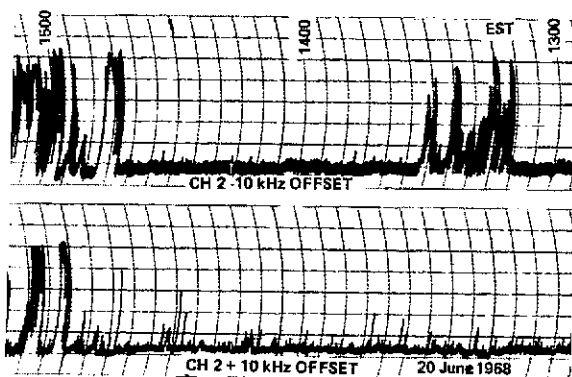
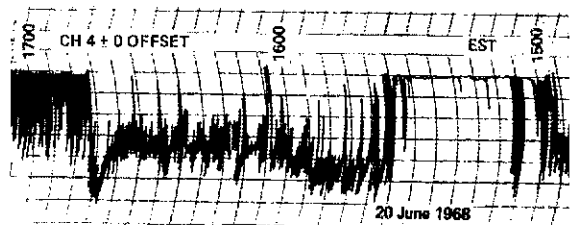


Fig. 11 — Simultaneous record of TV signals on Channel 2: WESH, Daytona Beach, Florida, above and WUSN, Charleston, S.C., below. Though these stations are almost in line from Rochester, N.Y., at 980 and 740 miles from the observing point, the more distant WESH came in strongly, when there was little or no reception of WUSN.



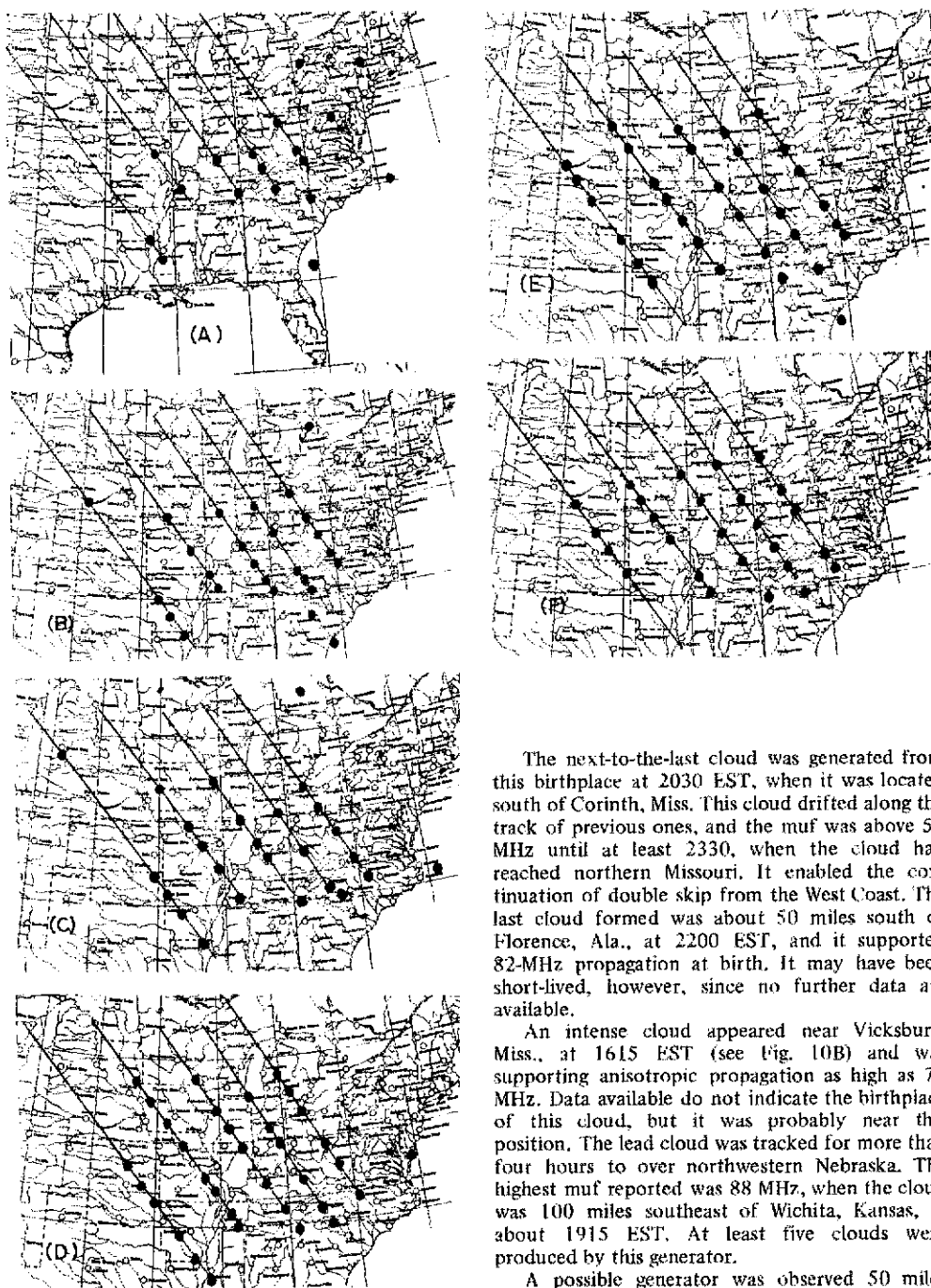


Fig. 13 — June 20, 1968, stands out in the memory of every vhf enthusiast who participated in the extraordinary display of E_s propagation on that date. Skip was everywhere, most of the day, and the muf went well above the 144-MHz band. Positions and tracks of E_s clouds shown here for six hourly intervals beginning at 1600 EST were plotted from observations of TV, FM and amateur 50- and 144-MHz signals.

The next-to-the-last cloud was generated from this birthplace at 2030 EST, when it was located south of Corinth, Miss. This cloud drifted along the track of previous ones, and the muf was above 50 MHz until at least 2330, when the cloud had reached northern Missouri. It enabled the continuation of double skip from the West Coast. The last cloud formed was about 50 miles south of Florence, Ala., at 2200 EST, and it supported 82-MHz propagation at birth. It may have been short-lived, however, since no further data are available.

An intense cloud appeared near Vicksburg, Miss., at 1615 EST (see Fig. 10B) and was supporting anisotropic propagation as high as 72 MHz. Data available do not indicate the birthplace of this cloud, but it was probably near this position. The lead cloud was tracked for more than four hours to over northwestern Nebraska. The highest muf reported was 88 MHz, when the cloud was 100 miles southeast of Wichita, Kansas, at about 1915 EST. At least five clouds were produced by this generator.

A possible generator was observed 50 miles southeast of North Platte, Neb., in a weather front, before 1700 EST. At least one cloud was intense enough to support 72 MHz at about 1700. This cloud drifted northwest and was still supporting 66 MHz at 1830, while just above the Nebraska border. The 50-MHz data from this cloud end at 1945, when it was 100 miles northwest of Rapid City, S. D.

Other generators appeared farther west during the daylight hours, enabling the double skip, east

to west. The clouds were in evidence until at least 0145 EST June 21, but data do not show evidence of muf higher than 72 MHz, west of Kansas. The direction of cloud tracks made from data appeared to rotate counterclockwise with increasing longitude, but this may be the result of scarcity of data from the area of the country concerned.

A strip-chart recording of the intensity of Channel 2 TV stations off set plus and minus 10 kHz, as received at Rochester, N.Y., is reproduced in Fig. 11. The upper trace is the signal of WESH, Daytona Beach, Fla., as the lead cloud from the morning generators drifted over North Carolina. Earlier clouds drifting over South Carolina were too far south for the station to be heard in Rochester. The lower trace is on the frequency of WUSN, Charleston, S.C. Note that no signal was heard, though the two stations are on almost the same bearing from Rochester. This indicates that the intensity of the cloud was not great enough to support the shorter skip. The spike at 1318 EST might have been a burst from WUSN.

The recording in Fig. 12 is Channel 4 TV (± 0 off set) showing the start of the Asheville generator, when WTVY, Dothan, Alabama, was received suddenly at 1456 EST. The interference at 1505 was caused by WOAI, San Antonio, at the start of the Memphis generator. The sudden jump at 1646 was caused by an intense cloud from the Knoxville generator, crossing the bearing of KARK, in Little Rock, Arkansas. The recordings illustrate the start of an intense E_s cloud as a propagation medium, the small size of the clouds, and how quickly signals increase many decibels as the intense cloud crosses the bearing. Detailed study of such recordings may well give a clue to the internal turbulence of an intense E_s cloud.

The positions of all intense E_s clouds existing over Eastern USA at 1600 EST are shown in Fig. 13A. The morning generators were still active, and six clouds from them are shown. The afternoon generators were an hour old, and their clouds were beginning to drift northwest. Clouds off the coast made propagation possible from the Northeast to Puerto Rico at this time. At 1700 EST, Fig. 13B, the clouds continue to drift northwest, and with new clouds being generated, now cover much of Eastern USA.

Cloud positions for 1800 are shown in Fig. 13C. The morning generators had stopped forming new clouds an hour before, and only three of the older clouds were still in existence. One cloud about four hours old was southwest of Toronto, and the other two were short-lived stragglers which had drifted in along the coast. The E_s clouds being formed by the afternoon generators were more intense at this time, and were supporting 144-MHz propagation, though the muf of any one cloud had not quite reached that value. Most of the 100-MHz short skip, and all the 144-MHz propagation paths, employed two clouds. The situation at 1900 EST, Fig. 13D, indicated that the muf of the Wytheville generator, now located southeast of Greensboro, and probably the Asheville and Memphis generators, had exceeded 144 MHz. An older cloud formed by the Memphis generator two hours earlier was positioned near St. Joseph, Mo., at 40 degrees north latitude. This cloud and another over

eastern Iowa were responsible for very short skip at 100 MHz.

Cloud positions at 2000 EST, are shown in Fig. 13E. The peak of 144-MHz activity occurred about 1930, and by 2000 activity was restricted to the first two generators. Originally termed "Wytheville" and "Asheville," these were now 80 miles southeast of Greensboro, and 60 miles west of Columbia, South Carolina, respectively. Their southeasterly drift caused their intense E_s clouds to come within the radio horizon of southern Florida, and by 1930 allowed 144-MHz communication from that area, until the muf of both generators dropped below 144 MHz, at about 2015 for the first and 2030 for the second. Any 144-MHz propagation after that went to an anisotropic type.

The muf for all generators was dropping fast after 2100, and none shown in Fig. 13F were above 88 MHz. However, at least one older cloud formed at about 1830, east of Memphis, had an muf well above 100 MHz while over north-central Missouri. Short-skip 100-MHz propagation was reported at this time, but no 144-MHz reports were received. Another older cloud, at this time over central Minnesota, was supporting 88 MHz.

At 2200 EST the total number of clouds supporting 50-MHz propagation was 16. Only the Memphis generator was supporting 88 MHz, and this for a short time. The cloud that had been supporting 100 MHz at 2100 had moved to 80 miles northeast of Omaha, Neb., and was still intense enough to support 72-MHz propagation. By 2300 the eastern half of the country had only two identifiable intense E_s clouds, both over northern Indiana. The West still enjoyed intense E_s , and double skip was reported until at least 2330 EST, but 50-MHz data for the East are lacking. One of the most exciting days in the more than 35-year history of E_s exploitation had come to an end, for eastern vhf enthusiasts!

Amateur Contributions

Amateur vhf operators have the opportunity to contribute to further knowledge and understanding of intense E_s , by careful observation of vhf oblique propagation conditions. This kind of data can best be supplied by amateurs, because of their random distribution, both temporal and geographical. The scientific community does not have the funds or the facilities to duplicate the distribution, enthusiasm and dedication of vhf DX-ers.

One important area for investigation is the role that meteorological forces play in the generation of intense E_s . Scientists must bring together the disciplines of plasma physics and meteorology, before a synoptic theory of the total atmospheric forces involved in the formation of intense E_s can be established. The vhf fraternity might well contribute, in the meantime, and lead the way in this important investigation.

The author would like to give well-deserved credit for the volumes of data provided by many vhf amateurs and TV-FM DX-ers² who made this evaluation possible.

QST

²Worldwide TV-FM DX Associations, PO Box 5001 Harbor Station, Milwaukee, Wisconsin 53204.

Amateur Space Communications — A Status Report

BY WILLIAM I. DUNKERLEY, JR.,* W42INB,
AND PERRY I. KLEIN,** K3JTE

A DECADE WILL soon have passed since the first Oscar (Orbiting Satellite Carrying Amateur Radio), designed and built by West Coast hams, was launched on December 12, 1961. Now, in 1971, space communications still remains a new frontier for radio amateurs.

Perhaps as a reflection of our changing times and an emphasis on reaping the benefits of space technology for the masses, the priorities of ham space activities are being reoriented. The trail-blazing satellite experiments of the 1960s now give way to amateur hopes for satellites for everyday use by hams for DXing, contesting, traffic handling, rag chewing, etc. Here then is the current status of amateur space communications plans.

Amsat-Oscar B

Amsat, the Radio Amateur Satellite Corporation (a non-profit amateur organization), is giving high priority to the development of long-lifetime, solar-powered satellites that can be used regularly and reliably by amateurs for routine communications. First in this series is Amsat-Oscar B (it will receive an appropriate numeral in the Oscar series upon launch). At present, a late 1971 or early 1972 launch is hoped for.

Following designs prepared by its Project Manager, Jan King, W3GEY, the satellite's internal

structural assembly and modules have been fabricated at the facilities of W2QJT in Ithaca, New York. This represents the beginning of construction of actual flight hardware. Several panels of solar cells left over from NASA and ESSA satellite programs have been made available, and some are being reconfigured for use in A-O-B. Rechargeable nickel-cadmium batteries have also been made available. Together they are expected to make possible satellite operating lifetimes in excess of one year.

Several pieces of communications gear are under construction. A selection will shortly be made from completed items for inclusion in the A-O-B flight unit, expected to carry two repeaters and one or two telemetry systems. The gear under construction includes the following:

A four-channel, channelized, hard-limiting fm repeater is being breadboarded by members of the Wireless Institute of Australia's Project Australis who had been involved in the construction of Australis-Oscar 5. It is of the demodulation-remodulation type and employs 145.9 MHz for the uplink and 432.1 MHz for the downlink, with a satellite transmitter power output of one watt per channel.

A linear repeater with a bandwidth of 50 kHz is under construction by the Euro-Oscar group in Marbach, West Germany. Its input is 432.1 MHz, and output, 145.9 MHz, with ten watts output. It is designed for use with ssb, cw, am, 1m, RTTY or SSTV, with as many stations as can fit within its 50-kHz passband.

Also being breadboarded by Amsat members in the U.S. is a linear repeater having an input of 145.9 MHz and an output of two watts around 29.6 MHz. It will handle any method of modulation permitted in these two bands.

* Assistant Secretary, ARRL.
** c/o Amsat, PO Box 27, Washington, DC 20044.



On a trip to the U.S., Wireless Institute of Australia (sponsors of Project Australis) president VK3KI met with Project Oscar officials. Shown from left are Project Oscar president K6LFH, VK3KI, Santa Clara Valley SCM W6VZT, and Oscar and ARRL board member W6ZRJ.

The WIA Project Australis group has developed an Oscar telemetry encoder which transmits directly in 850-Hz a.f.s.k. teletype format, for printout on an ordinary 60 wpm teleprinter. Any station having a tape reperforator will be able to send or retransmit the received data directly to Amsat headquarters for computer processing, or may decode the telemetry data using calibration information which will be made available prior to launch.

John Goode, W5CAY, has designed and breadboarded an Oscar telemetry encoder which transmits numbers directly in Morse Code, so that only pencil, paper and calibration information are needed for reception and interpretation of data from the satellite.

A breadboard of a command encoder capable of providing up to 35 separate command functions has been constructed by the Project Australis group. The command encoder is designed to provide a reliable and secure means of controlling the emissions of Oscar satellites to minimize any possibility of interference.

Project Oscar, Inc.

The pioneer organization in amateur satellites is the west-coast based Project Oscar, Inc. This group was responsible for the origination of the Oscar program and in particular for successes of Oscars one through four. Current Project Oscar activities include assistance with the A-O-B efforts. They have provided technical advice and aid in obtaining components, and also funds for necessary travel.

Project Oscar headquarters is Foothill College, Los Altos Hills, California. The group is working with the College on plans for incorporating an Oscar station in a campus space science facility. In addition to the above activities, Project Oscar has begun preliminary work on the development of another amateur satellite.

Moonray

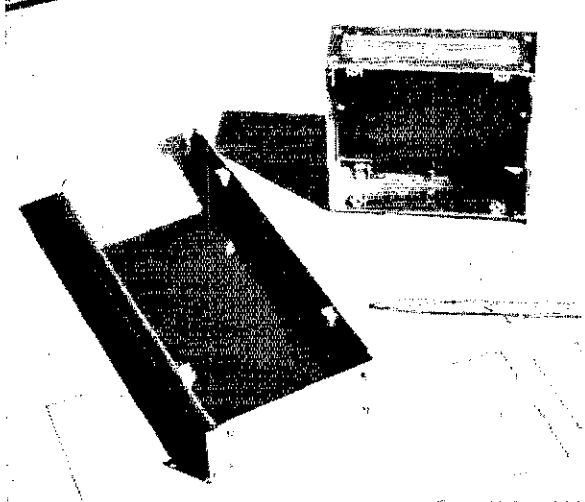
Perhaps one of the most imaginative ham space projects to come along has been Moonray, a lunar-based amateur uhf repeater. Work on this project is under the direction of Nastar, K2SS, P.O. Box T, Syosset, NY 11791. When completed, Nastar hopes to have NASA carry Moonray to the moon on one of the remaining Apollo missions. A continuously-operational repeater with a one year or longer lifetime is the project objective.

Moonray will contain a high-sensitivity, low-noise receiver, a signal processor, an identifier sending "SS" in Morse code, a timer-cycler-sequencer, six to eight channels of telemetry, and a laser receiver with optics. The up-link will be a 10-kHz passband centered at 439.9 MHz and the downlink will be a like bandwidth centered at 430.1 MHz. The repeater will be useful with all modes.

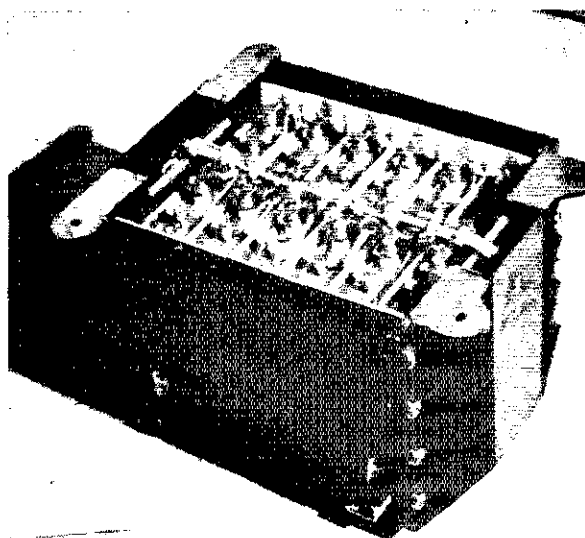
Count-down

As the time grows nearer for the operation of an amateur spacecraft, *QST* will carry full details and information on how to prepare your amateur station for use with a spacecraft repeater. Material is now being prepared in anticipation of a launch later this year or early next.

QST

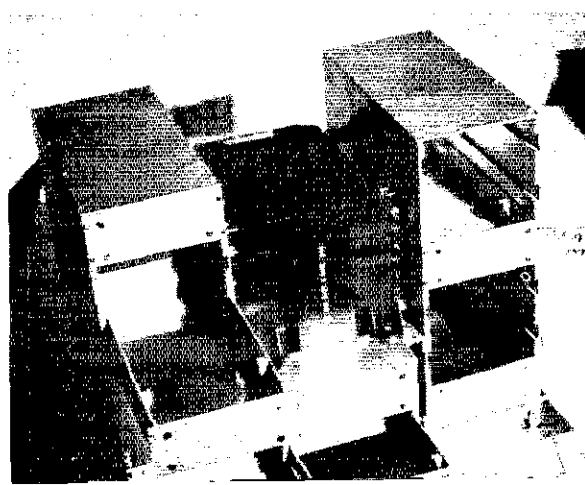


The electronics of A-O-B will be built in modular containers such as these.



Power will be supplied by this Nicad battery which will be recharged by solar cells.

The internal structure of Amsat-Oscar B.



Most Novices do not realize that there are over a dozen organized nets operating in the 80- and 40-meter Novice bands. Here is some information, written by a young ex-Novice from personal experience, on what goes on there and how all Novices can participate.

Can Novices Handle Traffic?

BY LONDA SHULTZ,* WA2CRW

THE IDEA of the Novice license when originated by the FCC was that it was a "training" period or apprenticeship. Among the many aspects of amateur radio the Novice can acquire skill in are DXing, rag-chewing and basic cw operation with its abbreviations, Q signals and speed. Only a handful of Novices realize that this could include training in how to send traffic and become what is commonly called a traffic handler. Sending messages can be fun and is fulfilling a principal reason for which amateur radio exists — to render public service.

Nearly every amateur, since receiving his license, has probably received a copy of *Operating an Amateur Radio Station* published by the ARRL and sold for 25 cents (but free to members). This book explains traffic operation in simple-to-understand language. Another ARRL publication which goes into even more detail is the *Radio Amateur's Operating Manual*, which can be obtained from headquarters or most radio stores for \$1.50. The traffic handler should also have ARRL message forms (35 cents a pad of 70 blanks). With these aids you should be able to write your message and figure out how to send it in correct form. Before you are really ready to send your message you should become familiar with the Q and QN signals. The Q signals are used in regular operation but the QN signals are reserved strictly for traffic passing on the traffic nets which exist solely for the purpose of handling messages like the one you have just written.

Your next question might be "Where do I find a traffic net?"

Looking at table I should answer your question. This was prepared from the information in the ARRL Net Directory which can be purchased from ARRL Headquarters for a self-addressed-stamped business envelope and 18 cents postage. All times and days in the net directory are listed in GMT. The symbol 1/3 indicates the net meets on the



indicated day the first and third week each month. An asterisk (*) after an entry in the time column indicates that the net meets one hour earlier during the period of Daylight Saving Time locally. For example the New Jersey Slow Net meets at 0100*GMT when local time is standard but at 0000 GMT when local time is "daylight." This is always 7 P.M. local time. The * simply means that the net time in relation to local time stays the same, even though the GMT time changes. This is probably confusing but after awhile you'll be able to convert with no problems at all. *Remember: times and days are GMT.* If you remember this, you shouldn't miss the net in your area.

Almost all of the nets listed have connections in one way or another with the National Traffic System (NTS). This system is made up of various net representatives which have General licenses or higher and are appointed by section net managers. Your particular net, for example, might send a representative to the section net. This will allow you to send messages to anywhere in the United States and to most servicemen abroad for whom complete APO-FPO addresses are known.

Now you've found the net but you can't decide how to check in. Don't get discouraged if your first attempts fail. The best way to learn what check-in

TABLE I

Freq.	Net Designation	Days	Time
3700	Northwest Slow Speed Net	Daily	0300
3708	W. Va. Upshur Co. Novice Net	M	0200
3715	Missouri Slow Speed	Daily	0300
	New York City - Long Is.	Daily	2300
	Traffic & Training Net		
3718	Georgia Training Net	Daily	2200
3728	Alabama Emergency Net	Daily	2300
	D Training		
3733	Eastern Mass. Novice Net	MWF	2300
3735	Kansas Novice Net	Sn	2200
3740	Eastern Area Slow Net	Daily	2300
	New Jersey Slow Speed	Daily	0100
7155	Southern Calif. Novice Net	WS	0400
7160	Wayne Co. (Mich.) Novice Tng. Net	MWF	0100
7170	International 40-Meter CW Net	1/3F	2300

*Net meets one hour earlier during the period of daylight saving time locally.

*111 Acorn Drive, Scotia, NY 12302

procedure a net uses is to listen in for awhile. There are two basic procedures of which various modifications may be found according to the particular net. All net controls will call the net by its abbreviation and then give their call. From here it varies. Some will then sign QNI (which means check in) and then K. Others may omit the QNI. Check-in tactics of the stations also vary. On the higher class nets they will send a dit, BK or anything and then listen. If the net control returns it they will continue the check-in. Other nets will just have the checking-in stations give the control's call followed by theirs followed by the control's acknowledgement. This means more work for the check-in because control can only handle one station at a time. An example of a check-in follows for the Eastern Area Slow Net (EASN):

EASN EASN EASN DE WA1GGN WA1GGN
QNI K
WA1GGN DE WA2CRW QRU K
WA2CRW DE WA1GGN GE LONDA AS

If I had traffic I would send QTC and then he would ask me to list it. If I had 1 piece for ARRL Headquarters and 1 for Calif. I would list it as follows:

WA1GGN DE WA2CRW QTC 1 ARRL 1
CALIF AR

Some nets will pass traffic on frequency and others will ask for another crystal frequency and move you off frequency to pass it. After calling the station who will take it (if you were operating VFO you would wait for him to pick the exact

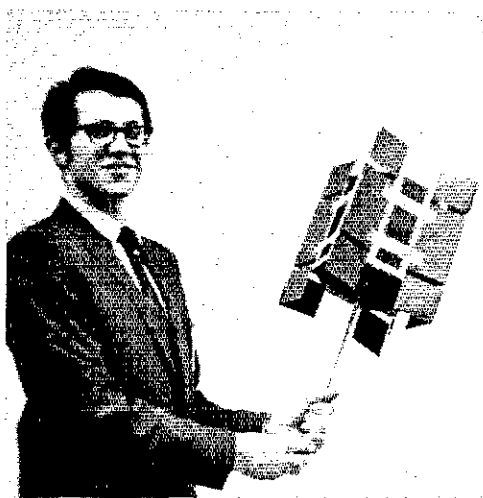
frequency and call you) you sign QRV? (are you ready to copy?). If he returns it go ahead and send your traffic according to the procedures outlined in the publications.

One reward of traffic handling is getting your traffic listed under "Station Activities" of your section in *QST*. This is done by sending a traffic report to your Section Communications Manager listing the number of pieces you originated, received, relayed, delivered and total. If the sum of your originated and delivered totals 100 or the sum of all categories totals 500 or more you will be eligible for an award and membership in the Brass Pounders League (BPL). This is quite an honor and few Novices have ever made it. How about you being one of them? Even if you know you can't handle that amount of traffic, at least you will find satisfaction in knowing that in case of an emergency you will know how to handle traffic if you have to. Probably the greatest joy I got out of amateur radio as a Novice was delivering a message to a mother whose son was serving in Vietnam and hadn't been able to write home for several months. She just couldn't express all the thanks she wanted to for what amateur radio had done for her. This is public service and this is why we exist. Support your Novice training nets. They are there to help train you but they can't do their job unless you join them and become an active member.

Don't find a net in your area? Why not start one?

QST

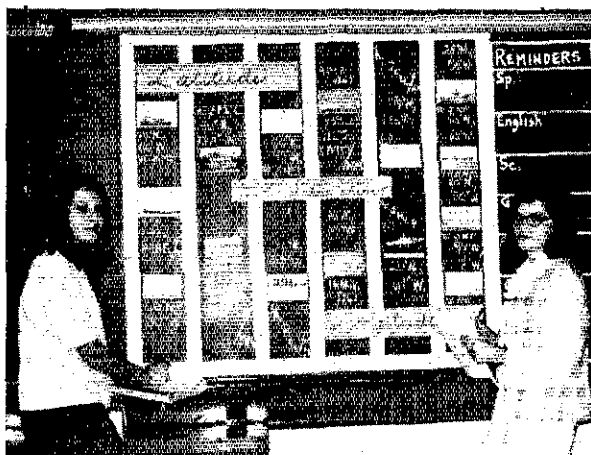
Strays



How about this rig? Amsat's W3GEY displays his concept of how some future amateur spacecraft might appear. For complete details on ham space plans, see the status report on page 58.

QSLs from maritime mobile stations add a touch of reality to a lesson on latitude and longitude. The young ladies are students in VE3GCO's eighth grade geography class in Mitchell, Ontario.

The International Federation of Railway Radio Amateurs (FIRAC) exists to promote contact and friendship between railway radio amateurs throughout the world. There are national groups in all European countries, the U.S.A. and several other countries. Regular contacts are made between European stations on Sunday mornings and with U.S. stations on Saturday evenings (GMT); also with other stations by agreement. Information may be obtained from Ronald Hooper, G3SCW, Station House, Tavistock, Devon, England.



An Unusual High School at an Unusual Location

THE GEORGE Glade Memorial Station, W6GK at Cabrillo High School in Lompoc is the only high school in California listed in the *Callbook* with an old two letter call sign. The new Cabrillo facility is an ultra modern plant built chiefly through U.S. government financing. This school serves the Vandenberg Air Force Base area with an enrollment of 1700 that are 80 percent military dependents. It is interesting to note that there are probably more student fathers here who work in diversified areas of electronics than almost any other place in the United States. Vandenberg is concerned with missile and re-entry vehicle experimentation, satellite launching and the training of the personnel who man our underground missile sites throughout the country. In addition, the vast Western Test Range is manned from VAFB.

The school's electronics program is operated by part-time instructors Don Eid and Dick Diddell. Dick is W6ZSI, and teaches several morning classes. He is employed full time in the telemetry field. With instructors from industry on the school staff, students are given an insight into industrial requirements and qualifications for employment on Vandenberg.

The Cabrillo Zero Beaters has some 30 members, many of whom are licensed operators of the club station W6GK. The rigs and accessories are installed on a heavy duty table which contains casters so it can be operated from the shack or out in the electronics shop classroom for all students to monitor and for demonstration purposes. Several other rigs and a PA are to be constructed by students.

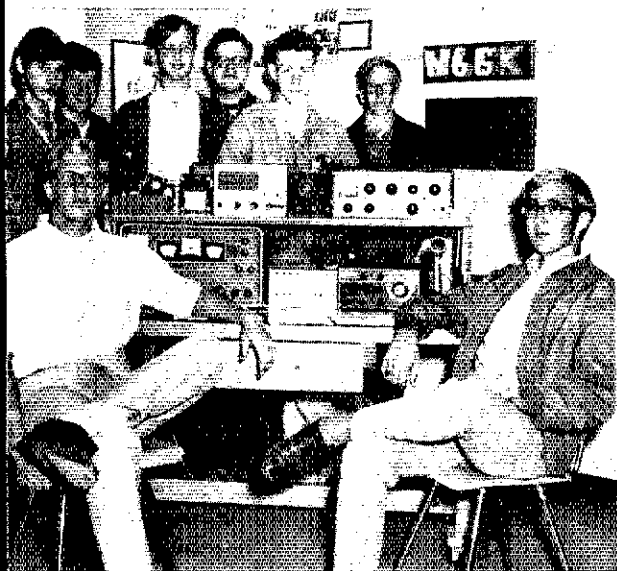
Those students who are licensed are encouraged to join the local Satellite Amateur Radio Club on

Vandenberg which operates W6AB. This giant of the central California coast has interesting meetings along with many activities which stimulate Cabrillo students toward greater ham radio participation.

The electronics program at the school is unique in that training is accomplished through the use of plastic "see-through" training modules simulating various circuits. This equipment allows the student to perform a carefully planned sequence of testing and experimentation. Certain critical parts mounted on the top may be unplugged and substitution made with different values or defective components, thus allowing the student to see what happens under varying circuit conditions. Students work in pairs at bench positions equipped with test equipment and experiment manuals. To supplement the experimentation, theory lectures are given along with field trips to local electronic installations and films from the airforce film library. Students also learn hints on obtaining employment which include taking entrance tests, filling out applications and presenting oneself for an interview.

The Zero Beaters Club President George Rock WA6ENF, who is the only Advanced licensee, thinks it would be nice if certain General class frequencies on several bands were "unofficially" designated for high school club operation. He stated that while W6GK has worked a few other high schools it is usually difficult to locate them without a pre-arranged schedule on a specific frequency. However, if over a period of time it became general knowledge that high school stations would operate on or close to certain frequencies then they would be easy to find. Recently a high school in Ohio proposed a net; however these are hard to run due to time differences, school schedules, etc. Therefore, George proposes that high school club stations try to operate on the following frequencies: 7280±3KHz (ssb), 14,280±3KHz(ssb), 21,400±3KHz(cw).

As a starter the Zero Beaters intend to operate W6GK at various times between 9 A.M. and 12:30 PST daily. The frequency generally used will be 14.28 MHz. In addition, this club intends to compile a list of "active" high school club stations and the bands they operate on. In order to obtain information for this booklet clubs are requested to list their band capability and time of usual operation on the back of their QSL and mail to: W6GK, Cabrillo HS, 4350 Constellation Road, Lompoc, CA 93436. When the directory is complete it will be forwarded to each club who responded. — W6ZSI



A few of the gang at W6GK. Seated (l to r) WB6UXM and WA6ENF. Standing (l to r) WA6CQE, WN6CPB, WA6CCT, WN6AVL, WA6CCU, and Mike Thomas (waiting for his "General" call).

SS

37th
ARRL
November
Sweepstakes
Results

REPORTED BY AL NOONE, *WA1KQM

AS ALWAYS, we are happy to announce another successful Sweepstakes. Again, participation was excellent. The 37th ARRL Sweepstakes (Nov 14-16, 21-23 1970), resulted in some 2117 logs being received at HQ, a 20% increase over last year! Of these, phone entries outnumbered cw, 1088 to 1029.

Breaking the total logs down by power category (a new listing, in lieu of multipliers), we found 1160 participants chose B, the other 957, A. Of the 958 single-operator cw entries, the A/B power category differential went 424/534 entries, respectively. The 966 single-operator phone participants, by a wide margin of 614 to 352, elected B over A.

Conditions, especially on phone, were just short of outstanding. Contact totals of 1000+ were not uncommon. Some 80 "Clean Sweeps," almost double that of last year, were recorded. On cw, with the going a little harder, only 14 stations worked all sections.

Special congratulations are due: WA1JLD, W1BGD/2, K3HTZ, K3WUW, W3CRE, K4PJ, W5JAW, W6HX (WB6OLD,opr.), K7VPF/7 (opr.W7RM,cw), W8SH (K7NHV, opr.), and W01YH. All of the above managed the extremely difficult "Clean Sweep" on both modes. And while it may or may not be a first, the ARRL Contest section is proud to have scored a "Clean Sweep" of its own; that is, receipt of logs at Hq. from 75 sections on each mode. Some 181 certificate awards (72-cw, 74-phone, 35 novice) are scheduled for a March 15th mailing.

The success of this 1970 SS can, in part, be attributed to recent changes recommended by the Contest-Advisory Committee. This group is hard at it on all the League's contests and would welcome your ideas. The CAC members are: W3GRF (chairman), W1AX, K2KIR, W3WJD, W4UQ, W5QNY, KH6IJ, W0HP, and KH6IJ.

TOP TEN

CW. Single Operator: W6HX (WB6OLD,opr.) 133,425; W6MAR 132,641; W9IOP 131,641; K6EBB (W6CUF,opr.) 127,650; W2PVX 126,075; W5JAW 125,850; W7RM (K7VPF,opr.) 124,200;

W7CFJ 124,027; K2KIR 123,192; K4GSU 121,472. Multioperator: WB6WIT 125,856; W8EDU 97,992; W1MX 97,632; WA1JUY 82,644; W2SZ 82,214.

PHONE. Single Operator: K7VPF/7 173,550; W6HX (WB6OLD,opr.) 164,475; K6EBB (K2EIU, opr.) 164,175; W5JAW 153,525; W9YT (K9KGA, opr.) 150,750; W3MVB (K3EST,opr.) 148,125; K5RHZ 148,000; WB2OEU 144,152; W7IR 142,642; W1BGD/2 141,450. Multioperator: W1FBY 136,050; WA0TJJ 121,248; K9QFZ 117,975; K0VVY 116,250; KH6RS 115,144.

Congratulations to W5JAW, W6HX (WB6OLD, opr.) and K7VPF/7 (opr. W7RM,cw) on making the Top Ten both modes.

NOVICE CORNER

This years Top Ten novice entrants are as follows: WN7OLT 33,728; WN5ZKE 20,628; WN4NRL 20,299; WN2MAN 15,024; WN7OTT 12,816; WN6KMV 12,466; WN1MAO 11,970; WN9DQJ 11,616; WN2JAM 10,750 and WN6AIU 10,516.

Other certificate winners are: WN1s LWS/1 NRV, WN2s LHA ONM, WN3s OJL PHG PMI, WN4s RGQ RUA SIJ, WN5s ZWC ZZZ, WN6s CQQ RMG, WN8s DZR EDE HHN, WN9s EAY FBG, WN0s AAM ANT AXW BRG BYX ZLI.

CONTEST PERIODS

1971

Starts		Ends
Saturday, Nov. 13		Monday, Nov. 15
2100 GMT	PHONE	0300 GMT
Saturday, Nov. 20		Monday, Nov. 22
2100 GMT	CW	0300 GMT

* Asst. Communications Mgr., ARRL.

DIVISION LEADERS

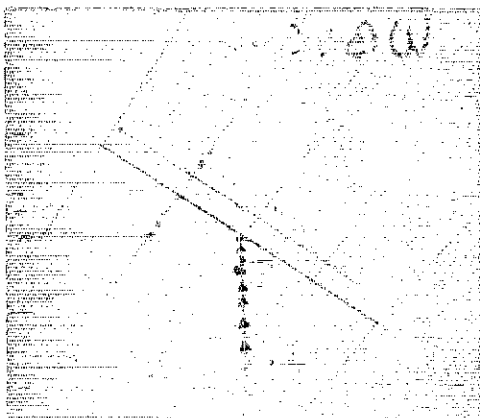
CW			Phone	
Single Op.	Multitop.		Single Op.	Multitop.
K2KIR	K3JYZ	Atlantic	W3MVB	K2ZW1
W9IOP	W9YB	Central	W9YT	K9QFZ
KØORK	KØVVY	Dakota	WAØHVR	KØVVY
K4PUZ	W4VSV	Delta	K4PJ	K4SXD/4
K4GSU	W8EDU	Great Lakes	W8SH	W8EDU
W2PVX	W2SZ	Hudson	W1BGD/2	W2SZ
WØINH	WØSOE	Midwest	KØYVU	WAØTJJ
K1ZND	W1MX	New England	K1JHX	W1FBY
W7RM	WA7OEX	Northwestern	K7VPF/7	WA7JAY
K6EBB	W6BIP	Pacific	K6EBB	KH6RS
W4BVV	W4JK	Roanoke	WA4FFW	WB4FDT
W5QJH	WB5AXC	Rocky Mtn.	W5EU	K7QEZ
K4TIG	W4DFU	Southeastern	WA4UFW	KZSCR
W6HX	WB6WIT	Southwestern	W6HX	WB6NSI
W5JAW	W5SBX	West Gulf	W5JAW	WA5VSK/5
VE7BDJ	VE3DBY	Canadian	VE5US	VE3BUV

SOAPBOX

CW

Just snagged KL7EWA by the skin of my teeth for section #75! — K3WUW,MDC. No equipment problems this year, just had the XYL knock the bathroom sink off the wall during the competition! — K3EVB/3,MDC. Suggested frequencies sure crowd up the contestants. — W3CSZ,MDC. Did you ever get the jitters on a bug? — WB2UON,SNJ. Didn't realize how much a keyer helped until mine broke and I had to use a straight key. — WN3PHG,Del. Biggest thrill was working the west coast on 40 meters. — WA3IYC,EPA. Picked up 6 new states toward my 40 meter WAS. — WA2VYA,SNJ. This is my first SS and I was really amazed by the high level of operating. — W2BHP,WNJ. This years SS was a lot of fun but wouldn't you know that my rotor would quit just before the contest. — WA9ZXE,ILL. This was my first contest, I only wish I would have had the time to use up the entire 24 hours. — WB9CTC,IND. After the SS I'm happily addicted to contests. — WN9EAY,IND. Found out after the contest that I could have used the linear! Next time I'll read the rules. — W9HHX,WISC. Heard VE5US early in the test, gave a couple of calls, but couldn't raise him. Said I would get him later but never heard him again! — WØYCR,MINN. Our 4-element tribander went kaput right after the phone section. — KØVVY,S.D. Murphy continually beat efforts here

with a club. — WB8EUN,MICH. I like the new format, the operating is much better than in years past. — WØFK,IOWA. So close and yet so far. I heard every section at least twice except for KL7. — WAØEMS,MO. Contest committee might consider shortening the SS message format to a 5 or 6-digit number and section. Copying the log is a massive chore! — K2BK,ENY. Sure enjoyed my first SS as a non-novice. — WA2KEA,NLI. Where was S.C., might be a good place for a DXpedition. — WA2JNQ,NNJ. Where, oh where, were Vt., Alaska and NWT? This is my first try in the SS and I guess you'll be seeing me again. — WA1IRG,EM. Missed Vermont, only 45 miles away! — W1BPW,N.H. Sorry about the score fellows, the coax melted in my 30L1 on Sunday morning. Spent prime operating hours repairing equipment. — W1E2D,WM. Worked every section I heard. — WB4ADT,ALA. This was my first contest and I thoroughly enjoyed it and will probably operate more contests in the future. — WN4RUA,GA. Suggest that 200 watts input be the limit for low power. — VO1CA,MAR. My first contest of any type. — VE1ABX,MAR. Personally thought the contest was fantastic and my code speed increased greatly. — VE3AOD,ONT. First contest since getting my ticket. Keep up the good work. — WA7OEX,WASH. Have missed only one contest in the last ten years. — K7BPR,ORE. My thanks to all for their help. — WN7OLT,ORE. Bands were very poor here. — KL7EWA,ALASKA. Conditions ex-



Here's Leigh, WB6OLD operating W6HX. With an antenna system like this, it's no wonder he placed 1st in the Top Ten on cw, 2nd on phone!

CLEAN SWEEP



W2PVX K5AEU K8EHU

cellent but nobody seemed to hear me. Wonder how many will say, where was San Francisco? - W6WLV,S.F. Put the low power multiplier back. - W4NM,VA. A credit to top ops today, picking my 1 X I call out of the pileups. Thanks for a good time. - K4EJG,VA. A really great contest but where were the VEs. - WN4NRL,VA. We shouldn't forget that Novices enter this contest too. The ones I worked seemed very grateful for the contact. - W7HVH,UTAH. Either there were a lot of multiops on or many of our high speed brothers have learned to send with one hand and write with the other. - WB0AOL,COLO. Had a wonderful time and would have liked to give the boys more Wyoming contacts. - W7HRM,WYO. Another fine SS, this is the best of all contests. - W5QJH,N.M. Fifteen minutes before the contest got a W5 from WWV. The corresponding loss of 10 meters and essentially unusability of 15 meters on Saturday eliminated the already small chance I had of competing with the old pros. W7RM,WASH. First SS since 1940. - W7HNY,ORE. Imagine my surprise when toward the end, I called "CQ SS WFLA." and was answered by WA4SSB in W. Florida! - W6RFU,S.B. The ARRL suggested operating frequencies is an excellent idea, less band hopping and should pacify anti-contesters. - K6MP,L.A. K1KTH was 50 db over S9 on 40! - WA7ISP,ARIZ. The long exchange is worthless. - WB4FEC,4,TENN. The only way to operate SS is tranceive with receiver offset, wish I had it here! - W5RTX,LA. I would like to say thanks to all the wonderful fellows that helped me to turn in a nice score. - WN5ZKE, ARK. Almost as much fun. - WB4GTS,VA. My first SS, and I'm quite happy about my results. - K4FAC,E.FLA. Thanks for the fine SS. At the next PVRC meeting I'll propose that we sponsor a cup for the second place club. - W4KXV,VA. Nearly fell out of my chair on the third KH6 contact. - WA1MJJE,W.MASS. This was my first SS and I'm looking forward to the next. - WB5AIM,S.TEX. Murphy is alive and well in NNJ, got my rig after 18 hours! - WA2FFV,NNJ. What weird compulsion can two thousand people have that can force them to drive themselves to the brink of exhaustion all at the same time? - WA2FEC,NNJ. Oh me, Where were Wyoming and West Indies? - K4FU,KY. Thanks for the fb contest. - WN8ENB,MICH. These Sunday Sweepstakes are ruff on us preachers but still try to get in a few contacts just for old time's sake. - W8JUP, MICH. Two weekends in a row is getting to be rough. - K4PJ,TENN. Probably my last SS for awhile, entering the Navy in January. - WA4UAZ, TENN. Loved every minute of the contest, see you next year. - K5OEU,LA. Was doing fine until 55 mph winds blew my beam down. - WN0CJV, MINN. How about suggested frequencies for Novices? - WN6RMG,S.Diego. Its different!!! - WA6IZV,ORANGE.

SOAPBOX

Phone

At 8000 feet a whip antenna is no disadvantage! - K9GRQ/0,COLO. Where was K4KFC?

Missed him. - WA7EWC,WYO. The WA and WB boys are for the most part excellent operators. The SS contest should get better and better as the years go by. - W5EU,N.M. Murphy stayed out of the rig but struck on Friday with laryngitis which lasted the entire phone weekend. - W5RSZ,N.M. An excellent choice of dates, both 10 and 15 were really jumping! - W0BWJ, COLO. Enjoyed the contest but would like to see it made a little shorter. It is awfully hard to get up on a Monday morning after a good contest like this one. - WA5QQQ,N.TEX. Located 10 miles from S.C. but couldn't work them at all. - K4WAR,GA. Very enjoyable SS, didn't hear any YUKON anywhere. - K4HPR,ALA. This is the first contest for me and enjoyed it very much. I tried very hard but not too many antennas pointed up north. - VE8CB, N.W.T. Still can't seem to get Vermont or West Virginia for a Clean Sweep - next year maybe hi! - VE5TO,SASK. I ran a half hour phone patch to VE1 land during contest, yet failed to get the Maritime section. - VE3RMC,ONT. My 80 meter dipole was not operating, sorry. - VE2UN,QUE. I passed up several sections thinking I could get

C
L
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S
W
E
E
P

K1JHX
W1FBY*
WA1EOT
WA1IQJ/1
WA1IRG
K0DOI/1
K2ZWI*
W2DKM
W2SZ*
WB2ZPW/2
K3HZL*
W3ADO*
W3AZD
W3DQG
W3E2T
W3ZKH
WA3COJ/3
WA3HGV
K4BAI
K4EAI
K4HPR
K4SXD/4*
W4KFC
W4VSV*
W4WSF
WA4FFW
WA4JJD
K5PFL
K5RLW

W5RSZ
WA5YAS
WA5ZRM
K6BEP
WB6ZUO
K7VPE/7
W7CFJ
W8EDU*
W8MXO
WA8MQP
WA8VBY
WA8VRB
K9QFZ*
K9WTS*
W9KVF
W9RQM
WA9BWY
WA9ZBV*
WB9FJX
K0IJL
K0VYV*
K0YVU
W0AIH
W0IYP
WA0IEF
WA0JCE
WA0LGS
WA0UCU
WA0VQX/0*

W1YK
W2AJR
K3MTK
W3MVB
WA3FXJ
K4CG
K5OJI
K6EBB
W6ISA
WA8ZDF
W9YT
VE2UN

WA1JMR, opr.
WA2UWA, opr.
K3DVS, opr.
K3EST, opr.
WA3IAQ, opr.
WA4KJR, opr.
WA0HYI, opr.
K2EIU, opr.
WA6CZR, opr.
WA8RWU, opr.
K9KGA, opr.
WA3HRV, opr.

*Multioperator

AFFILIATED CLUB PARTICIPATION

Each year an engraved coco-bolo gavel is awarded to the ARRL-affiliated club whose members tally the largest aggregate score. For the 6th consecutive year, the *Potomac Valley Radio Club* is judged to be the winner, and by a comfortable margin, at that. How do you beat a club that submits 111 entries? The answer, you don't! Congrats to Bob, K3EST who (operating W4BVV,cw and W3MVB,phone) takes honors for both modes. Second place, again this year, goes to *Murphy's Marauders*. They fought hard to dethrone the champs, but lacking the manpower,

fell somewhat short. Don't despair, however, they'll be back again next year! W1BGD/2 lead his club on both cw and phone. Nice going, Pete. Third place, up one from last year, goes to the *Minnesota Wireless Association* with K0ORK and WA0HVR taking cw/phone honors, respectively. Forth, with the only other club score over a million, is the *West Valley Amateur Radio Club*. Take notice, gang, they were 9th last year! Club certificates, again for both modes, go to Leigh, WB6OLD (operator of W6HX).

Club participation was never greater, 61 entries in all! What can your club do to make next year even better? Think about it.



AFFILIATED CLUB SCORES

Club	Score	Entries	CW Winner	Phone Winner
Potomac Valley Radio Club (Md.)	5,550,248	111	W4BVV	W3MVB
Murphy's Marauders (CT.)	4,223,977	89	W1BGD/2	W1BGD/2
Minnesota Wireless Association	1,598,112	31	K0ORK	WA0HVR
West Valley Amateur Radio Club (Ca.)	1,019,434	18	W6HX	W6HX
Central Michigan Amateur Radio Club	911,361	18	W8SH	W8SH
Indian Hills Radio Club (Oh.)	852,569	17	W8USP	K8RMK
Radio Club of Tacoma (Wa.)	726,460	25	W5OQQ/7	K7VPE/7
Columbus Amateur Radio Association (Oh.)	705,026	26	WA8ZDI	K8EHU
South Jersey Radio Association	692,558	35	W2PAU	W2PAU
Northern California Contest Club	653,181	7	K6RFB	
Frankford Radio Club (Pa.)	584,836	8	W3GM	WA3COJ/3
128 Contest Club (Ma.)	555,398	11	W1BFW	W1TRG
Boeing Employees Amateur Radio Society (Wa.)	547,572	39	WA7MIX	WA7IBM
Richardson Amateur Radio Club (Tx.)	522,288	16	K5OJ	K5UJ
Norwood Amateur Radio Club (Ma.)	381,049	16	WA1JYY	K1HHN
Suburban Amateur Radio Club (Pa.)	375,184	10	WA3NQY	K3MNJ
West Park Radiops (Oh.)	328,824	18	W8AJW	K8MMH
Connecticut Wireless Association	289,942	8	W1TCH	W1UC
Wisconsin Valley Radio Association	284,528	11	W9ROM	W9ROM
Suffolk County Radio Club (N.Y.)	282,297	8	K2AU	K2AU
R.F. Hill Amateur Radio Club (Pa.)	272,863	12	K3HJZ	K3HJZ
Miami Valley Amateur Radio Contest Society (Oh.)	267,514	9	W8WPC	W8WOP
Albany Amateur Radio Assoc. (N.Y.)	254,863	17	WH2JLR	WA2LAH
Oak Park Amateur Radio Club (Ill.)	245,311	5		WA8ZDT
Clinton Amateur Radio Club (La.)	206,951	7	K0GXR	
Northern California DX Club	206,887	4		
Erna Radio Club (Pa.)	199,383	3		
Wheaton Community Radio Amateurs (Ill.)	195,411	6	WB9JFX	WB9JFX
Radio Amateurs of Greater Syracuse (N.Y.)	188,716	6	K2KIR	
Estero Radio Club (Ca.)	186,374	4	WA6DFI	
Louisville's Active Radio Operators (Ky.)	173,350	4		
Central Illinois Radio Club	163,190	29	W9GXR	K9ORP
Richmond Amateur Radio Club (Va.)	161,783	9	K4JM	WB4DPU
Massillon Amateur Radio Club (Oh.)	160,894	9	W8VYU	W8VVEV
K-W Society (Oh.)	131,860	4		
P.H.D. Amateur Radio Association (Mo.)	131,670	3		
Honolulu Amateur Radio Club (Hi.)	127,932	4		
Ozaukee Radio Club (Wi.)	124,790	6		W9RXJ
South Hills Brasspounders and Modulators (Pa.)	120,917	4		
Chicago Radio Traffic Association (Ill.)	115,199	8	W9HPG	WA9BLP
Hamfesters Radio Club (Ill.)	111,388	3		
Ramona Radio Club (Ca.)	100,792	5	WA6GSV	
New York University Amateur Radio Soc. (N.Y.)	100,410	7	W2DSC	W2DSC
Johnson County Amateur Radio Club (Mo.)	96,051	5	K0PIV	WB0ABE
Delta Amateur Radio Club (Tn.)	94,712	18	WA4EDR	WA4EDR
Mid-Mo Amateur Radio Club (Mo.)	93,923	4		K0RPH
Northwest Amateur Radio Club (Ill.)	81,073	3		
Canton Amateur Radio Club (Oh.)	73,616	7	K8RXD	W8SWB/8
North Florida Amateur Radio Society	65,609	4		
Nashville AR Explorer Post 15 (Tn.)	67,777	6	WB4FLR	
Penn Hills Amateur Radio Club (Pa.)	60,938	4		
Appabose Radio Club (Co.)	53,020	3		
Coastside Amateur Radio Club (Ca.)	49,480	5		
Gloucester County Amateur Radio Club (N.J.)	46,538	6	W82WAR	
Utica Amateur Radio Club (N.Y.)	45,998	6	WB2KLA	K2SOT
Huntsville Amateur Radio Club (Al.)	44,612	4	WB4EOW	
West Jersey Radio Amateurs	38,056	6	K2OPN	K2OPN
Lake Success Radio Club (N.Y.)	35,167	10	W2CZ7/1	W2BNS
ARINC Amateur Radio Club (Md.)	32,482	4	W3TOS	
Garden State Amateur Radio Association (N.J.)	27,880	3	W2ZEP	
Bergen Amateur Radio Association (N.J.)	16,913	3		

QSO LEADERS

(Single Operator)

CW		Phone	
W6MAR	915	K7VPF/7	1160
W9IOP	910	W6HX	1113
W6HX	892	K6EBB	1098
K6EBB	868	W5JAW	1028
K2KIR	856	W9YT	1014
W7CFJ	856	K5RHZ	1000
W5JAW	845	W3MVB	992
W2PVX	843	W7IR	983
K4GSU	837	WB2OEU	979
W7RM	832	K5OJ1	964

QRP CHAMPS

(150 Watts or Less at All Times)

CW		Phone	
K5RHZ	117,216	K5RHZ	148,000
W5RTX	75,555	WA4UFW	113,588
WB4FEC/4	72,846	W0AIH	105,600
K4EQA	70,216	W9RQM	87,675
K0AZJ	68,675	W5QGZ	81,760
WA3GVP	66,010	WA0UCU	81,000
W9HHX	65,727	W7CFL	77,319
WB4EAE	63,350	VO1CA	72,520
WA0VIS	62,980	WB5AAU	71,468
WA6DEI	61,200	WA2EBW	71,000

them later. This proved to be a mistake. — VE6AGV,ALTA. Was certainly pleased with the operating techniques displayed by 95% of the stations I worked. — VE4ZP,MAN. That KG4 really threw me as West Indies, will not hesitate so long next time, hi. — VO1CA,MAK. Two hours before the end of the contest and 45 seconds after working my 75th sections, my transmitter power supply blew up! Wouldn't be any fun without Murphy, hi! — K5RLW,STEX. Excellent conditions netted 56 New England contacts — without a single Vermont or Maine! — K6MP,L.A. Thrilled to find VE8BB for a Clean Sweep with 10 minutes left in the contest. — K6BEP,L.A. Sweepstakes Axioms — Thou shalt not operate phone while eating crackers.(It's not healthy for your clean microphone). Thou shalt very carefully label all transmission lines.(A 10 meter beam does not work very well on 75). Thou shalt not be discouraged when working a station with 200 or more contacts than thou.(After all, he could be telling an untruth!). — WA3COJ/3,EPA. Think maybe I'll move to West Virginia next year and become famous! — W3ZNF,DEL. One question, WHO's Murphy? — WA9WUC,IND. Finally got a Clean Sweep after 14 contests. — W9KVF,ILL. Very good contest. Ten meters saved the day for me. — WA5YMW,ARK. Would like to see the SS become a 5-Band contest, with scoring for each band separately. — WB8CCE,MICH. Conditions excellent, ten meters really produced. — WB2OFU,WNY. The entire contest was worth the effort when VE5PC said, "Thank you, Honey". — K2OYG,ENY. My mobile rig got a good workout for the few hours I could operate. I really appreciate the stations efforts to read my often weak signal. — K8MMZ/9,WISC. Operated incognito in a college dorm with hundreds of stereos, and a multitude of "traffic handling" curiosity seekers made things tough. — WB2TJO/2,WNY. The excitement of twelve years of SS and several section awards was equaled by my first clean sweep. — K3MTK,EPA.



W6KWE . . . Tom

LED SECTIONS BOTH MODES

(Boldface = over 100K each mode)

K1GAX	K6TVL	W8SH
WA1IRG	W6BIP**	K9KGA*
W2SZ**	W6HX	W9YB**
W1BGD/2	W6KG**	K0VVY**
K4BAI	W6YL**	W0HSC**
KG4CS	WB6NSI**	W0SOE**
K5RHZ	KH6IJ	VO1CA
W5JAW	K7VPF	VE7BDJ
	W8EDU**	

*opr. W9LAX - CW, W9YT - Phone

**Multioperator

***W6DOD - Phone

THIRTY-SEVENTH

SWEEPSTAKES CONTEST

Scores are grouped by Divisions and Sections. Within each section, scores are further broken down by power category. A indicates dc input power up to and including 150 watts, B over 150 watts. The total operating time to the nearest hour, when given for each station, is the last figure following the score. Example of listings: WA3MSU 748-22-17-B 1 or final score of 748 number of contacts 22, number of sections 17, dc input power B, total operating time 1 hour. An asterisk denotes a Hq. staff member, ineligible for award. Multi-operator stations are grouped in order of score following single-operator station listings in each section tabulation.

CW SCORES

ATLANTIC DIVISION

<i>Delaware</i>	
WA 4MSU	748- 22-17-B 1
WA 3OHY	12,218- 152-41-A13
WA 3PHG	2856- 416-58-B10
WA 3OVV	2324- 48-28-A15

Eastern Pennsylvania

WY 1YUW	96,258- 678-73-B24
W3GM (WA3JDSZ, opr.)	
92,868- 654-71-B22	
W3ABJ (WASKLX, opr.)	
67,730- 522-65-B22	
49,959- 397-63-B24	
W3DOG	48,256- 416-58-B10
W3ISS	35,328- 276-64-B24
W6MN/3	23,441- 208-57-B12
WA 3NNA	18,316- 141-48-B10
WA 3NNA	10,872- 151-36-B14
K3MJJ	7200- 60-60-B 3
W3MGE (3 oprs.)	
5394- 89-31-B 6	

W3QKV	31,800- 300-83-A16
W3ALVC	18,894- 201-47-A16
W3ARK	18,668- 180-82-A12
W3ADH	18,104- 146-62-A12
W3SMZY	9006- 148-38-A13
W3N3OU	9027- 141-31-A19
WA 3OAY	8077- 105-44-A12
W3BUR	6300- 75-42-A 5
W3N3QX	4890- 82-80-A18
K3OIH	4424- 74-28-A 3
W3ADWO	3920- 70-28-A11
K3DVS	1794- 39-23-A 5
W3GCF1	1680- 41-21-A 7
W3ACMD	1218- 20-18-A 4
W3PNI	176- 11- 8-A
K3IAM (+K3HUA)	
33,108- 267-62-A24	

Maryland-D.C.

K1LPL/3	115,200- 800-73-B24
W3URE	71,657- 75-75-B23
W3MVB	110,704- 748-74-B24
W3IN	107,280- 748-72-B24
WA 3HJ (WA3AJQ, opr.)	
86,616- 605-72-B23	
K1WUW	84,750- 566-75-B24
W3EJZ	80,920- 581-70-B24
W3ZKH	79,170- 566-70-B23
W3AZU	76,516- 517-74-B23
W3GON	71,600- 510-68-B21
K1LKS/3	70,243- 510-69-B24
W3MFI	56,298- 427-66-B19
K1RWB/3	55,074- 420-67-B23
W3EA	51,544- 379-68-B18
W3AJNK (WA3JLT, opr.)	
44,840- 390-59-B23	
K3CKT	44,200- 340-64-B18
W3AEL	43,648- 341-64-B17
W3KWB (WA3JL, opr.)	
34,111- 276-72-B14	
W3DVO	33,176- 210-83-A14
K3ANA	31,420- 261-60-B16
W3IOS	29,700- 270-55-B16
W3EJV	25,048- 202-62-B14
W3EFP	23,436- 189-62-B13
W3AXW	19,220- 155-62-A 4
W3HVM	14,586- 143-51-B 9
W3ABC	13,672- 146-60-B18
W3HUY	13,005- 145-48-B22
W3CSZ	10,879- 127-43-B 5
K3WBB	1700- 30-17-A 4
W3HH	200- 10-10-B 1
K3JY7 (+WA3JX)	
68,600- 490-70-B24	
K3HVO (multi-opr.)	
24,840- 208-60-B18	

W3JGVP	66,010- 474-70-A24
W3TM7	32,240- 248-65-A11
W3JNVT	26,880- 230-58-A18
W3HPU	25,350- 195-65-A18
W3AGLO	24,672- 195-48-A13
W3AMJE	15,850- 160-50-A18
W3LIN	15,000- 150-50-A18
W3JNTE	14,281- 148-47-A11
W3ALUH	615- 21-15-A 3
W3AWN	532- 19-14-A 2
W3NOXK	434- 16-14-A10
W3JPKY	350- 10-10-A13
W3BHE	1- 1- 1-A 3
W3CWE (WA3E LOP, opr.)	
21,600- 200-54-A16	

Southern New Jersey

W2BQF	71,820- 513-70-B23
W2PAU	50,490- 387-66-B17
W2REB (K2PVM, opr.)	
29,976- 228-46-B18	
W2JHON	29,967- 200-55-B18
W2IA	18,616- 182-48-B17
K2QPN	17,226- 160-58-B10
W2BAWK	16,356- 147-47-B16
W2SMD	11,567- 123-47-B10
W2EPA	8241- 102-41-B 7
W2TVI D	1806- 43-31-B12
W2TIG	476- 11-14-B 2
W2JHI	360- 18-10-B 2

WA2BPL (+WB2WRP)

14,147- 151-47-B10	
W2LYS	41,400- 300-69-A20
W2LYL	34,722- 322-54-A22
W2HUIV	24,966- 219-57-A15
W2VYA	18,718- 175-54-A15
W2HRE	11,280- 120-47-A10
W2ZHF	9082- 120-38-A 5
W2ZNDP	5820- 99-45-A13
W2BWRP	2456- 60-23-A 7
W2NOM	1564- 49-24-A 9
K2SQS	950- 25-19-A 4
W2NOLS	800- 18-16-A22
W2NIIQ	720- 24-16-A 3
W2NPL	290- 18-14-A 6
W2MES (+WB2EQ)	
40,890- 154-58-A24	

Western New York

K2KJR	123,192- 856-72-B24
W2DIO	47,360- 372-64-B23
W2AJIV	24,000- 200-60-B19
K2YAH	20,488- 200-52-B12
W2BQKQ	10,250- 125-41-B15
W2B2MD	8400- 100-42-B 3
W2BFW	4402- 71-31-B 9
W2FZK	46,284- 406-67-A13
W2JCU	31,262- 319-49-A18
W2BQEQ	38,910- 245-59-A23
W2JFQ	24,490- 201-62-A24
W2JFQ	21,840- 196-56-A17
W2BJJN	16,450- 175-47-A13
W2KJ1	15,386- 157-49-A16
W2GZAN	14,160- 167-40-A16
W2ZOF	10,320- 131-40-A16
K2IHR	8556- 93-46-A10
W2B2TY	4455- 68-34-A14
W2B2MB	4500- 87-25-A10
W2KLA	7250- 50-23-A 8
W2QFE	508- 23-11-A10
W2N1HO	374- 17-11-A 3
W2N1NB	270- 14-10-A 7
K2GXT (WB2PNN, FOW)	
23,154- 247-51-A18	
W2B2LQ (WB2B2MK)	
12,870- 170-39-A14	

Western Pennsylvania

K3HJL	37,398- 276-69-B14
WA 3JH (+WA3JGY, MOJ)	
64,260- 474-68-B23	
W3NKL (7 oprs.)	
54,150- 437-63-B24	
W3AKOS	47,501- 355-67-A16
K3VXV	46,068- 349-96-A20
WA 3KQA	34,800- 300-58-A22
W3AKQ	25,948- 210-57-A16
W3QRE	13,311- 132-81-A18
WA 3GZO	10,535- 125-43-A11
W3AKYU	9436- 108-46-A19
W3PCK	9240- 114-43-A14
W3NPM	86- 34-B18
W3KJD	4104- 54-38-A 6
W3NORP	3720- 64-30-A15
W3JHSE	920- 25-20-A 4
WA 3MFD (+WA3JSD)	
5250- 78-25-A22	

CENTRAL DIVISION

Illinois

W9LVT	94,824- 841-73-B23
W9LY (WA9QMB, opr.)	
92,564- 834-73-B24	
W8FAW/9	90,144- 628-72-B20
W9N1JX	74,241- 510-73-B24
W91VH/9	
65,794- 491-67-B16	
WA9LO (WA9LFX, opr.)	
63,780- 452-70-B23	
W9N9C	61,300- 431-65-B20
W9OQC	53,992- 400-68-B17
W9WYV	49,758- 358-64-B17
K9DIA	39,208- 338-68-B21
K9PFE	37,860- 325-60-B19
W9TRI	24,534- 216-48-B18
W9VBV	15,120- 140-54-B 8
W9WR	11,628- 102-57-B15
W9VYD	12,144- 138-44-B 6
W9VZL	7182- 105-36-B23
W9ALEY	5880- 86-35-B11
W9UXX	1615- 44-19-B 3
K9MX	1150- 25-23-B12
W9YU	72- 6- 6-B 2
K9VRW (+K9UTM)	
53,620- 384-70-B21	
WA9IGX (6 oprs.)	
50,424- 385-66-B24	

W9LNO	59,940- 405-74-A22
K9UUY	46,716- 346-68-A22
W9GXR	39,000- 300-65-A21
W9HPO	23,490- 203-58-A18
W9N0HA	21,924- 204-44-A21
W9REU	20,584- 166-62-A17
W9TAF	20,405- 188-65-A22
W9RBB	18,126- 160-68-A21
W9IB	16,591- 177-47-A14
W9FHG	15,300- 150-51-A17
W9N0QJ	11,616- 127-48-A23
W9B9XX	9580- 120-40-A 5
K9KRU	9000- 90-50-A10

WB9BYV	8415- 95-46-A13
K9RVT	4026- 61-33-A10
W9ZEN	2200- 50-22-A 5
WB9BDK	1995- 50-21-A13
W9NCGJ	1302- 31-21-A15
W9NFDU	1060- 281-91-A18
WB9AJB	768- 32-12-A 3
WN911A	754- 45-13-A24
WA9701	570- 19-15-A 5
WB9DZG	560- 20-14-A 4
W9INQ	504- 18-14-A 3
W9ZPF	270- 15- 9-A 4
W9NDYV	180- 11- 9-A10
K9HJ	76- 4- 2-A 1
WB9JOK (multi-opr.)	
20,088- 186-54-A19	
WN9CGL (3 oprs.)	
330- 16-14-A 9	
WN9CCC (3 oprs.)	
32- 4- 4-A 3	

<i>Indiana</i>	
W9IOP	131,838- 910-73-B24
K9CUIY	74,175- 554-69-B24
W9JOQ	29,890- 245-61-B13
WB9DMC	19,920- 200-51-B13
WA9U1O	18,500- 164-60-B19
W9VIV	1800- 105-38-B 7
W9QLW	4536- 63-46-B 9
W9YB (4 oprs.)	
79,550- 539-74-B24	
W9BF (2 oprs.)	
49,414- 399-62-B24	
WB9DGY (WB9NBY)	
24,035- 226-45-B22	
WB9ALL (8 oprs.)	
19,292- 182-53-B20	
WA9BWV (+WA9JXG)	
9400- 100-47-B 4	
WA9BHR	23,364- 199-59-A11
WB9CTC	46- 68-32-A 9
W9N9Y	3388- 50-23-A 8
WB9HAY	2856- 51-28-A 2
WN9DOU	2418- 52-26-A10
WN9BAQ	360- 20-10-A 5

<i>Wisconsin</i>	
W4LAX (K9KGA, opr.)	
92,400- 670-70-B24	
W9EWC (W9ZGR, opr.)	
79,200- 600-66-B20	
W9N9Y	78,384- 553-71-B24
W9HLE	69,790- 500-70-B22
W9ROM	69,138- 404-69-B17
W9YTKJOAL, opr.)	
66,368- 488-68-B14	
W91MU	55,685- 275-65-B16
WA9OMO	33,668- 270-63-B18
W9KXK	13,920- 121-58-B11
W9TCE	7990- 85-47-B 8
W9CTI	6688- 88-38-B 8
W9GKJ	3976- 73-78-B 9
WA9FDZ	70- 7- 5-B 1

<i>W9HXX (WA9YUJ, opr.)</i>	
65,727- 493-67-A24	
WB9FEY	34,668- 321-54-A11
WA9IQM/9	
23,896- 200-58-A11	
WB9HJ	19,480- 180-57-A12
WA9SQN	14,240- 185-62-B16
W9ERW	13,974- 137-51-A10
WB9UUX	8557- 100-43-A 7
WN9IBG	5577- 91-13-A23
WB9BBC (+WB9BJX)	
13,650- 175-42-A18	

DAKOTA DIVISION

<i>Minnesota</i>	
K9ORK	107,237- 718-73-B24
W9YCR	79,520- 568-70-B24
W9HVV	79,419- 576-69-B20
W9YFP	75,344- 555-68-B20
W9NFI	64,377- 505-69-A17
W9KRW	45,960- 352-65-B21
K9NCN	42,791- 266-61-B 8
WB9HJ	19,710- 219-45-B 8
WB9AD	18,522- 200-49-A14
WA9PRS	18,513- 182-51-B10
WB9A (+WB9B, opr.)	
17,775- 165-54-B 6	
W9QWU	11,051- 130-43-B16
W9BTW	3640- 65-28-B 3
W9TIV	1920- 40-24-B 3
WB9AN	33- 6- 3-B 1
WA9VIS	62,890- 470-67-A23
K9UJL	59,735- 400-65-A18
K9ZLL	59,092- 436-68-A21
WA9JH	51,744- 410-67-A16
WA9WEZ	50,715- 406-63-A18
WA9WBG	47,385- 366-65-A24
W9HUC	42,228- 308-69-A18
W9HJG	37,820- 311-61-A12
WA9VDP	34,377- 255-66-A17
WA9VBN	18,384- 193-48-A14
WA9SLI	18,300- 184-44-A10
W9SIS	10,912- 124-44-A 4
WA9ZOW	10,000- 125-40-A 9
WA9KQI/9	
7708- 96-41-A13	
WN9ANT	4988- 90-29-A 4
WA9YKN	2184- 42-26-A 6

WN9CIV	1840- 42-23-A18
W9VPR	1476- 41-18-A 2
WN9COQ	1008- 28-18-A 2
<i>North Dakota</i>	
WA9RSR	8358- 100-42-B12
WB9SC (4 oprs.)	
3842- 57-34-B 5	
<i>South Dakota</i>	
K9VYV (3 oprs.)	
76,895- 594-64-B24	
K9ZTV	33,868- 234-51-A11
K9F1/9	336- 14-12-A

DELTA DIVISION

<i>Arkansas</i>	
WN57KE	20,628- 198-54-A31
<i>Louisiana</i>	
K5OEU	20,242- 175-58-B14
W5CEB	17,632- 142-55-B 9
WB5CBS	1368- 36-19-B 5
W5RTY	7,555- 650-69-A24
W5ASNUK	44,418- 239-66-A13
W5WQ	28,025- 339-59-A20
<i>Mississippi</i>	
K5AEU	10

W8NBN 120- 10- 6-A 3
W8UC (5 ops.)
14,976- 161-48-A20

Ohio

WBWPC (K8BPX, opr.)
11,408- 746-74-B24
K8RKM 97,088- 661-74-B23
K8EHU 88,800- 592-75-B23
W8AEB 83,376- 579-72-B24
W8BAKW 82,524- 598-69-B20
W8YU 65,320- 460-71-B19
W8FEZ (W8FMG, opr.)
55,614- 403-69-B19
W8EOG 53,363- 366-73-B21

W8RWS 43,550- 325-67-B16
W8VOT 34,010- 271-64-B17
W8BENE 33,248- 278-50-B22
W8KZH 25,724- 220-59-B15
W8KAI 25,500- 214-60-B18
W8UTU 25,326- 201-63-B 8
W8PMJ 21,600- 200-54-B12
WA4RIJ/8

19,200- 199-50-B10
W8GBH 17,100- 150-57-B 9
W8AQZ 17,000- 150-54-B15
K8RDX 15,900- 150-53-B14
W8AMCR 15,544- 134-58-B 6
W8YCP 10,952- 74-74-B 9
W8AMV 8,652- 103-42-B 8
W8BKV 35,328- 156-69-A15
W8AZTV 5320- 76-35-B 4
W8ZSU 4,744- 52-36-B 4
W8LVT 3,710- 53-35-B 3
W8BCWD 2000- 50-20-B 3
W8ELE 1700- 50-17-B 2
W8BBOR 1152- 32-18-B 6
W8EDU (3 ops.)
27,972- 681-72-B24
WA8LWH (+WA8LW)
77,880- 557-70-B24

W8AFX (2 ops.)
46,190- 376-62-B20
W8LTL (4 ops.)
39,176- 332-59-B13
WBACEE (+WB8DS)
15,800- 158-50-B19

W8OYL 57,744- 401-72-A21
W8AIW 53,588- 391-69-A19
K8EKG 43,772- 385-62-A12
W8BAJX 35,380- 291-61-A22
K8HBN 35,328- 156-69-A15
W8ARTG 28,179- 241-59-A15
W8ASME 24,592- 212-58-A16
W8BAP 21,670- 199-55-A10
W8SH 20,178- 177-57-A10
W8BEC 16,500- 172-50-A23
W8IDM 13,200- 150-44-A10
W8AWAK 12,600- 150-42-A
K8DHU 12,000- 120-50-A10
W8BEC 11,938- 127-47-B 3
W8FESX 11,808- 123-48-A11
W8AYHN 10,277- 120-43-A13
W8MH 8,568- 102-42-A 9
W8MKO 8,159- 100-41-A 7
W8RAGD 5,508- 81-34-A 9
W8DB 5,460- 70-39-A 3
W8AVYG 4,619- 76-31-A19
W8BOD 3,828- 58-33-A 7
W8BAUF 2,580- 43-30-A 4
K8IKO 2,500- 50-25-A 8
W8NHHN 1,914- 48-22-A14
W8OHO 1,909- 42-23-A 5
W8SGVE 1,587- 36-23-A 8
W8VZE 1,178- 32-19-A 5
W8AMGL 1,160- 29-20-A14
W8RQBY 825- 38-15-A14
W8RFNH 598- 23-13-A 2
W8NHHP 396- 20-11-A 8
W8FEVY 160- 11- 8-A 5
K8IKO/8 140- 10- 7-A 2
W8VND/8 (3 ops.)
35,532- 282-63-A16
W8FV (6 ops.)
27,930- 245-57-A19
W8RTR/8 (3 ops.)
19,412- 211-46-A19

HUDSON DIVISION

Eastern New York

W1BGD/2 118,800- 792-75-B24
K2BK 70,080- 480-73-B24
K2SHL 43,524- 352-62-B22
K2ELKM 36,300- 331-55-B
K2OYG 9,504- 100-48-B23
W2AWE 3,248- 56-29-B 6
W2KZN 1,880- 40-20-B 8
W2GFP 432- 24- 9-B 3
W2AKUL 84- 7- 6-B 4
W2SZ (7 ops.)
82,214- 558-74-B24
K2VOE 81,328- 608-68-B21
W2ZJLR 35,526- 287-62-A18
W2ZHAJ 30,856- 243-64-A21
W2ASGH 20,468- 20-18-B 8
W2JAM 10,750- 127-43-A19
W2MYV 7,400- 100-25-A19
W2KZS 7,245- 108-35-A17
K2GSL 4,408- 76-29-A13

WN2PQH 3564- 66-27-A17
WA2JXR 3132- 55-29-A 5
W2UUV 1740- 56-15-A
WN2NAH 540- 24-12-A12
WN2MYH 243- 17- 9-A 9
W2YPM/2 (WN2JZD, opr.)
225- 14- 9-A 4
WB2DXM 40- 5- 4-A
WA2LNX/2 4- 2- 1-A

N.Y.C. L.I.

W2PVX 126,075- 843-75-B24
K2AU 95,238- 647-74-B24
W2DSC (WB2TUL, opr.)
65,320- 460-71-B22
W2ALKEA 16,054- 176-46-B12
W2UAL 14,356- 158-46-B12
W2AGMD 6,327- 98-37-B11
WB4QZG/2 34,32- 66-26-B 3
WB2DZZ 1564- 34-23-B 1
WB2MUK 1491- 37-21-B 5
W2AWLQ 1064- 29-19-B 4
WB2JFX 242- 11-11-B 1
WB2WXR 36,382- 284-64-A24
K2DWM 17,600- 160-55-A22
W2AEGT 17,040- 179-48-A15
W2AJW 15,870- 174-44-A18
WN2MAN 15,024- 159-48-A20
W2ALEF 10,209- 133-41-A18
WB2LYB 8769- 123-37-A 1
WN2LOM 8336- 103-36-A22
WN2MRS 2484- 47-27-A17
W2HAE 1289- 32-20-A 4
W2TUK 800- 25-16-A 1
W2NBI 376- 17-14-A 6
W2HBO 374- 18-11-A 6
W2BNS 207- 13- 9-A 4
W2ZPG 32- 4- 4-A 1
WA2HOP (+WN2KYV)
36,96- 77-24-A14

Northern New Jersey

W2YT 77,140- 551-70-B23
WA2BAN 70,518- 511-69-B23
WA2ASM 62,040- 473-66-B23
WB2DAA 60,960- 508-60-B20
W2ZVPR 57,754- 431-67-B20
WA2JNQ 35,040- 292-60-B18
W2ZBY 22,800- 200-57-B16
W2ZEP 19,658- 182-54-B10
WB2LRL 17,658- 164-56-B21
WB2GGG 13,716- 127-54-B16
W2BAL 8,096- 88-46-B 6
W2VE 3,191- 57-28-B 5
W2EMS 810- 27-15-B 2
W2LOQ 144- 9- 8-B 4
W2VLP (+W2BHK)
71,484- 522-69-B24
K2OJC (WA2JME FVH)
59,356- 418-71-B18
W2CJC (+W2JME FVH)
46,656- 367-64-B23
WA2KHJ (+WA2LXS)
22,464- 220-52-B17
WA2HAD 53,196- 403-66-A21
WB2JAL 50,050- 358-70-A23
WA2FEL 34,461- 274-63-A17
WA2FEV 28,224- 295-48-A18
WA2FWA 13,680- 71-40-A13
W2DEN 13,158- 129-51-A12
K8CVJ/2 12,896- 124-52-A16
W2JFEK 12,880- 140-46-A18
WB2ZLI 11,700- 140-40-A 9
W2HR 7,844- 106-37-A 7
W2BWW 7,300- 87-45-A13
W2FWZ 6,474- 83-39-A 7
WB2NSV 5,775- 116-25-A12
WN2LHA 3,782- 61-31-A17
WN2PWS 2,808- 54-20-A15
W2MB 2,400- 50-24-A 2
WN2PGG 2,400- 58-24-A20
WA2OKX 1,512- 39-21-A13
WN2MUD 1,065- 39-15-A16
WB2IHL 580- 20-14-A 3
WB2LTV 468- 20-12-A 4
WN2PUL 128- 4- 4-A 4
WA2DIX 72- 6- 6-A 1
WA2HSG 40- 5- 4-A

MIDWEST DIVISION

Illinois

K8GXR 48,768- 401-61-B16
W1GVH 27,760- 188-75-B19
K8AZI 68,675- 513-67-A20
K8LUZ 45,370- 352-65-A19
W4870 40,870- 335-61-A22
WA9TVD/9 24,476- 211-58-A20
WA9ZBS 24,221- 211-51-A23
W8MOQ 12,240- 136-45-A 4
W8FK 12,012- 143-42-A 8
WA9EEN 11,815- 123-47-A13
W2ALMYR/8 9200- 100-46-A 7
WA9IAQ 8619- 112-09-A14
WA9QVM 2875- 52-25-A 3
WN9AAM 2366- 48-26-A10
WN9ZOM 112- 9- 7-A 5

Kansas

W8INH 78,792- 588-67-B19
K8PFV 37,448- 305-62-B21
W8CHJ 1760- 40-22-B 2
W8OFE (3 ops.)
72,080- 530-68-B24
WA8VIE 52,480- 415-64-A22
WA2HSP/0 42,160- 310-68-A17
WA8TAS 34,074- 318-54-A17
K3ZMI/0 27,216- 221-63-A22
WN8BYX 4480- 66-35-A16
W8ZY 285- 51-28-A 4
WN8ADS 1806- 60-21-A 5
WN8CRQ 1342- 31-22-A15
WN8CTQ 1- 1- 1-A

Missouri

WA8NVZ 67,914- 517-66-B21
K8PQ 66,456- 465-72-B20
W8OFE 68,580- 372-62-B18
WA8YFE 12,784- 136-47-B13
WA8PUL 14,839- 280-63-A17
W8KLG 31,248- 248-61-A18
W8BVB 15,416- 164-47-A11
WA8EMS 9,523- 69-69-A14
WA8WZR 6,006- 80-39-A14
W8DSW 3741- 65-28-A 5
WN8ZLI 3672- 62-34-A12
WN8AZK 1950- 40-25-A15
K8HGW (WA8EMS, opr.)
900- 25-18-A 8
WA8ZLU 500- 11-14-A 2
WN8ZLP 128- 8- 8-A

Nebraska

W8NGJ 74,830- 537-70-B22
W8WLO 69,138- 505-69-B23
WN8BRJ 3480- 60-29-A14

NEW ENGLAND DIVISION

Connecticut

K1ZND 110,880- 771-72-B24
K1JHX 110,880- 714-74-B23
W1FHY* 100,110- 705-71-B24
K1VTM 99,897- 706-71-B24
K1PKQ (WA1ABW, opr.)
88,750- 628-71-B24
W1FLM 83,835- 612-69-B24
K1ASJ 79,804- 567-71-B24
W1ECH 78,984- 550-72-B23
WA1HQU/1 76,983- 575-67-B17
WA1NFS* 72,660- 521-70-B20
WA1UL 68,700- 458-75-B16
K1EVS 59,704- 439-68-B16
K1DPB 57,720- 447-65-B22
K1GUD 55,141- 313-67-B17
WA1KMR 54,016- 423-64-B22
K1QKR/1 (WA1JZC, opr.)
52,325- 404-65-B22
WA1HOL 38,688- 312-61-B14
K1LWC 20,736- 195-54-B16
K8BXU/1 19,536- 208-48-B17
WA1LVW 17,860- 215-47-B21
W1FTD 14,872- 169-44-B 8
W1TCL 12,427- 145-43-B 8
K1OUD 10,640- 130-40-B12
W1RW* 9720- 110-45-B15

W1ACR 39,852- 322-54-A21
K1YRP 23,028- 202-57-A15
W1ETX 18,810- 165-57-A12
W1DIT 15,840- 144-55-A 9
WN1MAO 11,970- 144-45-A21
WA1JSD/1 11,640- 148-40-A10
W1DGT 11,340- 133-42-A 7
W1EER 11,070- 125-45-A12
W2CZ7/1 8600- 100-43-A 8
W1HM 7600- 102-38-A14
WA1KKM 4118- 71-29-A21
W1JFE 3542- 81-22-A15
W1BDI 3200- 50-32-A 6
WN1UC 2024- 45-23-A16
W1ECC 1116- 33-18-A 3
W1SK 666- 19-18-A 3
WA1LWO 407- 19-11-A 3
WA1HNR 70- 7- 5-A 1

Eastern Massachusetts

W1AIR 87,768- 613-72-B24
K1ELF 55,116- 49-66-B21
WA1IY 54,400- 400-68-B22
W1AX 39,600- 300-66-B
W1EJN 35,510- 265-67-B12
K1HHN 35,052- 254-69-B22
K1OME 29,732- 254-58-B12
WA1HAA 8200- 100-41-B 3
WA1MPI 7524- 100-36-B 8
WA1KSF 6116- 31-17-B11
W1PL 5508- 77-36-B 8
WA1LXE 1240- 31-20-B 2
W1MX (3 ops.)
97,632- 681-72-B24

WA1IUY (3 ops.)
82,644- 583-71-B24
W1ECC 48,640- 380-64-A24
W1ELM 39,804- 324-62-A23
K1HRE 38,482- 375-71-A18
WA1KAG 35,090- 320-55-B22
WA1LXK 33,588- 317-54-A24
WA1GFW/1 23,970- 240-51-A15
W1KRG 17,600- 160-55-A12
WA1LOO 15,408- 161-48-A17
WA1KJF 8785- 126-35-A17
WN1NRV 5536- 71-76-A22
WA1MNO 3510- 73-26-A12
WN1NDM 2925- 60-25-A 2
WN1NH 1911- 50-21-A 9
WN1NEW 1701- 42-21-A24
WN1NDP 1360- 34-20-A13
WA1KSW 1184- 38-16-A 6
K1HRV 928- 29-16-A 4
WN1MSH 732- 32-12-A11
K1HRE 704- 32-16-A 3
WN1MYK 624- 31-12-A 8
WN1NRT 552- 27-12-A15
WA1MHJ 440- 24-10-A10
W2VFW/1 440- 20-11-A 2
WA1NME 192- 12- 8-A 3
WN1NLX (2 ops.)
1740- 45-20-A18

Maine

K1GAX 46,930- 361-65-B17
K1TEV 20,300- 203-50-B19
W1FZN (W2BAS, opr.)
11,703- 125-47-B 8
W1DEO 5776- 78-38-A17

New Hampshire

W1BPW 99,100- 670-74-B24
W1EEL 49,075- 378-65-B16
W1BUT 46,565- 348-67-B15
W1EFC (4 ops.)
24,820- 232-56-B18

W1DXB 50,592- 372-68-A23

Rhode Island

W1ELN 24,635- 191-65-B16
W1EIR 33,099- 282-59-A23
WN1MNO 98- 8- 7-A 7

Vermont

W1PEL 13,677- 146-47-B19
W1AYK 9424- 124-38-B 6
W1MRW 9717- 121-41-A11

Western Massachusetts

W1YE (WA2BCT, opr.)
81,864- 578-71-B23
W1EZO 49,075- 378-65-B16
K1SSH 41,664- 372-66-B17
W1LPL 5742- 99-29-B 5
WA1MJE 22,737- 215-53-A19
W1MJE 5548- 82-32-A 9
WN1WS/1 3068- 62-26-A15

NORTHWESTERN DIVISION

Alaska

K17ME 1292- 34-19-B 2
K17FWA 9331- 112-43-A10

Idaho

W7IUD 42,840- 344-63-B17
WA7MPS 396- 18-12-A 4

Montana

W7YB (W7I R, opr.)
70,449- 534-67-B23
K7LTV/7 43,420- 380-57-B22
K7CPC 40,131- 321-63-A22

Oregon

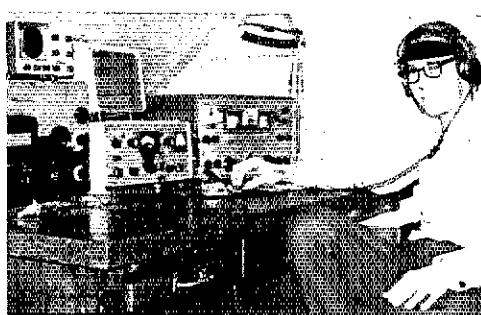
W7HNY 21,384- 200-54-B17
WA7MOX 20,300- 185-55-B14
WA7CEL (WA7PFS, opr.)
1840- 51-23-B 5
W7ESM (WA7LDZ, opr.)
270- 15- 9-B 2
K7BWP 56,576- 418-68-A24
WN7OUL 33,728- 248-68-A21
WA7NB 22,072- 178-62-A23
WA7KWS 11,178- 122-46-A 9
WA7WTE/7 10,191- 119-43-A12
K7YXS 9075- 114-43-A 9
WN7PEZ 6804- 81-42-A17
WA7KWW 600- 20-15-A 3

Washington

W7RM (K7VPE, opr.)
124,200- 832-75-B24
W5QQM/7 (K7HI Z, opr.)
9075- 81-42-A17
W7MJX 29,241- 263-57-B19
K7NWS (WA7JCB, opr.)
20,696- 199-52-B11



WA7OCL . . . Joe



VE3AIA . . . Victor



WA4FFW . . . Mac



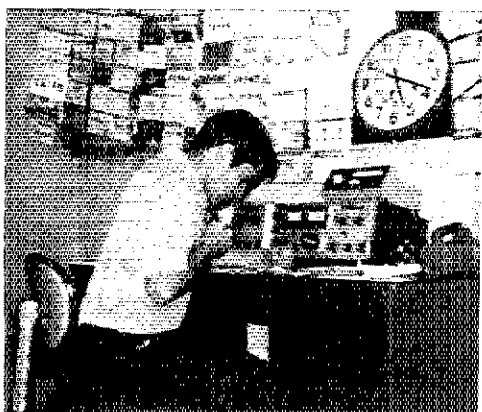
WA6DKF . . . Ken



W5EU . . . Sam



WB4GGA . . . Steve



VE4ZP . . . John



WB6HDG/7 . . . Ray

Quebec		W3ZNH	56,794- 389-73-B15	Western Pennsylvania		WB9BAP	704- 32-11-A 4
VE2AWR	24,753 238-52-B16	W3JPT	49,567 340-73-B22	W3YZR	25,862 197-67-B12	Wisconsin	
VF2CL	11,886 143-42-B16	W3KE	37,440 294-64-B15	W3SMX	25,665 218-59-B20	W9YT (K9KGA, opr.)	150,750 1014-75-B24
VE2SD	12,012 154-39-A13	K3ANA	33,660 255-66-B13	W3JGV	19,360 177-55-B 7	W9EWC (W9SZR, opr.)	96,940 655-74-B17
VE2AOP	11,169 111-51-A 9	K3KCT	27,522 209-66-B14	W3JNM	6,960 88-40-B11	WB9FLN	65,408 450-73-B19
VE2BVV	44,270 65-34-A 2	W3PUN	24,780 210-59-B16	W3QEL	47,280 100-24-B14	WB9AHQ	64,960 465-70-B19
VE2AQE	15,255 31-25-A 6	W3AGZT	24,156 183-60-B21	K3HJL (+W3AJ3J, opr.)	97,725 65-75-B24	W9HARG	50,048 372-68-B24
Ontario		W3HVM	21,560 196-55-B11	W3NKL (8 ops.)	64,600 477-68-B24	W9RJK	29,580 255-58-B16
VE3UOT (VE3AIA, opr.)	73,220 52-370-B24	K3FVB/3	16,856 155-56-B 7	W3JKA	15,688 150-53-A10	K9HFR	27,468 218-63-B14
VF3ENM (VE3IAH, opr.)	72,491 511-71-B23	W3EWP	13,376 152-44-B 5	K3JXY	13,776 177-54-A 7	W9UMQ	15,438 126-62-B20
VE3JWE	56,232 596-71-B16	W3JAM	10,176 106-48-B 4	W3AKS	13,630 165-47-A 9	W9WZC	13,824 108-64-B12
VF3HQ	1,721 21-16-B 2	W3JMC	48,884 66-37-B 7	W3KOD	10,008 102-52-A10	WB9JCK	10,414 129-41-B15
VE3EEW	33,894 269-63-A19	W3ABC	4884 66-37-B 7	W3JJP (+W3JNCH)	35,226 309-57-A24	W9NYI	4,674 83-30-B 3
VE3CQA	27,404 231-62-A18	W3KDP	19,274 37-26-B 3	W3AMHY (+W3AJ3Q)	26,660 217-62-A24	W9GKJ	3364 55-29-B 3
VE3GPN	13,824 144-48-A	W3GN	238 17- 7-B 1	CENTRAL DIVISION		W9CTI	11,522 32-15-B 1
VE3DBY (+VE3FEA)	10,530 117-45-A18	W3UIS (4 ops.)	81,144 578-72-B22	Illinois		W9JMO	616 24-14-B 1
VE3AOD (+VF3AXV)	48,772 96-29-A16	W3JZR (4 ops.)	78,621 539-73-B23	WB9FJX	112,500 760-75-B24	W9RSM	87,675 587-75-A19
Manitoba		W3ADO (11 ops.)	78,225 523-75-B24	W9KVE	55,575 577-75-B24	W9JMY	47,056 350-68-A24
VE4JB	40,992 336-61-A20	K3IVO (6 ops.)	56,168 413-68-B24	W9KYL	60,852 461-66-B21	WB9HJ	21,424 206-52-A18
Saskatchewan		W3LXL	44,450 318-70-A19	W9QXO	58,170 423-70-B22	W9BDN	10,900 109-50-A 9
VE5TT	33,779 56-31-A12	W3ANAV	34,574 295-59-A17	W9YOL (W9AUCU, opr.)	49,061 332-74-B16	W9GOU	10,080 112-45-A14
VE6VV	23,002 217-53-B13	W3MNTV	29,862 238-63-A23	W9BLP	42,822 351-61-B14	W9RMT	28,580 43-33-A 2
VF6AWW	58,455 85-35-B17	W3MFI	29,636 239-62-A19	W9GYN	36,102 274-66-B17	W9YUZ	12,400 31-20-A 3
VE6ADK	53,218 73-37-A12	W3FU	20,460 155-66-A15	W9B	28,380 215-66-B16	W9EDZ	60 6-A 1
VE6HI	810 28-15-A 5	W3JHG	91,522 104-44-A16	W9VVB	16,995 155-65-B 6	WB9BJR (+W9EZX)	36,140 280-65-A20
British Columbia		W3PS	80,664 65-63-A18	K9BOL	16,779 165-51-H10	DAKOTA DIVISION	
VF7BDJ	77,980 558-70-B19	W3AWN	20,500 41-25-A 4	W9BDE	15,895 145-55-B 9	Minnesota	
VE7IQ	6,345 71-45-A	W3AENM	10,448 29-18-A 2	W9HGO	12,816 134-48-B 7	W9HVR	118,992 809-74-B24
VE7AGN	240 12-10-A 7	W3JYS (W3AJHU, opr.)	18- 3-A	W9APC	91,200 114-40-B12	K9ILY	99,224 647-75-B20
Yukon-N.W.T.		W3CWC (W3AJS EOP EOC)	8400 200-21-A10	W9MFP	5616 78-36-B 5	W9LTP	85,560 571-75-B16
VE8BB	27,376 234-59-B12	Southern New Jersey		K9IMX	4884 74-33-B 5	W9VVK	58,650 425-69-B14
PHONE SCORES		K3JOC	60,079 412-73-B21	W9YVU	2300 50-23-B 2	W9PRS	41,683 286-73-B19
ATLANTIC DIVISION		W2PAU	40,584 381-67-B13	W9WEL	8- 2-B	W9WTV	22,538 191-59-B13
Delaware		W4ZDVU	44,226 351-65-B13	K9QFZ (+K9JRL, opr.)	117,954 78-75-B20	W9WVW	97,522 107-46-B13
W3JHG	96,300 648-75-B13	W2ITG	26,400 220-60-B18	K9WTS (3 ops.)	97,700 743-75-B24	K9CNC	12,924 34-19-B 1
W3CKH	46,540 361-65-B17	W2NRU	23,200 201-58-B12	K9VWB (+K9U1M)	58,078 743-75-B24	W9GHR	154 11- 7-B 1
W3NNK	44,178 299-74-B15	K3QPN	12,848 147-44-B 7	W9ZLB (3 ops.)	63,450 423-75-B	WB9BDI (2 ops.)	24,030 237-54-B 8
W3ZNF	11,440 143-40-B15	W2UON	11,664 124-48-B11	W9QAD (3 ops.)	63,450 423-75-B	W9AII	105,600 728-75-A19
W3OBY	35,412 345-52-A20	W2NDR	10,668 127-42-B10	W9FGX (7 ops.)	53,655 374-73-B22	W9ACU	81,000 542-75-A24
W3MSU	27,759 295-57-A16	W2OWA	10,578 123-43-B12	K9NBH (6 ops.)	37,359 303-63-B23	WB9AQI	40,680 462-70-A18
Eastern Pennsylvania		W2PFC	70,562 56-18-B10	WB9DED (+W9LVH)	33,540 282-60-B16	W9AIE	60,000 400-75-A14
W3ACQ/3	126,975 848-75-B24	W2EPA (+W2A1U1F)	81,848 432-72-B23	K9WYX (+W9AJS VBB WBG)	40,750 407-75-A24	W9BQV	36,790 283-65-A14
K3MJK	103,660 710-73-B22	W2BPL (+WB2ZWRP)	35,100 270-65-B19	WB9DEI (W9LVH)	33,540 282-60-B16	W9WYK	30,805 253-61-A16
W3HJZ	94,500 630-74-B20	W2ZQ (3 ops.)	32,832 344-48-B20	K9MFD	59,498 420-71-A24	W9B	30,400 238-64-A10
K3HJZ	81,150 841-75-B24	WB2CPS (+K24 DEI YBN)	15,360 160-48-B 8	W9UIMZ	40,300 310-65-A21	W9QRBW	30,030 231-65-A18
K3ONW	57,720 481-60-B19	W2ORA	39,600 410-64-A21	K9KQK	34,192 231-72-A23	W9WVM	12,656 113-56-A 7
W3JXJ	33,102 307-54-B22	W2EYS	29,808 216-69-A19	K9ORP	32,336 293-56-A18	W9QAS	11,790 132-45-A 8
VF4BWW/3	27,075 238-57-B16	W2REB (K2PWF, opr.)	24,566 216-53-A21	W9AYNE	31,614 260-66-A18	W9WEZ	8200 100-41-A 5
K3DPO	22,880 208-55-B 8	WB2UUV	23,588 158-63-A13	W9BVM	30,600 219-70-A15	W9WEN	2,564 49-24-A 4
W3JXF	20,350 185-58-B13	WB2VMD	20,586 219-47-A19	W9GXR	26,400 200-66-A15	W9WYX	40,750 407-75-A24
W3BUB	75,154 101-37-B16	W2U1	17,300 173-50-A11	W9BBI	24,400 200-61-A22	WB9AJA (5 ops.)	24,072 206-59-A24
W3JNQY	55,667 87-32-B19	W2AEM	15,657 154-51-A11	W9BXH	18,656 176-53-A13	WB9CIC (4 ops.)	16,176 172-48-A24
W3KRD	22,441 51-22-B11	W2JNP	78,966 84-47-A 7	W9BXX	14,535 162-45-A 6	North Dakota	
W3JHG/3 (3 ops.)	63,332 446-71-B24	W2SXI	53,900 71-35-A 9	W9WZW	13,254 143-47-A17	W9BRS	17,442 154-57-B17
W3BWF (3 ops.)	58,512 425-69-B24	W2EPA	49,848 21-4-A 9	W9WLM/9	10,920 140-39-A 4	W9BLN	440 22-10-B 2
W3JNAY (+W3JPRM)	12,912 135-48-B	W2HFE	29,766 48-31-A 6	WB9DIA	8436 111-38-A 8	W9HSC (4 ops.)	44,286 365-66-B18
Maryland, D.C.		WB2JIN (+W2NPOG)	70,200 90-39-A18	W9A7RP	8772 88-47-A 5	W9ZPI	37,830 296-65-A
W3MVB (K3EST, opr.)	148,125 992-75-B24	Western New York		W9OUE	7052 86-41-A 5	W9SVT/W	9348 114-41-A 8
W3AZD	126,000 840-75-B24	WB9F1J	144,152 979-74-B24	WB9AIA	8436 111-38-A 8	K9RSA	5742 87-33-A 4
W3ZKH	125,175 836-75-B24	W2ACQ	40,178 699-73-B20	W9A7RP	8772 88-47-A 5	South Dakota	
K3LPL/3	120,012 822-73-B24	W2ADH	65,401 472-73-B18	W9JMY	6090 88-35-A10	W9VYV (2 ops.)	116,250 775-75-B24
W3IN	115,560 801-72-B23	K3SOT	39,564 316-63-B20	W9JTD	5676 86-33-A 8	W9LYO	70,140 505-70-A22
W3AJX1 (W3AJA, opr.)	114,600 764-75-B24	WB2QAP	34,704 241-72-B21	W9RRC	2236 43-26-A10	W9WBI	50,048 306-64-A16
W3FZT	110,475 748-75-B24	W2GRL	11,616 123-48-B10	W9JNO	10972 39-14-A 4	DELTA DIVISION	
W3JML	100,050 667-75-B20	W2BAO	11,008 129-43-B10	K9WMP	684 19-18-A 2	Arkansas	
K3JWU	73,567 769-65-B24	W2CDV	9768 113-44-B 8	W9LMJ	36 6- 3-A 1	W9SVH	66,330 504-66-B19
W3KMY	90,009 616-73-B24	W2BVB	9042 137-33-B12	K9IKS	12 6- 1-A 2	W9SMW	22,629 199-57-B10
W3EAX (W3AJGL, opr.)	85,248 576-74-B20	W2BEX	6192 72-41-B 8	K9GRO	8 2- 2-A 2	W9WMC	39,399 287-69-A20
K3JKS/3	67,680 472-72-B16	WB2MEJ	2128 56-19-B 5	W9HGP	8 4- 1-A 1	W9WMD	16,059 183-53-A19
W3AKNK (W3AJX1, opr.)	57,132 427-69-B24	WB2JINW/2	10,455 29-19-B 2	W9WVH	6 4- 1-A 1	Louisiana	
		K2ZGT (3 ops.)	35,140 251-70-A20	W9GUCJ	6 3- 1-A 1	W9WUJ/5	20,600 71-31-B15
		K2CT (2 ops.)	8400 (100-42-A 6	W9A9CJ	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
				Indiana		W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15
		W3JWU	120,875 814-75-B21	W9A9A/9 (3 ops.)	39,520 319-65-A15	W9WUJ/5	20,600 71-31-B15

WIDRN/5
6468-100-33-B 4
Tennessee
K4PJ 128,700-861-75-B23
K4PUZ 131,192-866-72-B24
W4SOL 49,700-350-71-B19
W4AWTO 45,288-333-68-B11
W4AUAZ 42,880-317-64-B13
W4AFDR 25,472-199-64-B 5
W4AFPI 64,000-100-32-B 7
W4ACME 62,160-24-42-B 5
W4OMJ 52,360-77-34-B 5
W4B4VF 26,000-50-26-B 3
K4YVP 12,220-24-16-B 2
W4B4UW 7,590-25-15-B 2
W4AYNI 390-18-11-B 2
W4BLHD 98-7-7-B 1
K4HPH 50-5-5-B 1
K4PPW 24-4-3-B 1
K4SXI/D 4 (WB4FEC)
113,250-755-75-B24
W4VSV (4 ops.)
64,350-429-75-B22

W4OQG 22,400-175-64-A10
W4JMG (WB4LHK, opt.)
1848-46-21-A 3
W4OQG 640-20-16-A 1
W4BOZ 32-4-4-A 1
K4RSI/4 1-1-A 1
W4AZBC (WB4S EHD GSS)
65,952-458-72-A24
WB4JRK/4 (4 ops.)
14,550-151-50-A13
WB4MSN/4 (4 ops.)
13,050-146-45-A14
WB4PER/4 (4 ops.)
7293-97-39-A 8

GREAT LAKES DIVISION

Kentucky
K4FJ 34,942-243-72-A12
W441WB 20,655-203-51-A12
WB4NTQ 20,288-159-64-A18
Michigan
W8SH (K7NHV, opt.)
139,350-932-75-B24
WB1QL 134,606-929-74-B24
W4R2(D) 113,742-805-71-B24
W4S6BY 111,000-747-75-B24
W4JGBU/8

90,648-632-72-B20
W4R5VB 85,050-567-75-B20
WB8CCE 66,138-453-73-B24
W8MNL 64,824-445-74-B23
W8IOA 58,290-511-58-B21
W4BSOF 57,816-438-68-B21
W4SE1F 56,070-401-70-B17
WB8FKP 48,976-336-72-B24
W4VPC 23,302-191-61-B12
K4ZLE 14,906-132-58-B12
W4NZTQ 14,250-125-57-B17
WB8M 11,385-127-45-B 9
W81W 8700-87-56-B 3
W8F5Z 6000-75-40-B 3
W8HAN 5994-162-37-B 9
W8EGJ 4080-60-34-B 9
W8WUJ 51-29-B 5
W4SFRI/8 (WB4FRI)
36,672-291-64-B20
W4RMSR (11 ops.)
35,072-276-64-B24
W4RZZZ 27,594-219-84-A10
W8K7M 13,230-135-49-A 9
WB8AXP 8159-100-41-A11
W8NBN 4818-71-33-A 8
K4CVV 3276-63-26-A 9
W8UM (W4SHDM, opt.)
1280-41-16-A 4
W8MSK 1280-41-16-A 4
W81ZZ (WB8FBC)
34,056-259-66-A23
W8DC (2 ops.)
20,440-187-56-A15

Ohio
W4RZTF (W4BRWU, opt.)
134,925-902-75-B23
K8UNG 106,740-743-74-B24
W4NOSP 104,682-717-73-B24
W4AEB 89,498-613-70-B21
W4AMQJ 84,900-566-75-B21
W4R5FE 72,372-489-74-B21
W8DKI 36,448-268-68-B19
W8VQJ 34,848-264-66-B17
W8RSZ 33,184-244-68-B14
W8B8GJ 29,087-250-89-B
W8NHO 28,274-211-67-B17
K8RGV 27,580-234-62-B
W4BMCB 24,400-206-75-B16
W8B8FE 24,000-200-61-B15
W4SVEV 22,570-185-61-B17
W8KZK 27,568-182-62-B15
W4XYXI 24,228-185-58-B12
W4SWNI 11,960-115-52-B 8
W8WPC 11,468-123-47-B
W8GMC 10,440-94-55-B 8
W8KJ 10,430-100-51-B 7
W8KJN 11,318-76-42-B 6
W8BTW 3134-56-28-B 3
W4YCP 2600-50-26-B 3

WB8HJ 1541-34-23-B 5
WB8BOR 1496-34-22-B 5
W81MG 912-24-19-B 2
W81ML 608-19-16-B
W4RZGC 8-2-B
W8FHH (4 ops.)
107,775-719-75-B24
W4R5VH (WB8KJ)
73,164-546-67-B23
W8TFZ (5 ops.)
44,730-315-71-B24
WB8AKU (WB8AKW)
34,112-329-52-B 9
WB8CEE/8 (WB8CKC)
34,056-258-66-B21
W8KE (WB8KCS USP)
12,420-138-45-B14
K8EHU (WB4S2DF)
4200-100-46-B 4
WB8APJ 63,000-439-72-A21
WB8ALM 54,720-380-72-A19
K8MMH 38,484-304-64-B18
W8EOG 36,087-262-69-A16
W4R5EX 23,954-203-59-A16
W4R5ME 23,482-199-59-A15
WB8MO 22,500-150-75-A12
W8SWB/8

17,910-199-45-A24
W4VZE 17,832-155-58-A10
W8MH 13,590-151-45-A12
W8B8H 13,216-112-59-A 9
W8B8NH 12,090-157-39-A13
W4GLZ 10,829-112-49-A 9
W4WJ 9776-104-47-A 9
W4VFM 7722-99-39-A11
W81WU 7140-94-38-A15
W8YHU 6640-92-35-A 8
W4R5WA 54,312-66-41-A 6
K8EKG 50,332-74-34-A 4
W4R5U 4410-74-30-A 4
W81DM 3750-63-26-A 5
W4RVU 2850-57-23-A 3
WB8AGD 2616-55-24-A 4
WB8AU 2376-54-23-A 3
WB8BKX 1000-25-20-A 4
W81G 992-11-16-A 3
W81MF 240-12-10-A 2
W8YQJ 90-5-5-A14
W8EQG 30-5-1-A
WB8ESB (3 ops.)
40,588-279-73-A24
W8EY (6 ops.)
19,430-168-58-A16
W4RLV (WB4RLW)
13,728-208-33-A15
W4SMVV (WB81B)
12,173-132-47-A13
WB8G2 (2 ops.)
11,192-178-32-A18

HUDSON DIVISION

Eastern New York
W1BGL/D 141,450-943-75-B23
W4ZFAH 89,836-609-74-B22
WB2ZPW/2 85,575-571-75-B24
W4Z1LV 81,188-382-67-B23
W4Z1BQ 31,482-297-53-B12
K2RUK 28,160-260-55-B 9
K21CM 27,750-175-65-B16
W4ZDTE 21,142-200-53-B16
W4KZK 10,992-116-48-B 8
K2HQO 5952-124-24-B 5
K2OYG 5244-69-38-B13
W4ZCRW 4136-98-22-B 9
K2HUF 3060-51-30-B 5
W4ZKUL 1248-26-24-B 3
W2SZ (2 ops.)
106,950-719-75-B24
WB2VJB (3 ops.)
52,700-389-68-B18
W2KGY (8 ops.)
17,800-303-63-B23
WB21 PQ (WB21PKP)
6536-87-38-B 6
WB20OU (W4ZS FHI)
7550-51-25-B 4
W4Z1EP 50,330-360-70-A22
W4Z1EF 44,224-147-64-A17
K2SHL 19,224-179-54-A13
WB2RBG 1800-36-25-A 4
W4Z1NR 192-14-14-A 1
WB21QO 18-10-1-A 2
WB21DXM (WB21VQZ)
21,735-242-45-A23

N.Y.C. & L.I.
W2DKM 165,073-709-75-B23
K2ALU 104,773-453-73-B18
W4ZVDA 28,416-222-64-B12
K2YGM/2 27,900-225-62-B15
W4ZMSF 26,400-221-60-B16
W2DSC (WB21ZD, opt.)
23,760-198-60-B 7
W4ZAJR (W4ZUWA, opt.)
22,500-150-75-B11
W3MOR 15,900-159-50-B13
W4ZKPL 15,456-184-42-B13
W4ZERL 8104-137-37-B10
WB21ZH 7920-99-40-B 2

WB4QZG/2 4160-65-42-B 6
W2NBI 4032-75-58-B 6
W4NBI 3080-70-22-B 8
W2TUK 2900-50-24-B 2
W4ZPKB (4 ops.)
55,884-444-63-B20
W21TZ (7 ops.)
27,630-310-45-B20
W4ZWLQ (WB4ZELU)
8320-106-40-B10
W4ZQEB 64,680-462-70-A22
K2DW 46,464-355-66-A14
W4Z1YH 25,760-286-46-A21
W2BNS 9460-110-43-A15
W2CZ 8600-100-43-A11
W4BABW/2 3388-77-23-A 2
WB2MJD 3274-52-31-A 6
W2HAI 1950-39-25-A 3
WB2MUK 1880-47-20-A 5
WB2LYB 306-17-9-A 1
W4ZDFD 70-7-5-A 1
W2ZPG 60-6-5-A 1
WB2HRR/2 (WB2BZY)
162,490-162-49-A24
W4ZFNQ (WB2BZY)
2052-54-19-A 6

Northern New Jersey
W2MB 109,584-764-72-B24
WB2IOF 72,000-503-72-B22
W4ZASM 65,952-460-72-B21
W4ZKHQ 51,093-411-63-B23
W4ZDZU 50,715-368-69-B20
WB2VPR 9288-172-27-B 7
W2VE 3472-56-31-B 3
W4ZEBW 71,000-500-71-A12
WB21OH 72,000-30-70-A 2
W4Z1NQ 22,410-201-57-A18
W4ZKCU 22,400-190-58-A18
W4ZHSQ 15,808-153-52-A20
WB2VVA (WB2ZYQ, opt.)
6882-93-37-A 6
WB2Z1J 5312-83-32-A 5
W41MVM/2 5040-70-36-A 4
K4CVJ/2 2726-47-29-A 8
WB2TUL 1932-69-14-A 5
W4ZCAK 1040-26-20-A 6
W4ZUD1 324-18-9-A 2
W4Z1EC (2 ops.)
38,556-306-63-A15

MIDWEST DIVISION

Iowa
K4YVU 100,200-671-75-B22
W4ZJCE 85,275-570-75-B24
W4Y1Y 30,900-260-75-B14
W4OEFN 14,734-146-51-B15
K4GKR (WB4GKW)
87,172-591-74-B24
WB0CQU 28,980-230-63-A14
W4ZDZ 22,356-243-46-A14
W4BTAQ 15,732-73-46-A20
W4Y1W 12,260-160-48-A13
W4MOQ 9447-101-47-A 3
W4QVBM 1408-32-22-A
Kansas
W4QVJ1 31,248-250-63-B20
W4QJY 2700-51-27-B10
W4SOE (9 ops.)
104,086-733-71-B22
W4QUMH (3 ops.)
2760-60-23-B 7
WB8AHL 35,778-267-67-A21
W4J1C 12,784-136-47-A 9
W4ZKFR/9 12,012-140-44-A10
K4WUJ 3248-56-29-A10
Missouri
K4REY 91,080-654-72-B21
W4BYK 88,480-634-70-B23
K4RPH 38,170-416-70-B12
K4QFQ 33,345-260-65-B15
K4E1Y 30,160-260-58-B10
W4B4FW 7854-120-33-B 8
W4NKKY 672-21-16-B 6
W4Q1J1 (3 ops.)
121,248-850-72-B24
W4QJNF 52,920-379-70-A19
W4QKC 7770-94-42-A10
W4QSW 1966-94-37-A 6
W4QPE 4921-67-37-A 8
W4Q1U 2800-50-28-A13
W4QV 2465-68-19-A 8

Nebraska
W4QRCR 76,392-533-72-B24
W4QRRK 51,060-426-60-B21
K4VVO 44,082-367-62-B13
W4QKK 14,150-143-50-B 7
W4QJRK 8621-117-37-B 2
W4Q1U 462-17-14-B 2
W4QLGS 45,000-300-75-A15
W4WLO 8646-66-66-A11
W4QVY 2808-59-24-A 6

NEW ENGLAND DIVISION

Connecticut
K4JHX 136,050-907-75-B23
W4JUD 125,250-835-75-B24
K4PKQ 124,074-840-74-B24
K4VTM 117,142-797-74-B24
K4ZND 111,592-755-74-B24
W41QJ/1 102,150-683-75-B21
K4DPB 90,724-615-74-B21
K4GUD 83,366-573-73-B21
W4FLM 81,864-577-72-B20
K4JSL 73,657-510-73-B22
W4TQJ 71,415-518-69-B24
W4JZC 71,208-495-72-B22
W41SD 66,010-473-70-B
W4KMR 62,530-423-74-B22
W41NPS* 61,600-441-70-B18
W4B1H 54,823-377-73-B12
K4THO 52,455-404-65-B12
W41HOL 44,616-338-66-B19
W4PQU 35,400-300-59-B12
W41RQ (K4FVS, opt.)
31,578-279-57-B 8
W41FTD 29,328-282-82-B11
W41KQJ/1 27,200-200-68-B16
K4IOJ 25,376-244-52-B10
W41LTJ 22,176-256-44-B15
W4JCP* 20,986-159-66-B
K4GTG 11,520-120-48-B18
W4DEP 8816-116-38-B12
K4FVS 7735-111-35-B 3
W41FK 7308-87-42-B
K4WQJ 4560-60-38-B13
W41FBY (3 ops.)
136,050-907-74-B24
G4XPM/WJ 44,720-344-65-A18
W41KQ 31,882-316-64-A13
W41YV 41,920-336-64-A18
W4EHC 34,237-235-73-A13
W41EX 16,046-131-71-A 9
W41KKM 10,200-150-34-A17
W4EGM 9408-112-42-A 4
W41EEZ 8800-100-44-A 4
K4ING 8610-106-41-A11
W41RW 8000-100-44-A 5
K41WC 8000-100-40-A12
W41LWQ 4179-100-21-A14
W41CC 3328-52-32-A 2
K4PQA 1980-52-20-A14
W4DGL 261-15-9-A 2

Eastern Massachusetts

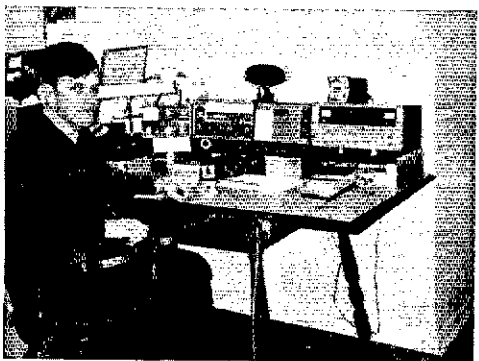
W41RG 110,475-740-75-B24
W41JY (WB2YEW, opt.)
110,376-767-72-B24
K4JHN 71,808-544-66-B19
W41EGT 70,200-468-75-B22
K4IOME 59,430-430-70-B20
W41MPE 55,176-419-66-B19
K41LU 54,712-419-66-B19
W41JWQ 47,600-350-83-B19
K41CSI 42,340-290-73-B19
W41KBZ 30,550-235-65-B18
W41LX 27,744-291-48-B16
W41AX 20,460-155-66-B
W41EB 16,320-162-51-B 9
W41KDL 10,472-119-44-B 5
W41PL 5616-78-36-B 6
W41JNM 3100-62-25-B12
W41BN 1938-51-19-B 6
W41KBN (3 ops.)
55,632-492-57-B24
W41KSE (K41PB)
28,840-239-60-B23
W41KBG 45,552-312-73-A22
W41EC 31,744-256-62-A14
W41MCY 30,326-258-59-A16
K41YH 23,973-197-61-B15
W41KZE 23,607-198-61-A15
W41MWN 19,448-182-52-A12
K41MX 13,068-124-54-B 8
W41WM 10,152-108-47-A12
W41GFW/1 5250-125-21-A 5
W41KSW 4608-130-18-A11
K41RVR 3828-66-29-A 4
W41TZ 3456-65-27-A 8
W41MHJ 6-1-1-A 1
W41KRY (W41KRY LAW)
47,970-369-65-A24
Maine
K4GAX 65,136-473-69-B17
New Hampshire
W41BT 34,534-279-62-B 9
W41FM (W4QVY)
38,676-296-66-B13
K4CTO (5 ops.)
26,564-231-58-B18
W41RDX 24,003-193-63-A17
W41DXB 20,242-175-58-A12
Rhode Island
K4UQJ/1 130,050-871-75-B24
W41BER 38,822-290-66-B11



WN6CQQ . . . Donald



WN0AXW . . . Dan



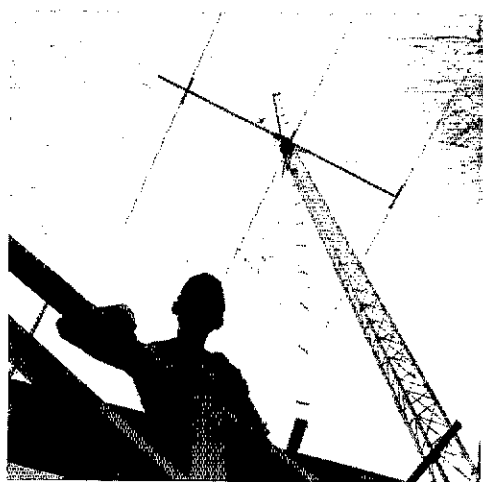
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WN1NDM . . . Dave



WN4RPZ . . . Jon



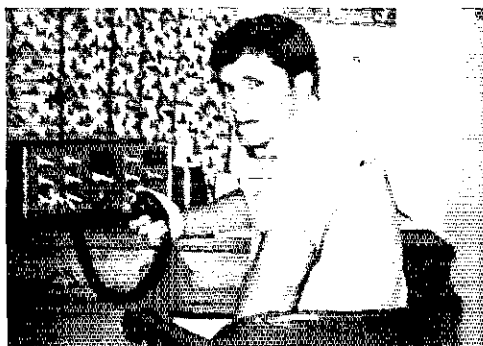
▲ WN2MAN . . . Richard

◀ WN4NRL . . . David

WFLN	35,76K-264-68-B16	WA7JIM	820R-106-39-A18	W4JDM	80,142-542-74-H21	W4IAA	4174-70-24-A 7
	<i>Vermont</i>	W7GYF	8200-100-41-A 1	W4W5F	70,825-486-75-B15	K4FAC	3096-43-36-A14
W2AEL1/2	23,760-221-54-B15	W7RWW	4686-71-33-A12	W4W5H	72,732-489-72-B16	W4PUB13	0813-20-17-A 7
W1MRW	12,909-168-39-A11	WA7GTR	4404-62-36-A 6	W4W5J	69,496-479-73-B21	W4H0GD	444-20-12-A 3
	<i>Western Massachusetts</i>	W7TTS	2700-56-27-A 8	W4W5L	53,475-388-69-B21	W4H0HY	
W1YK	(WALIMR, opr.)	K7TAN	2500-50-25-A11	K4K0R	48,843-371-67-B17	Georgia	
W1A1ZS	95,475-540-75-B23	K7K0M	1316-47-14-A10	W4A1VL	48,162-349-69-B20	K4BAI	111,000-74-75-B24
W1E1D	56,374-397-71-B17	W7D0H	738-41-9-A 3	W4N4H	47,600-450-68-B17	K4WAK	(WAZIP, opr.)
K1KNO	26,271-210-63-B 6	K7EKK	176-11-8-A 1	W4Y2C/4	44,722-379-59-B18	K4YSB	(W4B4WK)
W1MFB	440R-77-20-B 5	W7KWY	(W4W11P)	W4YHD	(K1ANV, opr.)	West Indies	
W1A1P	23,084-199-58-A12	W7YD	(4 opers.)	K4QD	41,520-346-60-B 8	K4GCS	80,640-568-72-B23
W1FBX	10,848-113-48-A 6		832-33-13-A 7	W4AUSB	40,752-283-72-B19	W4A1VY	77,700-555-70-B22
	PACIFIC DIVISION			W4WBC	31,616-257-64-B13	W4ASSB	9996-119-42-A10
	<i>East Bay</i>			W4ZM	24,988-238-63-B 8		<i>Western Florida</i>
W4EKL/K17		W6RQZ	1188-27-22-A 2	W4H11	25,800-228-55-B18		
KL7ME	62,583-455-60-B18	W6D0D	(W6GK) 100,164-69-72-B 8	W4N4W	23,128-200-59-B 6		
KL7A1Z	(8 opers.)	W6E5K	(2 opers.)	K4A4WV	18,624-194-48-B 9		
	70,140-505-70-B24		65,888-49-71-B23	W4PHL	17,136-151-56-B 9		
W7CNC	71,781-508-71-B14	W6C0P	44,446-117-71-A15	W4RVP	15,036-174-42-B 8		
W7NKS	(W7A7NQ)	W61D	21,204-186-57-A12	W4RPU	13,508-117-62-B21		
W7CEL	77,119-846-71-A32	W6BHC/6	14,942-146-51-A15	W4SWS	11,459-115-63-A14		
W7MPS	38,178-304-63-A14	W6LDZ	2800-50-28-A 7	W44HX	11,280-125-48-B12		
	<i>Idaho</i>			W4B4H	8064-90-42-B 6		
W7LIV/7	59,976-442-68-B20			W4C1	7104-97-47-A 4		
W7YIN	54,600-390-70-B20			W44UN	4676-84-28-B 6		
W7YR	(W7LR, opr.)			W4B4J	2150-43-25-B12		
W7NML	(W7A7YU)			W4SQU	1955-44-23-B 8		
W7JDX	(multi-opr.)			W4CATS	1748-46-19-B 1		
W7POZ	(12 opers.)			K4A1H/4	(W4B4ONK)		
	28,671-253-57-A24				16,600-166-50-B12		
	<i>Oregon</i>						
W7ESM	(W7A7LZ, opr.)						
W7CEL	(W7A7PS, opr.)						
W7FES	15,561-125-63-B14						
K7EUB	(W7ERO, opr.)						
W7EWS	23,541-201-59-A10						
W7M7M	21,948-188-59-A18						
W7KWV	(W7LEIT)						
	592R-76-39-A13						
	<i>Washington</i>						
K7VPF/7	173,550-1160-75-B24						
W7RIN	87,458-591-74-B20						
W7UBA	87,104-608-74-B16						
W7EAM	87,104-608-74-B18						
K7IDX	72,243-540-69-B18						
W7JBM	60,030-435-69-B16						
W7NPN	59,429-444-67-B17						
W7MJX	53,037-381-71-B23						
W7JCB	47,570-355-67-B17						
K7HIZ	46,242-368-63-B13						
W4BIS/7	45,582-321-71-B12						
K7RSH	37,200-300-62-B12						
W7WJM	32,886-262-63-B19						
W7A7KD	30,495-269-57-B15						
K3RJW/7	30,492-242-63-B18						
K7UWT	28,405-219-65-B14						
W7NG	25,200-200-61-A 9						
K7NWS	(W7C1, opr.)						
	24,480-200-61-B16						
K7GZO	24,381-195-63-B18						
K7NZU	3306-57-29-B 8						
W7A0UB	2673-41-33-B 5						
W7A7AC	2040-51-20-B 3						
W7AZI	900-25-18-B 2						
W7OS	630-21-18-B 2						
W7WLM	476-17-14-B 3						
W7A7MK	330-15-11-B 3						
W7A7G	176-11-8-A 1						
W7AJAY	(5 opers.)						
	79,296-565-68-B21						
W7AGNP	(W7A7S, HD IRV)						
	19,080-180-53-B 7						
W7EFC	34,720-280-62-A20						
W7A7FHG	31,691-237-67-B20						
W7A7BSO	30,420-234-65-A19						
K7AWB	29,055-225-65-A17						
K7IND	24,552-199-67-A19						
W7WMY	19,494-171-57-A10						
W7A7LFG	17,100-165-52-A13						
W7A7GJ	17,060-175-50-A18						
W7W1A	11,220-110-51-A11						
W7A7KTD	10,604-122-44-A12						
W7QVC	10,310-131-40-A14						
W7A7BL	9520-119-40-A 9						
W7A7HUC	9503-115-42-A20						
	ROANOKE DIVISION						
	<i>North Carolina</i>						
W4A44W	(18,125-789-74-B21)						
K5HWOJ/4	54,060-198-68-B24						
W44NIE	33,571-285-59-B13						
W44QZQ	(14,462-127-53-B14)						
K4ADT	(12,054-124-49-B12)						
K4C4A	(10,600-134-40-B13)						
W42SSJ/4	4422-67-33-B 8						
K4E4A	(5,675-143-55-A10)						
K4TSC	3402-65-27-A10						
	<i>South Carolina</i>						
W44MJY	39,060-330-60-A18						
W44GUA	28,066-230-61-A11						
W44HUX	990-33-15-A 2						
	<i>Virginia</i>						
W1ETU/4	(16,581-800-73-B23)						
K4C4G	(W4A4K81, opr.)						
	107,175-715-75-B24						
W4K4C	(101,400-678-75-B18)						
	SOUTHEASTERN DIVISION						
	<i>Alabama</i>						
K4HFR	71,850-479-75-B22						
K4FPH	6552-84-39-A11						
W44OKT	5100-75-44-A11						
W44A1D	1760-30-1-A 2						
W44JMH	160-10-8-A 1						
	<i>Canal Zone</i>						
KZ5CR	(5 opers.)						
	78,455-556-71-B22						
	<i>Eastern Florida</i>						
W44JD	90,975-609-75-B22						
K4E4A	70,200-477-74-B17						
W44LE	61,212-472-B22						
W44IFA	32,327-280-59-B21						
W44OZE	29,808-276-54-B 8						
K4HNC	15,984-108-74-B16						
W44HJW	5100-17-15-B 2						
W44HJW	11,588-778-74-A24						
W44OPL	62,928-437-72-A22						
K4K4C							
W44JFK	7920-99-40-A 9						
	WEST GULF DIVISION						
	<i>Northern Texas</i>						
KSOJL	(W4B4HYL, opr.)						
	37,700-964-75-B24						
K5MOA	69,264-481-72-B23						
W454YS	62,100-419-75-B16						
W454RM	61,425-412-75-B16						
W5QBOM	59,445-426-65-B18						
W45OQU	47,468-326-58-B14						
W45QVM	27,240-227-80-B24						
W45KVD	27,880-180-80-B 8						
W45WCV	(2,787-182-49-B 9)						
W45WJC/5	(W4B4FAH)						
	15,759-155-51-A11						



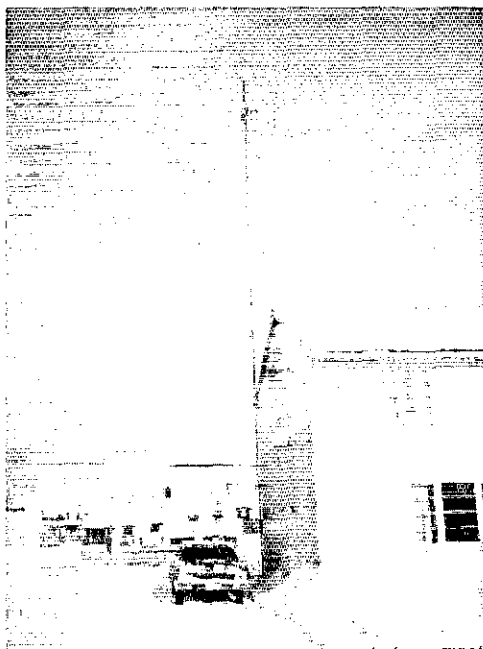
K9JPS . . . Lew



WB4IUX . . . Tommy



WA7NSS . . . Steve



VO1CA QTH

K5RHZ 148,000-1000-74-A23	VE2AQL 19,008- 150-64-A13
WSQGZ 81,760- 884-70-A20	
WA5UCI 50,652- 380-67-A14	
WA5HJS/S 30,624- 268-58-A18	
WB4PLW/S 16,728- 164-51-A	
WSUNL 15,086- 199-38-A 6	
W5SAAR 13,320- 149-44-A12	
K5HVM 13,005- 145-45-A12	
WA5ZUC 36- 18- 1-A 7	
WA5VSK/S (+WA55 LXN VSO)	
57,120- 418-70-A24	
<i>Oklahoma</i>	
WA5TSJ 87,290- 644-70-B23	
WA5RYM 82,800- 576-72-B23	
WA5WDS 72,878- 537-68-B18	
WB5AFW 57,524- 408-73-B16	
WA5DWR 21,200- 200-53-B15	
<i>Southern Texas</i>	
W5IAW 153,525-1028-75-B23	
K5PEL 122,400- 818-75-B23	
K5RCW 106,650- 714-78-B18	
K5ISR 77,000- 500-71-B11	
WB5BAF 32,240- 266-65-B17	
W5RRB 25,600- 500-64-B10	
W5SBX 8700- 100-41-B 3	
WB5AAU 71,468- 533-68-A24	
K5MXO 504- 21-12-A 4	
W5PXZ (5 ops.) 44,672- 352-60-A18	
WA5UOR/S (+WA55XR)	
1000- 75-20-A 2	

CANADIAN DIVISION

<i>Maritime</i>	
VO1CA 75,520- 519-70-A21	
<i>Quebec</i>	
VE2UN (WA5HRV) 124,575- 833-75-B24	
VE2AIL 17,952- 187-48-B12	
<i>British Columbia</i>	
VE7BDJ 126,614- 858-74-B24	
VE7BB 36,270- 279-65-B18	
VE7A7G 5967- 77-39-A 6	
VE7IQ 2538- 47-27-A 3	
<i>Yukon-N.W.T.</i>	
VE8CB 54,754- 433-69-B17	
VE8BB 22,125- 188-59-B10	
VE8AR 4092- 62-33-A 4	

VE3ENM 47,377- 328-73-B17	
VE3JMC (VE1ABU, ops.) 31,940- 270-61-B17	
VE3DPG 4760- 72-35-B 8	
VE3SV 2914- 47-31-B 4	
VE3FHQ 720- 24-15-B 4	
VE3HUV (+VE3DSS) 57,486- 434-67-B20	
VE3EGA 5379- 82-33-A 6	
VE3EXA 4806- 89-27-A 3	
<i>Manitoba</i>	
VE4AR 832- 26-16-B 1	
VE4ZP 64,008- 462-72-A19	
<i>Saskatchewan</i>	
VESUS (VESUF, ops.) 128,020- 873-74-B19	
VE5TO 38,880- 270-72-B21	
VESAA (VESs PK VO) 41,344- 326-64-A14	
<i>Alberta</i>	
VE6AIK/6 43,392- 341-64-B15	
VE6AGV 27,720- 231-60-A13	
VE6HD 12,017- 140-44-A 6	
W5ILH/VE6 1976- 38-26-A 2	

CHECK LOGS

CW: W2WPI, W3BIH, K4EJQ, K4VGO, W4JUK, W4SPQ, WB4MSM, W6IQK/6, WA6ROC, WA7OUB, K8UDJ, W8MC, K0OEL, VE3BUIV, and KZ5GW. Phone: WB2AYD, W4YSJ/4, W6BL, K8UDJ, VE7AJ and VE7RN.

The following logs were discovered too late to be included in their proper place within each section. They are: K2SQS, 5538-71-39-A10; K3HTZ, 75,000-500-75-B23; W3PNL, 1944-36-27-A2; WB5AOF, 19,292-187-52-A17; W8DB, 1702-37-23-A2; WA8ZAV, 8-2-2-A; K0PEV, 14,688-137-54-A11 and WA0VDO, 2520-42-30-A6. All other pertinent information with regard to the above entries was recorded in its proper place. Sorry, fellas.

QST

Strays

The Boy Scouts of America are participating in a year long ecology/conservation project called Save Our American Resources (SOAR). June 5 has been designated Scouting Keep America Beautiful Day, and Scout hams will be participating in a SOAR Jamboree-on-the-Air, to begin 1400 GMT Saturday, June 5, and end 0200 GMT Sunday, June 6.

Purpose is to exchange ideas and plans for unit, district, and council conservation projects. Approximate operating frequencies will be 3590, 3940, 7030, 7290, 14070, 14290, 21140, 21360, 28190, and 28990 kHz. K2BFW, at Scout headquarters, North Brunswick, N.J., ncs for the B.S.A. national net, will monitor the operating frequencies. No reports are required; no special QSLs or certificates; just a good turn to Scouting.

— * * * —

Remember the "Let's Talk Transistors" series by Robert E. Stoffels, WB9ESH? We've put together a reprint booklet of this 9-part transistor primer and it is available from ARRL for \$1 including postage.

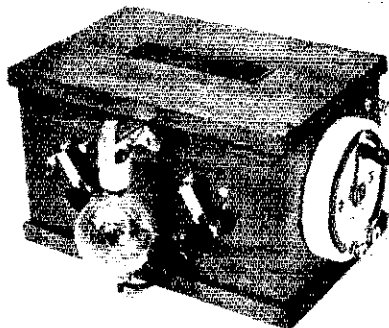


Tiny, The Magical Musical Clown, has been entertaining kids and adults for more than thirty years. When he's not doing his thing in front of an audience he can be found on the air as W6JCR. A member of Clowns of America, Inc., he wonders if any other hams are professional clowns. [Yes, there are at least two others: Bill Smith (Muzo the Clown), W7SNY; and Harry Gumm, Sr. (Gumbo the Clown), K6MDD. Any more? — EDITOR.]

Thanks to the efforts of QCWA Northwest Chapter members the History of Electricity Museum at Rocky Reach Dam powerhouse near Wenatchee, Washington includes an extensive display of antique radio equipment. Here W7JY explains a piece of equipment to museum curator Harley Bryant as Marge Frazier, W7GX1, looks on.

From the Museum of Amateur Radio

This is the famous and now rare DeForest RJ4 Detector. It was offered to the trade in 1909, and later superseded by the well-known oaken box. The Audion here is the original with Hudson filament. The socket is porcelain by Bryant, later changed to the well-known nickel-plated variety. The right-hand switch is the off-on and the other one controls the plate voltage, to a certain extent. — W1ANA



AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY GEORGE HART,* WINJM

MARS REFILES ARE LEGAL

FOR SOME time the arguments have waxed strong concerning the legality of traffic originating in countries with which the U.S. has no third-party agreement, when such traffic was handled via MARS to the U.S. and thence transferred to amateur circuits. Our understanding was that since the international part of the transaction was not handled via amateur radio, no amateur is guilty of handling illegally any international third party communication. It is the *International* Radio Regulations, not FCC's regulations, that forbid this, and naturally these regulations apply only to international communications. Since no international communication by amateur radio, as such, is involved, and since by FCC's regulations amateurs are permitted domestically to handle traffic on behalf of third parties, there is no violation, even though FCC is bound to observe and enforce the international regulations to which the U.S. is signatory.

This is now official. That is, WSCEZ took the bull by the horns and asked FCC — and *this time* got away with it. Carter wrote to Bill Simpson (WSRA), engineer-in-charge of the New Orleans office of FCC. Bill consulted Washington and received the following reply: "A Commission licensed amateur station may handle domestically, on amateur frequencies, third party communications destined for or received from an overseas area when the international transmission and reception of such communications is via military stations (MARS) operating on military frequencies. The domestic handling of such traffic by an amateur station must be in accordance with Part 97, Amateur Radio Service Rules. Sections 97.3(b), 97.3(f), 97.39 (l) and 97.111 are particularly applicable. The Commission does not have jurisdiction over the operation of MARS stations operating on military frequencies."

*Communications Manager, ARRL.

Another PSHR Revaluation?

The Public Service Honor Roll celebrated its first birthday last month. Yes, it was in the Feb. '70 issue of *QST* that the PSHR first appeared. Two minor changes have been made since then, amidst much discussion and a small amount of heat. Recently, not much discussion.

Have we arrived, then, at the point where the PSHR is settled down and will now become as stable an operating achievement as the BPL? Is everybody satisfied with it as it now stands? Is it doing the job it was originally intended to do — that is, recognize aspects of public service operating other than the physical handling of traffic?

Perhaps it is time we PS-minded amateurs have another look. In its one-year tenure, the PSHR so far has occupied approximately 7.5 *QST* pages. The requirements were stiffened twice, first to raise the point total required, then to equate similar activities by different modes, with a twofold objective: first, to recognize such non-traffic-count functions as NCSing, conducting liaison, participating in organized nets even though no traffic is handled, mode versatility, and net managing — with message count a small factor, because this is already recognized in the BPL; second, to set up a *QST* column for this purpose which is "similar to the BPL." This was the mandate set down by the Board of Directors, which we have tried to follow.

No compelling requirement for comments. This is just to record the anniversary and bring it to your attention.

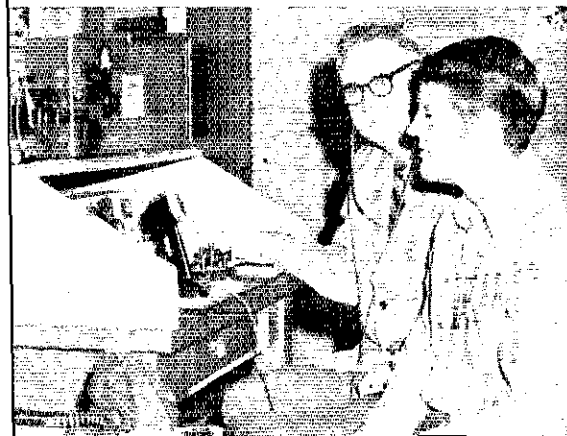
Local Monitoring Services

Kansas SCM Bob Summers, K0BBXF, has set up a "Mobile Emergency Watch" in his section, supplementing the Midwest Amateur Radio Service which guards 7258 kHz most of the time. It operates on 3920 kHz, starting at 7 P.M. and lasts until 10 or 10:30 P.M. The object is to cover the entire state of Kansas each night, utilizing mostly mobiles but with fixed stations in control.

The set procedure follows that used in the nationwide monitoring services. A triple break (BREAK! BREAK! BREAK!) is a life-or-death emergency and stops all operation until it is handled. A double break indicates priority or urgent time-controlled traffic. "Information" notifies NCS you have info that either helps or explains for other stations. "Contact" notifies NCS you wish to contact a station just heard or who might be listening.

Albermarle, N.C., amateurs also got into the act on holiday traffic to servicemen, and got some nice publicity in the local papers for their efforts. WB4NIV and K4JBH are shown sending several of the fifty or so radiograms on their way.

QST for



We believe a single "break" is used also to signify a station wishing to say something having no urgency.

Maybe such "monitoring services" are the coming thing. Might be a good idea to consider starting one up in *your* section, eh? — WINJM.

Traffic Talk

In an age of smart young people questioning basic concepts that have been accepted without question for ages, we come to the questioning of many bases for traffic handling. Why do we do things precisely the way we do them? Who says this is the right way and any other way is the wrong way? The challenge of authority is infectious, once the hue and cry is started.

Let's face (and admit) it, many of the standards promulgated by ARRL in traffic handling were set arbitrarily, often by one person. Provided the standard set is practical, what difference does it make who set it or why? The object is to *have* a standard, one which can be urged for adoption by all amateurs, one which will become "correct" for usage on the amateur bands. Sometimes ARRL-recommended standards "take hold", sometimes they do not. If they do not, often common usage determines what standards shall be adopted.

As an example in point, for many years ARRL recommended the use of the word STOP in place of periods and semicolons in messages. Military usage dictated PERIOD, later shortened to PD. Others began to use X. All three had shortcomings: STOP because it is a common word and could make a message text ambiguous; PERIOD for the same reason; PD because it could easily be mistaken for AND; and X because on cw it is so similar to the BT prosign separating the text from the rest of the message. Nevertheless, the X gained most popular usage and eventually became the ARRL standard.

Another example, on a slightly different plane: the phonetic alphabet. Years ago, ARRL adopted the Western Union list as its standard. After WWII, inquiries to the fraternity revealed that the majority appeared to feel that the WU list was obsolete, they were sick of all things military and therefore were opposed to the joint Army-Navy (JANAP) list. So we composed our own. It never really made the grade, mostly because everybody kept on using JANAP — not because they liked it, apparently, but because they *knew* it. Then along came RACES and the ICAO phonetics, and our cherished ARRL phonetics were doomed. The situation is still confused, however. On the air you hear a weird mixture of JANAP, ARRL, ICAO, and nonstandard alphabets as operators, groping for phonetics, grab the first one that flits through their minds.

The procedure for handling "book" messages is one we have been trying to standardize for a long time, but it's tough selling because it's inevitably a little complicated. We seldom hear a "book" sent properly in all respects.

A message handling service was sponsored in the Philadelphia (Pa.) area by the city, MARS and the Inglis House Radio Club. Pictured are, left to right, K3WEU; WA3EDS, President of the radio club; and S. Harry Galfand, Director of Commerce for the City of Philadelphia. (City of Philadelphia photo)

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for Dec. Traffic

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL4	448	1629	1482	91	3650
K8ONK	180	803	787	15	1785
WA3MKO	311	621	219	402	1553
K5TEY	4	721	633	2	1360
W7BA	12	666	610	52	1340
W8LCX	36	674	568	9	1287
W3ZEP1	96	577	485	80	1238
K2KQC	531	562	88	15	1196
K9ZSO	0	596	0	596	1192
W3IYS	49	458	412	38	957
W6VNO	16	509	428	1	954
W6INH	150	350	322	1	823
W4NNO	68	401	333	3	805
W4EMT	30	452	305	5	792
W6LOT	2	393	393	0	788
W4ZBAN	16	432	323	5	776
W4MPX	194	328	217	21	760
W4DEI	86	335	326	2	749
W4QGA	33	349	334	7	723
W4A1W	12	354	346	8	720
W3VR4	235	241	230	5	711
W4QVAS	122	285	30	255	692
W6BBU	5	271	380	14	670
W6BAX	38	301	274	17	630
K7HJR	16	308	278	24	626
W6IOU	26	293	213	77	609
W4EZT	170	237	172	28	607
W6IOM	5	300	298	2	605
W6LRU	9	308	248	38	603
W4IFY	54	269	212	46	581
K7NHL	15	298	245	21	579
W2OE	175	244	141	11	571
W4OMG	40	270	249	5	564
W7PI	18	261	251	27	557
W4JLXW	22	278	210	38	548
W6INH	19	261	235	26	541
W4ARAV	9	247	269	5	530
K6CSF	40	245	0	245	530
W4EFOQ	97	214	179	35	525
W4ZHHQ	88	196	227	11	522
W5BHM	43	257	210	6	516
W6IPW	9	253	253	0	515
W4ZHN	30	239	214	29	512
W4JFRU	79	245	168	26	510
K8ZSQ(Nov.)	0	283	1	283	567

More-Than-One Operator Station

W2DSC	116	225	165	26	532
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BPL for 100 or more originations-plus deliveries

WB6SKY 326	WB21 GA 135	K6MRI 109
WB2OHV 302	WA3JMI 129	W91YO 106
W4SRD1 212	W4STMC/5 118	W421U 105
W7AXT 198	W7OCX 117	WB40JD 105
W7BO 198	W42FGS 114	W6MNY 103
W6HGG 170	W2TUK 114	W41BXQ/4 102
W42FPA 168	W46UTN 114	Late Reports:
W3TN 160	W6WZM 113	K4VNB (Sept.) 457
W3DV 158	W43NYU 112	W8RCWD (Sept.) 141
W6KVO 152	W421NQ 111	K8ONA (Sept.) 128
K5YHM 147	VE2ON 111	W4HFKP (Nov.) 115
W44MKH 136	WB4KDI 110	KH6BZF (Nov.) 108
	WB9BJR 110	

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listing: WA9WNH.

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 a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.



We suspect there are those who dissent from standards recommended by ARRL just because it is ARRL who recommends them, similar to those who deliberately QRM WIAW because it is the ARRL station — not realizing they are hurting all of amateur radio, not just the League.

We need standards. Somebody has to set them; who better than the national organization? Assuming agreement with this, the general procedure is determination of the ARRL-recommended procedure based on a study of usage, facility, precedent and just plain logic based on amateur and other-service experience — or any one of these in the absence of all others. Dissent is listened to, considered and, if widespread enough,

the recommended procedure changed. It is obviously not practical to take a membership poll on small details, such as whether to use the BT prosign on cw between the date and addressee of a message. Someone has to make a decision. Once the decision has been made, based on the above concepts, we all ought to observe the procedure, even if it is at variance with our favorite method. Those who stubbornly adhere to nonstandard methods aren't doing amateur radio any good.

We promise to listen to the voice of the active operators in formulating official ARRL-recommended procedure. How about all of us following the standard recommended until or unless we can change it? — WINJIM.

National Traffic System. There seems to be a difference of opinion about the Christmas traffic rush for 1970. One or two of the managers claim that it just didn't happen, but most of the nets do show a definite increase over the past few months. W2FR, 2RN pilot, says this year's total traffic was just under last year's record. Howie has also issued a certificate to W2HYM for this third year of service. On 4RN, WB4QMG has received the esteemed bit of wallpaper from manager W4SHJ. W6LRU reports issuing an RN6 certificate for WA6FOQ. Manager Don was also the recipient of a certificate recently when he received the necessary nominations for A-1 Op. Because band conditions wiped out a couple of late sessions, RN7 coach W7BQ reports holding the late session at 0145 Z the following day. W9HRY also reports some difficulties with long skip on 9RN. After several years of service W9LGG has resigned as TEN manager. Thanks for your help, Bertha, and we all hope you will still find the time to participate in NTS. W9HF is acting as interim manager until the Central Area Staff can recommend a permanent replacement. K2KIR says Santa was good to EAN this Christmas. He gave the net its highest monthly traffic total of all time, and the highest rate. W9INH reports that the uphill battle on CAN is slow, but progress is being made.

TTN, TEX (Tex.); NLI, NYS (N.Y.); NMN (N. Mex.); AENR, AENO, AENR (Ala.); MTN (Man.); W. Que. VHF, OQN (Que.); BSN (Ore.); WSN (Wash.); ILN (Ill.); RISP (R.I.); CN (N. & S. Car.); MSN, MJN, MSPN (Minn.); WMN (Mass.); GBN, OPN, OQN (Oat.).

2TCC functions, not counted as net sessions.

3Overall efficiency rating, percent.

Transcontinental Corps. All three TCC Areas report the making of many extra functions to handle the extra load of traffic over the holidays. W3FML has forwarded some statistics on the functioning of TCC Eastern for 1970. Bill says that 54 stations participated at some time during the year, handling a total of 10,115 TCC messages and a grand total of 27,270 pieces of traffic. Both traffic figures are down slightly from 1969, but things went smoothly despite the lesser amounts of traffic. TCC Eastern certificates have been sent to WB4NNO and W8PMJ. W6VNO reports inauguration of an alternate J schedule to help with large amounts of traffic showing up for EAN on certain days of the week. Bob has issued TCC Pacific certificates to K6KCB and W7PI and also says he is still looking for stations to fill some schedules. Any takers? Contact W6VNO.

December Reports

December Reports				
Net	Sessions	Traffic	Rate	Avg. Rep. (%)
1RN	62	905	.355	15.0 91.9
2RN	62	970	1.106	15.7 99.4
3RN	62	887	.572	14.3 91.8
4RN	60	953	.529	15.9 94.2
RN5	62	864	.470	13.9 91.6
RN6	62	1417	.679	23.3 100.0
RN7	58	577	.497	9.9 60.8
8RN	62	1037	.587	16.7 99.5
9RN	62	683	.604	11.0 98.0
TEN	62	961	.816	15.5 78.8
FCN	62	292	.287	4.7 90.3
TWN	52	582	.329	10.0 77.4
EAN	31	3223	1.975	104.0 98.9
CAN	31	1711	1.428	55.2 100.0
PAN	31	2266	1.379	73.1 100.0
Sections	2114	15802		7.5
TCC Eastern	1712	1508		
TCC Central	1212	1147		
TCC Pacific	1532	1919		
Summary	2941	37,704	EAN	21.0 90.3
Record	3450	51,705	1.916	27.3

December Reports			
Area	Functions	% Successful	Traffic
Eastern	171	95.3	4147
Central	121	95.8	1444
Pacific	153	96.6	3838
Summary	445	95.9	10,429

The TCC Roster: Eastern Area (W3EML, Dir.) — W14 RJG, E1J NIM, K1SSH, W4JTM, W2s FR, GKZ QC, K2KTK, WA2s BLV UWA, W3EML, K3MVO, W4s NLC, SQQ UQ, K4KNP, WB4s GTS NNO, W8s PMJ RYP, K8KMO, WA8CXY, W8ARLU, VE3ERU. Central Area (W6LCX, Dir.) — W4s OGG ZFY, W4KPE, W5MI, W9s CXY DND, WA9VZM, W9BPU, W9s HI INH ICX ZHN, WA0s IAW WEZ. Pacific Area (W6VNO, Dir.) — W5RE, W6s BGE BNK EOT IPW MLE MNY V7T, K6s DYX KCB, WA6s DEI LEA, W7s EM KZ PI DZX, K6ISP.

Independent Net Reports.

Net	Sessions	Traffic	Check-Ins
All Service	4	56	65
Mike Farad E & T	27	395	458
75 Meter Interstate SSB	31	658	1258
20 Meter North American SSB	27	573	570
Interstate 20 Meter SSB	72	2101	522
Northeast Traffic	31	405	430
Hit & Bounce	31	1043	434
EUTTN	31	395	392
Clearing House	26	443	448

1Section and local nets reporting (61): SGN, PTN (Me.); BUN (Utah); SGN, WCN (Cal.); MDCTN (MD-D.C.); BEN, BWN (Wn); WBSN (Wisc.); QMN (Mich.); NJAN, PVTEN, NJN (N.J.); VEN, FMTN, WFPN, GN, QFN, FPTN, TPTN, NNN (Fla.); GSN, GTN (Ga.); OZK (Ark.); LAN (La.); CHNN (Calo.); EPA, PTTN, WPA (Pa.); CN, CPN (Conn.); QSSB, BN, QCEN (Ohio); KTN (Ky.); VN, VBSN (Va.);

WB6IKF and WA6COE (SCM-San Diego) man the amateur radio display booth at the Thirty-eighth Annual Home and Electric Show. On display were these two emergency stations, one demonstrative of what might be set up in the field and the other a typical home installation. Also on display was an amateur TV set-up and a working RTTY station. During the six days of the show beginning Nov. 27, approximately 100,000 persons viewed the amateur display.



Public Service Honor Roll December, 1970

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total points in the nine categories below. In some cases scores have been adjusted to agree with new maximum allowable points which have taken effect. Use CD-190 or submit equivalent information through your SCM. See page 75, Nov. '69 QST for initial description and page 72, Sept. '70 for latest point evaluations. Please note new maximum points for each category.

Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Totals
Max. Pts.	10	10	12	12	12	20	3	—	5	
WA2BAN	10	10	12	12	12	6	3	1	5	71
WB4KDI	10	10	12	12	12	3	5	5	69	
W6HXX	10	10	12	12	12	20	4	5	63	
WA2FPI	10	10	12	12	12	3	3		62	
WA1ECM	10	10	12	12	12			5	61	
WA2DRH	10	10	12	12	12			5	61	
W2OIE	10	10	12	12	12		3		59	
WA0OLJ	10	10	12	12	12	6	4	5	59	
W6EZZ	10	10	12	12	12	5	3	5	57	
WA3FMI	10	5	12	12	12	18			57	
WA2ICU	10	10	12	12	12				56	
WA2KHQ	10	10	9	12	12		3		56	
WB4IMH	10	10	12	12	12				56	
WB9BXX	10	10	12	9	12		3		56	
WA0VYV	10	10	12	12	12				56	
WA5IMC/5	5	5	12	12	12		3		54	
WA1HOL	10	10	12	12	9				53	
W3MPX	10	10	12	12	12		3	5	52	
W7LBR	10	5	12	12	12				51	
W0LCK	10	2	12	12	12		3	3	51	
WA0VAS	10	10	12	12	6	20	3		51	
K7NHL	10	5	12	12	12	3	3	5	50	
WA0YMU	10	10	12	12	12		5		49	
VE3GI	10	5	12	12	12			5	48	
WB4OMG	10	10	12	12	12		3		47	
W5SRM	10	5	12	12	12		3	5	47	
W6LRU	10	5	12	12	12		3	5	47	
W7JWI	10	5	12	12	12	20			47	
W7PI	10	10	12	12	12		3		47	
WA2BLX	10	7	12	12	12			5	46	
WA2DHN	10	5	12	12	12	7			46	
WA2DME	5	5	12	12	12				46	
WA2FVH	5	5	12	12	12				46	
WA2VYS	10	10	12	9				5	46	
W7CAF	10	5	12	12	12	2			46	
W9HRY	10	7	12	12	12			5	46	
K1EIR	5	5	12	6	12			5	45	
K3ZNP	10	5	12	12	12	1		5	45	
WB6SKY	10	10	12	12	12	20	3		45	
W2BU	10	10	12	12	12				44	
WA9WMT	10	5	12	12	12			5	44	
W6BGF	10	4	12	12	12			5	43	
W9BBV	10	5	12	12	12				43	
VE3DV	10	5	12	9			3		43	
WA0OG	10	10	12	12	12	15		5	42	
WA5VJW	10	5	12	12	12	3			42	
W6FTT	10	10	12	12	12	20			42	

W6VNO	10	12	12	3	5	42
VE3ERU	10	12	12	3	5	42
VE3FXA	10	5	3	12	12	42
W1BVR	10	3	12	12		41
K4FAC	10	10	9	12		41
W5QJA	10	2	12	12		41
W6MNY	10	5	3	3	12	41
W7HQ	10	4	12	9	1	41
8R1Y/W4	10	7	12	12		41
VE4FO	10	1	12	12		40
W2FR	10	12	12			39
W3LOS	10	12	12			39
W3NEM	10	12	12			39
W4UQ	10	5	12	12		39
WA6LFA	10	12	12			39
W7HLA	10	5	12	12		39
W1ZPB	10	3	12	12	1	38
WB2LGA	10	4	12	12		38
W2MTA	10	5	12	6		38
WA3AFJ	10	5	6	12		38
W6YBV	10	12	12			38
WB0AEM	10	10	9	9		38
K3MVO	3	10	12	12		37
WB4OJD	10	12	12	3		37
W6INH	10	12	12	3		37
WA0HTN	10	12	12	3		37
WA1MB	10	9	9	3	5	36
W2QC	10	2	12	12		36
WA3AFJ	10	5	12	9		36
WA0KHU	5	6	6	20		36
W2MTA	10	5	12	3		35
K1SXF	5	12	12		5	34
K2OQJ	5	5	6	6	12	34
K3HKK*	10	12	12			34
WA3PU	10	12	12			34
K3JOH	10	12	12			34
W3TN	10	12	9	3		34
K4KNP	10	12	12			34
WA6LOQ	10	12	12			34
WA5DUL	10	12	12			34
W8IZ	10	12	12			34
WA8PIM	10	12	12			34
W9MZV	10	12	12			34
WA9VZM	10	12	12			34
VE4FXI	10	12	12			34
W6DEI	10	5	12	6		33
WA0TSJ	10	10	12	1		33
K2KTK	8	12	12			32
W7AXF	10	6	12	3		31

* Denotes multi-operator station.

Category Key: (1) Checking into cw nets; (2) Checking into phone/RTTY nets; (3) NCS cw nets; (4) NCS phone/RTTY nets; (5) Performing assigned liaison; (6) Legal phone patches; (7) Making BPL; (8) Handling emergency traffic; (9) Serving as net manager.

Public Service Diary

WA0UTT was mobilizing, with WA0SEI as a passenger, on the morning of Nov. 16, when they witnessed an automobile mishap in the south section of Wichita, Kans. Using the W0DKU repeater, WA0RKY was contacted and the accident was reported to police. — WA0UTT, EC Wichita, Kans.

During the afternoon of Dec. 20, VE3FHB was mobilizing near Hamilton, Ont., when he witnessed a head-on collision. Using the VE3DRW repeater, help was summoned through the aid of VE3CZN. Police arrived at the accident scene almost immediately, and it is likely that the quick assistance of the radio amateurs accounted for the saving of a woman's life. — VE3AYR, EC Halton - Wentworth, Ont.

K3LJP was mobilizing on Interstate Route 95 through Virginia on Dec. 21, when he saw another motorist skid off the road because of poor

road conditions. Calling the ECARS service control, WA2LWC, contact was made with WA3LHL and the police were notified. — WA2LWC.

At 0300Z on Dec. 23, a train derailed in Houston, Tex. Several of the cars left the track, rolled down an embankment and struck a large gas main causing an explosion and fire which eventually spread to a nearby warehouse. Nine local amateurs, including local EC WA5ABA, SEC K5HXR and Assistant State Radio Officer W5CWL, volunteered their services and were put to work supplying liaison communications for the Red Cross and other agencies. The operation utilized the facilities of the local fm repeater while the repeater in nearby Pasadena was kept as back-up. — WA5ABA, EC Harris Co., Tex.

Members of the Cascades Amateur Radio Society of Jackson, Mich., participated in a drill to test their communicating ability on Oct. 25. Stations, using ten-meters, were set up at the Parkside High School, the site of a simulated plane

crash, and three local hospitals. According to civil defense officials who conducted the drill, the exercise was a success, with communications greatly improved over previous tests.

Several additional reports of Halloween "Goblin Patrols" have been received. Twenty-eight Sedgwick Co., Kans., amateurs manned 20 mobile stations to patrol several of that county's smaller cities on Oct. 30 and 31. Liaison was maintained with the local sheriff's department using two-meter fm. — *WA0UTT, EC Sedgwick Co., Kans.*

In British Columbia, a number of local groups responded to the call for aid from local agencies. In Nanaimo, fifteen amateurs manned six mobiles and set up a base station at the local RCMP station. In Vancouver, the North and West ARC supplied twenty amateurs and ten mobiles with the control station set up at civil defense headquarters where direct links to police headquarters were available. The Richmond ARC used sixteen amateurs and six mobiles in their patrol effort on behalf of the RCMP, and the East Kootenay ARC of Kimberley supplied six operators for a mobile and base station. In all cases fm in the two-meter band was utilized for communications. — *VE7FB, SEC BC.*

In Dundee, Mich., six amateurs used three mobile units to aid in transporting auxiliary policemen during the Halloween weekend. A base station was established at the police station, and all emergency vehicles were dispatched from there. Each mobile was assigned an area to patrol, but areas were traded several times to prevent spotting of the unmarked cars. A number of mischievous vandals were intercepted and prevented from doing any damage. — *W8EFK, EC Monroe Co., Mich.*

The Thunder Bay, Ont., AREC participated in a drill to test communications on Oct. 31. A train wreck was simulated in Murillo and chlorine gas was assumed to be escaping from a ruptured tank car. Communications were maintained between Murillo and Thunder Bay and 51 messages were passed. Five mobiles, manned by VE3s AJ, AY, Z, ANP, EDZ and EF1, took part in the test under the direction of EC VE3AYZ. — *VE3AYZ, EC Thunder Bay, Ont.*

On Nov. 9, VE3QS, of Toronto, was contacted by a neighbor for assistance in forwarding a death notification to a Canadian serviceman stationed in a remote part of the Northwest Territories. The local police had advised the in-

quirer that the best way to contact the remote base was via amateur radio. With the help of VE1IJ, VE3QS contacted VE8RCS on the base and the necessary communications were carried out. Within two hours, the serviceman had been able to arrange transportation to Toronto for the funeral.

Twenty-one Edmonton, Alta., area amateurs furnished communications for a night-time sports car rally on Nov. 14 and 15. Communications from 29 check-points covering a 384 mile route was provided to rally officials concerning the progress of the 15 cars participating. A renovated bus, equipped with an ac power plant and a multi-channel fm rig was used as a command point in several locations during the event. In areas where vhf communications were ineffective because of the long distances and difficult paths involved, 75 meters was used as a back-up. — *VE6PM.*

Seventeen Columbus, Ohio, area amateurs under the direction of EC/RO W8ERD helped with communications for a March of Dimes Pledge Walk on Nov. 14. Stations were set up at each of twelve check-points along the route and in an ambulance that was standing by to assist if it was needed. About 60 messages were handled and the amateur radio equipped ambulance was pressed into service three times during the course of the walk. — *W8ERD, EC/RO Columbus, Ohio.*

Five Tacoma, Wash., amateurs helped with communications for a parade on Nov. 21. K7NPG was stationed at the staging area and relayed changes in place, drop-outs, etc., to W7RDG aboard the civil defense communications bus near the reviewing stand. K7CZF and K7CYZ were located along the route to advise of any difficulties along the way. K7NKZ was the lead car for the parade and carried a very important guest — Santa Claus! — *K7CZF, EC Area 4 Wash.*

We reached the low point of the year for number of SEC reports received during a calendar month: 39 for November. Number of AREC registrants, however, held up well, considering the low number of reports, with 14,068 members listed as active. Last November we had 46 reports for 16,203 AREC members. Rather disappointing. Ah well, next month we'll have our annual totaling of reports for the year. Sections reporting: Alta, Ariz, Ark, Colo, Conn, EFla, EMass, EPA, Ind, Iowa, Kans, Ky, Mar, Mich, Mont, Nebr, Nev, NLI, NC, NNJ, NTex, Ohio, Okla, Ont, Org, Oreg, SDgo, SF, Sask, SDak, SNJ, STex, Tenn, Utah, Wash, WVa, WFla, WMass, WPa.

QST



During the West Virginia Sports Festival held in Oak Hill on Sept. 3-5, an amateur radio exhibit was set up at Fayette County Civil Defense headquarters. Full cooperation was established with c.d., Red Cross and the auxiliary police. Traffic was accepted from the public and was channeled into organized nets. The event was topped off by a parade in which the amateurs participated. Pictured are K8BDH and W8UDB operating the station during a simulated emergency communications demonstration.

QST for

Hamfest Calendar

MARCH						
1971						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Georgia — The annual Columbus Hamfest will be held on March 21 at the Fine Arts Building behind the Municipal Auditorium at the Fairgrounds. For information write John Laney, K4VGT, 1905 Iris Drive, Columbus, GA 31906.

Illinois — The Chicago Suburban Radio Assn. will hold its annual Hambooree on March 21 at the Operating Engineers Hall, 9200 West Joliet Rd., La Grange (Countryside), Illinois. The latest amateur radio equipment will be on display; all hams are invited to display or sell any products or items they wish (free of charge). The exhibit hall has plenty of space and there is ample paved parking space at no charge. A donation of \$1.50 per person at the door is the admission charge. Advance tickets are \$1 per person and may be purchased from Wilson Thomas, W9KWA, 4017 Vernon Ave., Brookfield, IL 60513.

Illinois — The Sterling-Rock Falls ARS Hamfest will be held March 7 at the Sterling Coliseum, corner of 3rd St. and 3rd Ave. (same place as last year). Plenty of parking, food, entertainment for kids and XYLs. Advance tickets \$1; \$1.50 at the door. Write Sterling-Rock Falls ARS, P.O. Box 11, Sterling, IL 61081.

Michigan — There is 24,000 square ft. available for the Blossomland ARA 4th Annual Auction and Swap-Shop at Shadowland Ballroom, St. Joseph-Benton Harbor, Sunday, March 14, 9:00 A.M. to 4:00 P.M. Hot food. Prefer to do your own selling? Rent one of the swap tables. If that fails, let the skilled auctioneer put your gear on the block. Direct inquiries to B.A.R.A., Box 175, St. Joseph, MI 49085.

Mississippi — The Old Natchez ARC will hold their Hamfest on April 4 in Natchez.

New York — The Seventh Annual Amateur Radio Luncheon, in connection with the IEEE International Convention, will be sponsored by the Metropolitan N.Y. Chapter of QCWA on Tuesday, March 23, at The Engineer's Club, 32 West 40th St., NYC, starting at 12:15 P.M. Tickets are \$7.50 per person and reservations must be made in advance, either through W2FGZ or W2PFE.

New York — The Annual Auction of the New York RC will take place at the George Washington Hotel, 23rd St. and Lexington Ave., NYC, on Sunday, March 14 at 2:00 P.M. All are welcome, bring gear and money! For information write George Kiener, W2TOV, 67-19 168th St., Flushing, NY 11365.

Texas — The Midland ARC will hold its Annual Swapfest on Sunday, March 21. The event will be preceded on Saturday by the First Annual Southwest Regional VHF Conference. Leading authorities on vhf, fm mobile, and repeaters will be participating. In addition, there will be a social and dance Saturday evening. Talk-in on 7.27 and 146.94-146.34 MHz. Awards will be given for home-brew equipment (no kits), frequency guessing, cw, etc. Registration fees are as follows: Saturday VHF Conference, \$2; Saturday night dance \$1; Sunday Swapfest, \$2. Advance registrations may be made to Midland ARC, P.O. Box 967, Midland, TX 79701.

GREAT LAKES DIVISION CONVENTION

Muskegon, Michigan

March 27, 1971

As we announced briefly in the "Coming Conventions" calendar last month, the original sponsors of the Great Lakes Convention scheduled for Grand Rapids in April had to bow out. The Muskegon Area Amateur Radio Council dashed in to fill the gap; despite the shortness of time, they've come up with a full program for March 27 at the Muskegon Community College on Quarterline Road. These special interest activities will be covered: Army, Navy, and Air Force MARS; vhf repeaters; nets and traffic; RTTY; ham TV; RACES and Civil Defense; MIDCARS; QCWA and a *laarge* "Swap and Shop." Friday night, early birds get together at the Downtowner Motor Inn with, hopefully, a Wouff Hong initiation at Midnight. Advance tickets are \$2.00 (\$2.25 at the door). There is parking for 1000 cars and complete facilities for luncheon at the college. To reach it, head for Muskegon on Interstate 96, then follow US Route 31 to its junction with Michigan Route 46. Write the Muskegon Area Amateur Radio Council, P.O. Box 691, Muskegon, MI 49440, for tickets and further information.

COMING A.R.R.L. CONVENTIONS

March 26 — Great Lakes Division, Muskegon, Michigan

May 22-23 — Virginia State, Vinton, Roanoke County

July 3-4 — West Virginia State, Jackson's Mills

July 3-5 — Pacific Division, San Jose, California

September 4-6 — Southwestern Division, Anaheim, California

Note: The Great Lakes Division Convention originally scheduled for Grand Rapids April 16-17 has been cancelled by its sponsors.

Strays

I would like to get in touch with . . .

. . . other hams interested in exchanging old radio shows, airchecks, and commercial film materials such as stills. Thomas King, WA7DPO/4, Auxier, Kentucky 41602.

. . . amateurs interested in starting a homework net for students. WA1LWT.

. . . hams interested in hypnosis and ESP. WB9AJM.

Remember the "Let's Talk Transistors" series by Robert E. Stoffels, WB9ESH? We've put together a reprint booklet of this 9-part transistor primer and it is available from ARRL for \$1 including postage.

Happenings of the Month

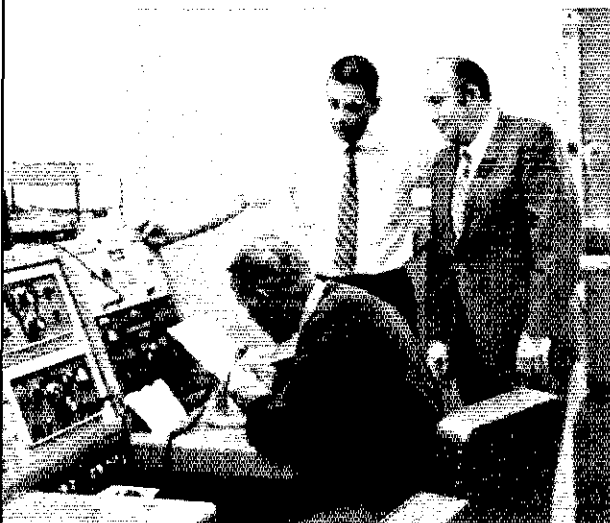
NEW FCC APPLICATION

An updated Form 610 to be used in applying for new, modified, upgraded or renewed individual amateur licenses is now being circulated by FCC. Though the new form became available only in early January, it bears the date July 1970.

The new form includes a box for Advanced Class, missing from the earlier form; similarly, it shows that photocopies of licenses may be

attached, in lieu of the original. If the box for "Present or Proposed Station Location" is not properly and completely filled in, the Commission will issue only an operator license — no station license or call letters! But this is only to insure proper completion — the Commission expects to issue call signs to virtually all applicants, whether their plans for an amateur station have gone beyond the daydream state or not. There are some minor changes on the back of the form, and one small error. Applicants for Extra Class may now show two years of holding Conditional or higher class license or the equivalent issued by any United States or foreign government authority, but the earlier language still appears on the form.

Forms dated prior to July 1970 may not be used for any application reaching the Commission on or after July 1, 1971.



If your club is planning any big deal in connection with Field Day June 26-27 or Amateur Radio Week, June 20-26, 1971, it's not too soon to start now. That's what Oregon amateurs did last year, and got the Governor not only to proclaim Amateur Radio Week, but to make the announcement over ham radio as well — The Honorable Tom McCall at the mike; Clayton Raker, W7OBK, center, and E. D. Spencer, W7TMF. Others involved were Arthur Melvin, W7ADF, and Gene White, K7YQM.

WHO THE DEVIL IS WHO?

Number 21 in a Series of Call Conversion Charts

The flood of new two-letter call signs resulting from Extra Class licensees turning in their one-by-three and two-by-three calls has slowed to a trickle. Since the last installment in January, 1970, these amateurs have notified us:

Now	Was	Now	Was	Now	Was	Now	Was
W1KZ	W1MKN	K3AJ	W3LH2	K6OM	K6EDE	W8MC	W8RAA
W1NT	WA1JBK	K3AR	W3JLB	K6QE	W6UKQ	W8MD	W8GLV
W1OW	W1MGL	W4QX	W4QVY	K6QK	W5CWP	W8ME	WA8GDR
W1PL	WA1FHU	K4MD	WA4GTM	K6QN	W6EJH	W9GR	W9BGI
W1RU	W1IKE	K4MK	W2GOO	K6QX	W6MBN	W9HI	WB9AMR
W1RW	W1LVQ	K4MN	W4YAH	K6QY	WA6KPB	W9HL	W9EUI
K2BH	K2BVQ	K4NB	WB4JVC	K6QZ	W6MVO	W9HQ	WA9LDG
K2DA	K2QYN	K4ND	W4MLP	K6RC	WA6EKH	W9HZ	W9BZB
K2DK	W2LAT	K4NE	W4KMG	K6RJ	WB6DCH	W9ID	W9JXQ
K2DT	SM5ZZ	K4NL	W4FCB	K6RK	W6ATR	W0LV	W0RHV*
K2EE	WB2GOY	K4NN	W8PUD	K6RS	W6CZD	W0LX	W0PHR
W3VH	W3DPS	K4NO	WB4FOC	K6SJ	K6OGE	W0LZ	WA0JUN
W3YT	W3WBH	K4NW	WB4IDI	K6SQ	W6BKZ	W0MA	W0CGZ
W3YX	W3RVG	K4NX	W4RVB	W7OH	W7BOI	W0MC	WA0EXF
W3ZD	W3LHF	K4OO	W4VOI	W7RQ	W7FOJ	W0MD	WA0YEW
W3ZM	W3DWF	K4PK	WB4CAZ	W8KE	W8POR	W0MK	W0LAJ
W3ZR	K3RHM	K4PY	WB4JLG	W8LF	W8PUB	W0MM	K0YGC
W3ZY	WA3CHO	W5OY	W5MMU	W8LK	W8DMN	W0MN	K0ACG
		W5TB	W5PQU	W8LX	K8KZY		

*Correcting an earlier listing

Behind the Diamond

Number 27 of a Series



Among our New Year's resolutions for 1971 is one to keep coming with these brief sketches of the amateurs "Behind the ARRL Diamond." First subject since the calendar flipped over is Northwestern Division Director Robert B. Thurston, W7PGY, of Seattle, Washington.

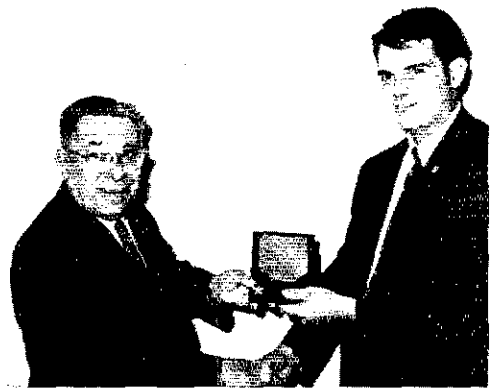
Bob, a retired civil service communications technician, was first elected to the Board for

the 1965 term; he earlier was vice director, 1961-1964, and Section Communications Manager for Washington, 1958 to 1964. He has been president, vice president, secretary, treasurer, and trustee of the North Seattle Amateur Radio Club, and now is trustee for the Skagit Amateur Radio Club. W7PGY has been Civil Defense Radio Officer for Seattle, net manager of the Air Force MARS vhf RTTY net and a founding member of the Seattle vhf RTTY net. He's been licensed since 1951 under the same call.

At the Board meeting in May, 1970, Bob was elected to the Executive Committee. He had been a member of the ARRL Planning Committee for the five years prior, serving as chairman in 1969-1970. For years and years, W7PGY's primary activity in amateur radio was traffic handling. From the end of World War II to 1965, Hq. kept a Brass Pounders' League Honor Roll; Bob was the third W7 from the top, 18th nationwide — and he came into the game after it had been in progress at least six years!



John Kitts, WB2TSX, has won the First Army MARS trophy for 1970, recognizing his work in handling nearly 6000 morale messages for servicemen. The presentation was made by Lt. General Jonathan O. Seaman, commander, First Army at Fort Meade, Maryland.



Jesse Bieberman, W3KT, Atlantic Division Vice Director and manager of the ARRL W3 QSL Bureau since 1947, was honored by the Radio Association of Erie at a recent testimonial thanking him for his long volunteer service for other amateurs. Jesse accepts a plaque from Mike Hall, WA3HSR, right. (Photo thanks to Ronald J. Jakubowski, K3VXE).

The October *QST* Cover Plaque award went to Ken MacLeish, W1EO/7 for his article, "A Frequency Counter for the Amateur Station." The presentation was made at the Old Pueblo Radio Club, Tucson, Arizona, by ARRL assistant director Chuck Breeding, W7ENP, left center, with Stan Van Pelt, K7KNP, far left, and Phil Shafer, W7BM, at right, looking on.



March 1971



Correspondence From Members-

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

FOLKSY TRIVIA?

● At the risk of my grapes turning sour, I would like to comment on the state of *QST*. I think it is a waste of resources for ARRL to promote contests and devote magazine space to trivia. Two-thirds of *QST* is about as interesting as reading the *Callbook*. Folksy columns are fine for the local club newsletter, but for an organization with 100,000 members to print a hodge-podge of one-liners about individual members is ludicrous.

Of all the ham magazines *QST* has the least readable print. I see two solutions: (1) make it bigger and raise the price, or (2) make it bigger and delete items of little interest. It can be argued that the magazine must be balanced. But does 20 pages of trivia balance 20 pages of more meaningful material? Rather than delete material, perhaps the ARRL should offer membership in various interest groups as the IREF does with its microwave group, circuit theory group, etc.

I would gladly pay \$5 for ARRL membership and a subscription to a *QST* containing only useful articles to develop technical and operating skills. Human interest could be maintained by including short biographies of the contributing authors as well as short stories. And I'm sure other hams would be willing to pay \$5 for ARRL membership and a subscription to a trivia newsletter that would satisfy their ego by publishing their call letters.

It would be interesting to research the interests of the membership in this regard. I suspect that if two or more groups were established, one of them would not last more than a couple of years due to a lack of interest. By this criterion I believe material should be selected for publication in the current form of *QST*. - Donald Kochen, K3SVC, Dundalk, MD

● How long is *QST* going to continue to print the 10 to 14 pages of drivel each month which is euphemistically called "Station Activities"?

Who cares except the guy who sees his call in print? You must have better use for the space. - Edson B. Snow, W2UN, Rochester, NY

BOUQUETS

● I compliment Mel, W2BOC, on his excellent article about Sporadic-E skip. It was well researched and contains much practical information for the 6-meter operator. - Jon K. Jones, WA0VJF, Overland Park, KN

[EDITOR'S NOTE: Part I was in December 1970 *QST*.]

● I like the new listing of the Sept. 12 FMT Results as tabulated and listed in December *QST*. As an SCM, the individual FMT report was something of a hassle! - Lee Wical, KH6BZF, Kaneohe, HI

● Let me express my appreciation for the literary efforts of the editor of the "How's DX?" column. That guy is a master of constructive humor. His December piece on Auntie Murphy was a gem. - C.J. Renken, K9HPW, Orland Park, IL

● It is very interesting to keep in touch with the American amateur scene through *QST*, and although most of the advertising is not relevant over here, it is useful to see the gear that you use.

The technical articles are excellent, this being the main interest, as most of the circuitry can be used. The fairness in dealing with members' correspondence, even when the member holds opposite views, is commendable - and the variety of technical articles, often coupled with humour, is much appreciated.

Thank you for the regularity with which *QST* arrives, usually a month late, but considering the delay your pages indicate on local delivery this is very good and I am quite satisfied. - Charles H. Biggs, Fallowfield, Manchester, England

● Thank you for your excellent magazine that helps us to really keep our finger on the pulse of ham radio activities in all phases. - Lyndon W. Olson, VE6AHN, Camrose, AB

● Today I passed my General Class license exam. Had it not been for your W1AW practice schedules and your *License Manual*, I doubt if I would have passed it so soon. Your services have been invaluable. - Keith Hoffman, WN3PSW and soon to be WA3PSW, Towson, MD

● I am grateful to ARRL for the Code Proficiency Program which helped me get my Extra Class license last August; for the many hamming activities you initiate and encourage; and for the excellent journal, *QST*, which keeps readers abreast of the art of vhf and uhf amateur radio. - Robert Wessel, K4PR, Old Hickory, TN

● I enjoy reading *QST* every month. Please keep up the good work. - Emerson A. Cox, WN9FBE, Geneva, IL

FASTER RTTY?

● I am against Docket 19110, which would allow amateur radio teleprinter operation at 75 and 100 words per minute in addition to 60 wpm. Almost all of the stations I work on RTTY cannot type 60 wpm, and faster speeds would be of no value to us. What a mess things would be if we had all three speeds going at the same time.

Model 15 and 19 machines come close to flying apart at 75 wpm, and of course they would not operate at 100 wpm. I saw this happen in the FAA when we switched over to 75 speed with the model 15. The only thing that will do the job is the model 28 and there are only a few of us who can afford them.

I realize that there are amateurs with the model 28 ASR and KSR machines, and to put them on 100 wpm is no problem, but when you stop and look at the overall picture, and understand that even the guy with the Western Union model 100 printer that cost only a dollar is just as much a RTTY enthusiast as the fellow with the model 28, it would be unfair. - Clarence Kreh, K0KPI, Farmington, MN

- On FCC Docket 19110: there is no problem of spectrum space. In my business, we stick 100 wpm signals (75 baud) into 150 cycles of a band. Of that 150 cycles, 80 are guard band and only 70 cycles are used for the fsk signal. The only other problem that I can foresee is the problem of identifying the signal speed. Perhaps speed sub-bands might be considered officially or by gentlemen's agreement. — *Harold Smith, WA2KND, Rochester, NY*

[EDITOR'S NOTE: Deadline for filing initial comments in Docket 19110 is March 1, 1971. Comments in reply to papers submitted by others may be filed until March 21. ARRL will file in favor, based on an earlier Board decision.]

- In docket No. 19110 the Commission proposes to amend the rules to permit operation of radioteletypewriter equipment in the Amateur Radio Service at higher speeds than is currently permitted.

It is believed that the rule change as presently proposed does not implement the Commission's own policy as presently enumerated in the last sentence of Rule 97.69(a): "In general, this code shall conform as nearly as possible to the teleprinter code or codes in common commercial usage in the United States."

The code most commonly used now in the United States is the American Standard Code for Information Interchange (ASCII). The 8-level ASCII code has a control alphabet enabling the transmission of 32 special machine command functions in addition to the standard 96-character upper-case and lower-case alphabets and punctuation and symbols (see Appendix 1 of MIL-STD-188B). The combined output of teleprinter manufacturers of machines suitable for this code is of the order of 50,000 units per month. Machines having complete keyboards, tape punch and reader, and full-page printer can be purchased new for under \$800, and are frequently found used or sold at auctions for as little as \$300. Thus these machines are readily available at prices well within the amateur budget and can be expected to become widely used by amateurs in the near future once rules are adopted that permit their use. — *R. W. Johnson, W6MUR, Huntington Beach, CA*

SPECIAL MEMBERSHIPS

- Reference your League Lines item in December *QST* concerning "special classes" of membership.

I agree, but jealously guard my Life Membership "special class" and ask that the LM head any such listing. Would recommend special classes of membership similar to those used by other organizations, to wit:

1. Life Member
2. Sustaining Member
3. Patron Member
4. Regular Member
5. Junior Member

With regard to the "Junior Member": I cannot suggest too strongly that ARRL's future lies with the kids who are now Novices and whose interest and support we must have. Yet, they are least able to pay the regular fee. Why not give them membership at half-fee for the duration of their Novice license? As sponsor of a high school radio club, I know the boys would join if it weren't for that big \$6.50 which they would rather use to buy crystals!

Please establish a half-fee Junior membership. — *Norman W. Pinney, Jr., W4EMP, Montgomery, AL*

- . . . I personally would not mind an increase in dues, but not over \$10.00. I firmly believe that there should be only one class of Full membership . . . — *Joe L. McDonald, WA2QIL, Kew Gardens, NY*

- . . . Perhaps those who pay sums "above and beyond the call of duty" could have their *QSTs* sent via first class mail. . . . — *Steven D. Katz, WB2WIK, Springfield, NJ*

- . . . I feel that giving special privileges to those who have more money than others is discrimination . . . — *Michael J. Perkins, WB9ESK, Ellsworth, WI*

MATTER OF RELEVANCY

- A few weeks ago I received my Technician ticket. I paid \$9 for the exam, yet there was not one question on it pertaining to the vhf spectrum in any way! Why should Techs be forced to pay \$9 for someone else's exam? For \$9 we ought to get a test oriented toward the kind of work we will be doing, not a warmed-over General/Conditional exam. Although the types of emission permitted on 80 meters might, for example, be of academic interest to a Tech, wouldn't an exam oriented toward vhf and uhf, and tougher than the present rather simple exam, be inductive toward making the Technician license one for experimenters and technicians, as was originally intended, rather than just the next step up from Novice? — *Mike Brown, WB2JWD, Dix Hills, NY*

TIME JUMBLE

- Presumably the intention of Operating Aid 10 is to rationalize the Board's order regarding the use of GMT, and it occurs to me that the author undertook a difficult assignment. The idea that GMT is better because it is understood by foreigners may find favor in the DX fraternity although its proponents show a very marked tendency to avoid specifics. It practically boils down to a question of whether a log entry in local time can ever in the future be converted to terms of another zone. Then comes the statement that a GMT clock is a distinguishing mark, which may be true if the clock has a large dial. It may be irrelevant to say that a big barometer could produce the same effect.

We take it that the "Time Jumble" article (page 103, November *QST*) has the same objective. But we ask permission to turn the major premise around and suggest that the confusion may be expected to exist so long as we insist upon an artificial practice which violates natural, deeply ingrained, universally accepted concepts. It is not readily apparent how one reaches the conclusion that amateurs are a breed apart, not involved in local communications, aloof to time zone thinking. If this writer has less need for a commonly understood time language he is unaware of it.

"Time Jumble" exhorts us to lose our sense of morning and afternoon; to accept as a fact the dawn of a new day at 1900 EST. How many people will read and take it seriously? What is the real purpose? It seems quite clear that amateurs should use the time/date designations common to their country and translate only in the rare cases where it is necessary. This applies to logs, announcements, schedules and radiograms.

QST has not exaggerated the problem. It has merely proposed an impossible solution. — *Elmer Preston, K4KNP, Front Royal, VA*

I.A.R.U. News



INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

ALIEN OPERATING

With many amateurs engaged in international travel for business or pleasure, occasions have arisen for possible hamming while in a particular country. The advent of licensing reciprocity between some nations has opened up operating permission for visiting amateurs in many cases. Still other countries offer temporary licenses as a courtesy to foreign amateurs.

Headquarters receives inquiries from numerous amateurs about obtaining operating permission abroad. In fact, in a year's time, we supply info regarding over 100 different locations. The most popular countries in this regard are the United Kingdom, Germany, and Switzerland. But, it's not unusual to hear from an amateur with plans for a trip to St. Pierre or Tahiti.

As assistance to traveling amateurs, elsewhere in this department appears a list of countries having licensing reciprocity with the U.S. and Canada. In addition, member societies of IARU have furnished details to help alien license seekers. Headquarters has compiled this information as presented below. A word of caution, however, when applying — be sure to allow enough time since most countries require from 30 to 90 days processing time.

The information below presents the country name, name of IARU society, names of countries whose amateurs are accorded eligibility for amateur operating privileges, and the address from which forms and assistance for application may be obtained.

Argentina: (*Radio Club Argentino*) — USA. Direccion General de Telecomunicaciones, (Seccion Radio-aficionados) Sarmiento, 189 Buenos Aires, Argentina, or, Radio Club Argentino, Carlos Calvo 1424, Buenos Aires, Argentina.

Australia: (*Wireless Institute of Australia*) — All countries. P.M.G. Department, Contoller, Radio Branch, Parkade Building, Bourke Street, Melbourne, Vic. 3000, Australia.

Austria: (*Oesterreichischer Versuchssenderverband*) — Germany, United Kingdom, Canada, Australia, New Zealand, Switzerland, Liechtenstein, Luxembourg, Finland, Czechoslovakia, Denmark, Netherlands, Sweden, Yugoslavia,

Romania, USA, Monaco, Costa Rica. Walter Nowakowski, OE1WN, c/o OVSV, Dachverband, P. O. Box 999, A 1014 Wien 1., Austria.

Barbados: (*Amateur Radio Society of Barbados*) — United States. Government Electrical Inspector, Old Hospital Buildings, Jemmott's Lane, Bridgeton, Barbados.

Belgium: (*Union Belge des Amateurs-Emetteurs*) —

All countries in the world. Union Belge des Amateurs-Emetteurs, International Affairs Manager, Rene A. Vanmuysen, ON4VY, 52, Diepestraat, Wezembeek-Oppem (Brabant), Belgium.

Bermuda: (*Radio Society of Bermuda*) — British Commonwealth, Austria, Belgium, Finland, German Federal Republic, Luxembourg, Monaco, Morocco, Netherlands, Poland, Portugal, Denmark, USA, Rep. of S. Africa, Yugoslavia, Sweden, France, Switzerland, Reginald S. Pitman, VP9AX, Telecommunications Officer, Serpentine Road, Pembroke, Bermuda.

Canada: (*American Radio Relay League - Canadian Division*) — All British Commonwealth, Bermuda, France, Germany, Israel, Luxembourg, Netherlands, Nicaragua, Norway, Senegal, Switzerland, United Kingdom, United States, Venezuela, Peru, Mexico, India, Uruguay, Sweden. Dept. of Communications, Berger Building, Ottawa, Ontario, Canada.

Ceylon: (*The Radio Society of Ceylon*) Commonwealth countries. The Post-Master General, New C.T.O. Building, Lotus Road, Colombo-1, Ceylon.

Chile: (*Radio Club de Chile*) — Peru, United States, Canada. Radio Club de Chile, Nataniel 1054 (Casilla 13630), Santiago, Chile.

Colombia: (*Liga Colombiana de Radioaficionados*) — United States, Spain. Ministerio de Comunicaciones, Bogota, Colombia, or, LCRA, Ap. 584, Bogota, Colombia.

Costa Rica: (*Radio Club de Costa Rica*) — United States, Central America. Radio Club of Costa Rica, Apartado 2412, San Jose, Costa Rica.

Denmark: (*Experimenterende Danske Radioamatører*) — Germany, England, Sweden, Norway. Generaldirektoratet for Post & Telegrafvesenet, Centralpostbygningen, Tietgensgade 37, 2 - 1530 - Copenhagen V, Denmark.

Dominican Republic: (*Radio Club Dominicano, Inc.*) — United States. Direccion General de Telecomunicaciones, Santo Domingo, Dominican Republic.

Ecuador: (*Guayaquil Radio Club*) — United States. Direccion de Telecomunicaciones del Ecuador, P. O. Box 3066, Quito, Ecuador.



During last year's earthquake disaster in Peru, W2APF working with "Operation Goodwill" of the Rotary Club of Albany, NY, mobilized over 180 thousand pounds of food, clothing, and medicine and raised over \$7000 for relief efforts. For this work, Dave received the personal thanks of Santidgo Marcenaro, Consul General of Peru. Pictured from left are OA4PQ; Sr. Marcenaro; Erastus Corning, Mayor of Albany; and W2APF.

- El Salvador: (*Club de Radio Aficionados de El Salvador*) - Central America, United States. Club de Radio Aficionados de El Salvador, c/o The Secretary, P. O. Box 517, San Salvador, El Salvador, C.A.
- Faroe Islands: (*Føroyiskir Radioamatørar*) - England, Sweden, Norway, Denmark, Germany. Føroyiskir Radio Amatørar, P. O. Box 184, Torshavn, Faroe Islands, Europe.
- Finland: (*Suomen Radioamatooriliitto r.y.*) - United States, England, Austria, Switzerland, Canada, Sweden, Iceland, Germany (West), France, Australia. Suomen Radioamatooriliitto r.y., Box 10306, Helsinki 10, Finland.
- France: (*Reseau des Emetteurs Francals*) - Belgium, Great Britain, United States, Holland, Luxembourg, Monaco, Israel, Canada, Germany, Switzerland, Andorra, Morocco. Direction des Services, Radio Electriques, 5 Rue Froidevaux, Paris 14, France.
- Germany: (*Deutscher Amateur Radio Club e.V.*) - All countries. Deutscher Amateur Radio Club, e.V., International Affairs, Muehlenstrasse 27, D-5601 Dönnberg/Wuppertal, Germany.
- Greece: (*The Radio Amateur Association of Greece*) - U.S. Military Personnel. Radio Amateur Association of Greece, P. O. Box 564, Athens, Greece.
- Honduras: (*Radio Club de Honduras*) - USA, Central American countries. Humberto Andino N., Jefe de Radio National, Tegucigalpa, D.C., Honduras.
- Hong Kong: (*Hongkong Amateur Radio Transmitting Society Ltd.*) - Austria, South Africa, Belgium, France, Luxembourg, Netherlands, Monaco, Finland, Denmark, Fed. Rep. of Germany, Portugal, Sweden, Switzerland, United States, Morocco, Poland, Yugoslavia, and all Commonwealth countries. Telecommunications Department, General Post Office, Hong Kong.
- Iceland: (*Íslenskir Radioamatörar*) - Norway. Post-og sinamalamastjornin, Landssimahúsinu v/ Austurvölli, Reykjavík, Iceland.
- India: (*Amateur Radio Society of India*) - England, United States, Switzerland, West Germany, Sudan, Arabian Gulf, Canada, Australia. Wireless Adviser, WPC Wing, Department of Communications, Parliament Street, New Delhi 1, India.
- Ireland: (*Irish Radio Transmitters Society*) - United Kingdom, United States, West Germany, Norway. Department of Post & Telegraphs, Experimental Radio Section, Hamman Buildings, O'Connell Street, Dublin, Ireland.
- Israel: (*Israel Amateur Radio Club*) - United States, Canada, United Kingdom. Radio Engineering Services, Frequency, Licensing and Legislation Section, Achad Haam St. 9, Tel-Aviv, Israel.
- Italy: (*Associazione Radiotecnica Italiana*) - All countries (operator's license only). Direzione Cent. Servizi Radioelettrici, Viale Cristoforo Colombo, 153-Roma, Italy.
- Jamaica: (*The Jamaica Amateur Radio Association*) - British Commonwealth. Mr. V. A. Panton, Chief Post Office Engineer, P. O. Headquarters, South Camp Road, Jamaica, West Indies.
- Korea: (*The Korean Amateur Radio League, Inc.*) - U.S. Army Personnel. Dong-In, Cho, HMTAJ, Korean Amateur Radio League, Inc., Central Box 162, Seoul, Korea.
- Lebanon: (*Association des Radio-Amateurs Libanais*) - All IARU members except Israel. Association des Radio Amateurs Libanais, P. O. Box 1217, Beirut, Lebanon.
- Liberia: (*Liberian Radio Amateur Association*) - All countries. Dept. of Post & Telegraph, Division of Telecommunication, Monrovia, Liberia, or, Liberian Radio Amateur Assn., P. O. Box 1477, Monrovia, Liberia.
- Luxembourg: (*Reseau Luxembourgeois des Amateurs d'Ondes Courtes R.L.*) - United States, Canada, Great Britain, Netherlands, Belgium, France, Germany, Austria, Switzerland. Administration des P. & T., Hotel des Postes, Luxembourg-Ville, G.D. Luxembourg.
- Malaysia: (*Malaysian Amateur Radio Transmitters Society*) - Australia, Hong Kong, Japan, New Zealand, Germany, United Kingdom, Canada, USA. Director General of Telecommunications, Government of Malaysia, Kuala Lumpur, West Malaysia.
- Malta: (*Malta Amateur Radio Society*) - United Kingdom, United States, Canada, Germany. Mr. Galea, Inspector of Wireless Telegraphy, The Prime Ministers Office, Valletta, Malta. Monaco: (*Association des Radio-Amateurs de la Principaute de Monaco*) - Germany, Austria, Belgium, France, USA, and United Kingdom. Association des Radio-Amateurs de la Principaute de Monaco, 16, Boulevard de Suisse, Monte Carlo, Principaute de Monaco.
- Morocco: (*Association Royale des Radio-Amateurs du Maroc*) - Countries allied or friendly to Morocco. Association Royal des Radio-Amateurs du Maroc, Box 2060, Casablanca, Morocco.
- Netherlands: (*Vereniging voor Experimenteel Radio Onderszoek in Nederland*) - United States, Canada, United Kingdom, Belgium, Germany, France, Austria, Luxembourg, Ireland. Radio Control Dienst, P.T.T., Kortenaerkade 12, S-Gravenhage, Netherlands.
- Netherlands Antilles: (*Vereniging voor Experimenteel Radioonderzoek in de Nederlandse Antillen*) - All countries. Govt Radio & Telegraph Administration, P. O. Box 103, Curacao, Netherlands Antilles.
- New Zealand: (*New Zealand Association of Radio Transmitters, Inc.*) - British Commonwealth, United States. Radio Division, New Zealand Post Office, G.P.O., Wellington, New Zealand.
- Nicaragua: (*Club de Radio Experimentadores de Nicaragua*) - All countries. Club de Radio Experimentadores de Nicaragua, Box 925, Managua, Nicaragua, C.A.
- Norway: (*Norsk Radio Relae Liga*) - United States, Canada, West Germany, Ireland. Teledirektoratet, Universitetsgt. 2, Oslo 1, Norway.



A presentation was made recently by officers of *Vereniging voor Experimenteel Radioonderzoek in de Nederlandse Antillen* to PJ2VD, an award winner in the 1970 ARRL International DX Competition. Shown from left are treasurer PJ2CA, PJ2VD, and president PJ2ARI.

Panama: (*Liga Panamena de Radio Aficionados*) — United States, Costa Rica. Liga Panamena de Radio-Aficionados, P. O. Box 9A-175, Panama 9A, R.P.

Peru: (*Radio Club Peruano*) — West Germany, Bolivia, Canada, Chile, Spain, Holland, Switzerland, Uruguay, United States. Radio Club Peruano, P. O. Box 538, Lima, Peru.

Poland: (*Polski Związek Krotkofalowcow*) — All countries. Polski Związek Krotkofalowcow, P. O. Box 320, Warszawa 1, Poland, or, Państwowa Inspekcja Radiowa, Swietokrzyska 3, Warszawa, Poland.

Portugal: (*Rede dos Emissores Portugueses*) — USA, England, France, West Germany, Belgium, Switzerland, Holland, Morocco. Rede dos Emissores Portugueses, Rua D. Pedro V - 7 - 4, Lisboa - 2 - Portugal.

South Africa: (*South African Radio League*) — United Kingdom, Rhodesia. Postmaster-General, General Post Office, Pretoria, South Africa.

Spain: (*Union de Radioaficionados Espanoles*) — Belgium, Germany, Colombia. Union de Radioaficionados Espanoles, P. O. Box 220, Madrid, Spain.

Surinam: (*Vereniging van Radioamateurs in Suriname*) — United States, Netherlands, Netherlands Antilles. Verniging van Radioamateurs in Suriname, P. O. Box 566, Paramaribo, Suriname.

Sweden: (*Foreningen Sveriges Sandareamatorer*) — All countries. Televerkets centralforvaltning, Urf, S-123 86 Farsta, Sweden.

Switzerland: (*Union Schweizerischer Kurzwellen-Amateure*) — France, Belgium, Germany, Finland, Monaco, Netherlands, Netherlands Antilles, Austria, Kuwait, United States, Great Britain, Luxembourg, Canada. Generaldirektion der PTT, Sektion Allgemeine Radioangelegenheiten, 3000 Berne, Switzerland.

USSR: (*The Radio Sports Federation of USSR*) — All countries. IARU Society in country of applicant.

United Kingdom: (*Radio Society of Great Britain*) — Austria, Belgium, France, Luxembourg, Netherlands, Monaco, Finland, Denmark, Fed. Rep. of Germany, Portugal, South Africa, Sweden, Switzerland, United States, Morocco, Poland, Yugoslavia, and all Commonwealth countries. Ministry of Posts & Telecommunications, Amateur Licensing Branch, T & RRD, Waterloo Bridge House, Waterloo Road, London S.E. 1, England.

United States: (*American Radio Relay League*) — Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France, Germany, Guatemala, Guyana, Honduras, India, Indonesia, Ireland, Israel, Kuwait, Luxembourg, Monaco, Netherlands, Netherlands Antilles, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Surinam, Sweden, Switzerland, Trinidad and Tobago, United Kingdom and Venezuela. American Radio Relay League, 225 Main Street, Newington, Connecticut 06111, USA.

Uruguay: (*Radio Club Uruguayo*) — All countries. Radio Club Uruguayo, P. O. Box 37, Montevideo, Uruguay.

Venezuela: (*Radio Club Venezolano*) — United States. Radio Club Venezolano, Av. Lima Los Caobos, P. O. Box 2285, Caracas, Venezuela.

Zambia: (*Radio Society of Zambia*) — British Commonwealth. Director of Telecommunications, P. O. Box 1660, Ndola, Zambia.

DX OPERATING NOTES

Reciprocal Operating

United States Reciprocal Operating Agreements exist only with: Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France*, Germany, Guatemala, Guyana, Honduras, India, Indonesia, Ireland, Israel, Kuwait, Luxembourg, Monaco, Netherlands,* New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Sweden, Switzerland, Trinidad and Tobago, United Kingdom,* and Venezuela. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write League headquarters for details.

Canada has reciprocity with: Bermuda, France, Germany, India, Israel, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Peru, Senegal, Sweden, Switzerland, United Kingdom, U.S., Uruguay and Venezuela.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U.S. radio amateurs on behalf of third parties only with amateurs in the following countries:** Argentina, Barbados (only U.S. stations/8P) Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Permissible prefixes: CE CM CO CP CX EL HC HH HI HK HP HR LU OA PY TI VE VO W or R/8P XE XP YN YS YV ZP 4X and 4Z. Canadian hams may handle these same type third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Israel, Mexico, Peru, U.S. and Venezuela. Permissible prefixes are: CE CP HR K OA TI W XE YS YV and 4Z.

DX Restrictions

U.S. amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the ITU under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia and Vietnam forbid radio communications between their amateur stations and such of other countries. U.S. amateurs should not work XU XV or 3W8. Canadian amateurs may not communicate with Cambodia, Vietnam and Jordan. Prefixes to be avoided by Canadians are JY XU XV and 3W8.

QST

*Agreement includes overseas entities.

**By special agreements, third-party traffic is also permissible with Australian amateurs for traffic regarding amateur satellites, and with 4U1TU.

How's DX?

CONDUCTED BY ROD NEWKIRK,* WØBRD

How:

We remarked in January how fortunate we all are that so relatively few irresponsible disreputables can make the ascent into amateur radio. It is an ascent; you don't just fill in a paper to become a ham. There are challenging stairs to climb.

Few of us make it up those steps without invitation, inspiration, and help. This is as it should be if the thing is to stay worth while, and the League goes at it with a batch of superbly useful publications, Headquarters team, field staff, WIAW, etc. But ARRL is loudest in proclaiming that personal ham-to-nonham contact, not hard-sell ballyhoo, is what most often makes nonhams become want-to-be-hams, and that continuing personal aid and guidance is what turns most hams-to-be into hams.

Too frequently one hears a sad story in this little nutshell: "Oh, I almost got a ticket, too, but Elmer, W9XYZ, moved away and I kind of lost interest." Sure, the guy could have burned through on his own, maybe, but he, like others, wound up an almost-ham. No more Elmer.

We need those Elmers. They're the antithesis of the sickies and yowling sadsacks mentioned here last month. And our Elmers, too busy with the helping hand to make much noise themselves, rate thankful recognition. All the Elmers, including the ham who took the most time and trouble to give you a push toward your license, are the birds who keep this great game young and fresh.

The head Elmer in our old neighborhood, for example, was pre-WWII W9NUF, one real amateur's amateur. Bud was a super-Elmer even. Though busy with his own operating, building, arduous studies, chronic family illness, and full social calendar, he miraculously found time to be big brother to any local youngster or oldster groping uncertainly toward hamdom. 'NUF always managed to scrounge up the odd part needed to keep a guy on the air, always stood ready to help hook it up. You couldn't be anywhere near him without catching that old ham spirit. In the glow of Bud's enthusiasm pessimists shriveled and slunk away. He's gone now but the many amateurs he spawned doubtless include a few Elmers in their own right.

We know some admirable Elmers in our present bailiwick, and it's a joy to see them perform. Each

of us, when called upon, can be helpful in our way but not everyone can be an Elmer. They have a special something, leadership charisma if you like, that strikes blazing sparks. Who was the ham most instrumental in encouraging you to climb those magic stairs? Next time you drop "How's" a line include that info for our Elmer file. Perhaps later we can salute some Elmers of the Year, unsung fathers of amateur radio.

+ + +

What:

You probably have your own stalk lists roughed out by now for the ARRL DX Contest a-roarin' through the slots. Nevertheless for the record we'll document the DXquisite status of our 20-meter band in the fashion of other DX ranges last month. Prefixwise, that is, with one selected identifier sufficient for each multilabel region. This recent activity is reported in "How's" dispatches from (cw) Ws 1BV 1PL 2KXX 4PKS 4YOK 5BZK 5JPC 5OM 5QKZ 8YGR 9LNU, Ks 1JME 4BYK 4ESA 5MHG/6, Was 1JKZ 2BLE 2FOS 5YLM 9SXQ 9TZD 0VJF, WBS 2DRS 4JYB 4KZG 9CJS, KP4DJL, 11ER, VE7BAF; (phone) Ws 1PL 3HNK 4YOK 5QKZ 9LNU, Ks 1JME 2QHT 4ESA, WAs 2BLE FOS, WB4JYB and the DX press. . . .

20phone and cw each feature the presence of colleagues in A2 AP VR-9 CO CN CP CR4-6-7-8 CT1-2-3 CX DL DM DU EA-6-8 EI FL EP ET F FB8W-X-2 FC FG FK FL FM FO FP FR FY G GC GI GW HA HB HC-8 HI HK HP HS I IS IT JA JD JT JW JX KA KC4U KC6 KG4-6 KH KL KM KP4 KR KS6 KVL A LZ M1 MP4B-T OA OD OH-0 OK OX OY OZ PA PJ2-7 PY PZ SM SP ST SU TA TI TJ TU UA-2 UB UC UD UE UG UH UI UJ UM UO UP UR VK-9 VP1-2A-2D-2G-2K-8-9 VQ9 VR1-2 VS5-6 VU XE YB YK YN YO YS YU YV ZA ZB ZC ZD5-9 ZE ZF ZK1 ZL ZP 3A 3B7-8 3V 4S 4U 4W 4X 5H 5N 5R 5U 5Z 6W 6Y 7Q 7X 8J 8P 8R 9G 9H 9J 9K2 9M2-6 9Q 9V and 9Y.

20phone also includes signals from CR5-9 C21-31 EA9 FH HH HL HR HV HZ JY KB KG6S KJ KS4 KW KX LX MP4M PY0 SV TG TN TR TT TY UN VK0 VP2E-L-M-S-V VR4-5-6 VS9 XT XW YA ZD3-7-8 ZK2 ZS2-3 5A 5T 5V 5W 5X 7Z 9M8 9N 9U and 9X.

*7862-B West Lawrence Ave., Chicago, Ill. 60656.

LAØAD's snowswept Norwegian heights make an interesting QTH of the Month. You'll remember Bob as former EP2BK, VS1LP, 9M4LP, 9V1LP, and WØGTA/BF4. (Photo via W5BZK)



20 cw is additionally represented in BV BY CR3 EA FS GD GM HBØ HKØ KP KZ LU-1Z OE P14 TF UA9 UL UQ VO1-2 YJ YVØ ZS 3Y and 9L. Got 'em all? On the wall? Okay, then, now try it with transistors and a vertical.

+ + +

Where:

ASIA — In November of '69 I agreed to help MP4TCE collect German QSLs toward his DLD award but I did *not* arrange to handle other cards despite mistaken announcement. Now I have lost contact with him and am unable to forward nearly a hundred QSLs mislent to me, some with International Reply Coupons. Can anyone supply MP4TCE's present address? — **DJ2MM**. . . . JA1ZZ handles cw-only QSLs for my October-December operation from 9K2AH. — **JA8BI**. . . . QSL manager WA6AHF has my logs dating from August, 1970. — **K42AI**. . . . I shipped out cards to all stations contacted from KR6FT and these should have been received via bureaus by this time. Those still requiring KR6FT cards can reapply with self-addressed stamped envelopes to my current Marianas address. — **KG6JAR (W3CHH)**.

AFRICA — My managerial duties for ZE1BT became effective as of November 15, 1970. The usual s.a.s.e., or s.a.e. with IRCs, plus Greenwich Mean Time QSO record, apply. — **WA1RY**. . . . I assumed QSLing responsibility for 9Q5UH on November 1, 1970. S.a.s.e. applications will receive prompt attention and others will be answered via bureaus. **WANKQF**. . . . Regardless of the call used, **DJ6QT** does phone QSLing and **DJ1QP** handles cw cards for their recent joint Africa romp. Incidentally, the International Telecommunications Union now allocates the 3DA-3DM identifier block to Swaziland, 3EA-3FZ to Panama. — **DXNS**.

EUROPE — Logs have been received for G3PHD's recent operations as GD3PBD, OE1ZBW and OE1ZBW/6 — **W2GHK**. . . . My QSLing will be 100 percent via W3MNE, s.a.s.e. required, but do not confuse me with pre-1971 holders of my call. **SVØWOO** (opr. **John, WA3KCP**). . . . CT1ZW becomes my sixth Portuguese managerial client. — **W3HNK**. . . . Your notes on the new DA prefix infer that present DL4s and DL5s will have their calls changed but this is not true. The DL calls will be kept until they are invalid. Now that most Yanks hamming in Europe are here for at least two years it seems reasonable that the *Callbook* should include listings of DL4 DL5 and DA amateurs. By the way, since my HBØXSF call was quite temporary, QSLs for my Liechtenstein operation should not go to the Swiss bureau. — **DL4WJ (W4UVV)**. . . . Cards can reach me via my home address, via the SV bureau or at the address in the list to follow, and I'll answer them myself from Greece, S.a.s.e., please. — **SVØWPP (WA5UKR)**. . . . SV1s use

9K2AH (seated) and guest JA8BI produced a flurry of Kuwait QSOs beginning in October. Abdulhamid and Kunio manned their Trio gear mainly on 15- and 20-meter cw. JA8BI, an engineer for Nippon T & T, has been hamming since 1953.

the SZØ prefix during state celebrations, and German nationals are employing the DF label occasionally. — **WCDXB**.

SOUTH AMERICA — I'm receiving QSLs for recent KC4USN operation but this is incorrect. I was QSL manager only for 1965-'66 QSOs made from KC4USN by operator Lars Andersson. — **SM6CLH**. . . . W8GDIQ assumes QSL management for our January 22-31, 1971, work from San Andres. Cards mailed instead to our QTHs will eventually get to Willie okay. — **W9UCW, K9CQV**. . . . You've just got to keep working YVs until you run into one who QSLs, like YV6AV. **WA6CPP**. . . . 4T4LM's activity did not take place under our DXpedition of the Month banner. — **W2GHK**. . . . Surinam call areas are PZ1 Paramaribo, PZ2 Nickerie, PZ3 Coronie, PZ4 Saramacca, PZ6 Para, PZ7 Brokopondo, PZ8 Commewijne and PZ9 Marowijne. PZ5 is for foreign visitors, PZØ for specials. — **VERON**.

HEREABOUTS — "QSLers of the Month" CEØAE, CX7BL, DL4JS, EA8GK, HM1BL, I1FTU, JA1KRU, KL7HAQ, KR6AY, PJ5 8AR 9CL, TJ1AW, TU2BW, YV6AV and ZB2AV, plus QSL aides W3HNK, Kx 6ØAK 6TIB ØVXU, WA3HUP and WN7QLT, are applauded for swift pasteboard pushin'. Any recent quickies in your collection? — **K4ESA, WA5 2GMD 2HZR 5UHR 6CPP 6PZL ØVJE**. . . . QSLs for last November's HH9DL QSOs were expected to enter the mails by February. — **WCDXB**. . . . K2PJG has no arrangements to manage DX QSLs. — **WB2WH**. . . . I could use a QTH/QSL hint re KC6BT. — **W5BZK**. . . . Ws 3DJZ 4HHN 4WWD, Ks 2BKU 2KTK 4CIA 4KH, WAs 2EFN 4OTA and WN4SDD assist with Expedition of the Month QSLing. — **W2GHK**. . . . WAs RTB WPB and I are associated in QSL managerial efforts. — **WA5UHR**. . . . Anyone still needing YN1RTS or HT1RTS QSLs should reapply via my new Honduras address. — **WA7QJW/HR1**. . . . We volunteer to serve as QSL managers for DX stations in need. — **W9MWO, K4ESA, WAs 1HAA 2HZR 6PZL**. . . . Now a few specific suggestions from the mailbox but keep in mind that each item is necessarily neither "official," complete, nor accurate. . . .

AX9LV, R. Varney (G5RV), Box 900, Port Moresby, Papua
C21AA, R. Lear, Radio Station, Nauru Is.
C21GB, D. Stephens, Radio MQ1, Nauru Is.
CO2BU, P.O. Box 6, Havana, Cuba
DA2YW, Capt. M. Caplan, Muller Bruderleinstrasse 22, Krefeld, W. Germany
DL4WJ, J. Wilson (GS-11), MISSA-DSE, Worms, APO, New York, NY, 09058
DM4WOA, G. Koehnsm, 2344 Glowe/Rq. Ruegen Radio, E. Germany
ELs 7RL 8RL 9RL (via LRAA)
ELØK/5A/mm (via DL8UI)
FY7AB, P.O. Box 107, Kourou, Fr. Guiana
H18XR, P.O. Box 603, Santo Domingo, D.R.
HR6AK, A. Kirkonnell, Guanaja Is., Bay Is., Honduras
HR6JB, Oakridge, Roatan Is., Bay Is., Honduras
H1ABC, VOA, c/o U.S. Embassy, APO. San Francisco, CA 96346
HSs (ABF ILG 4AEJ (via STAR)
KG4s EE EQ (via W4PKS)
KG6JAR, J. Frekot (W3CHH), Box 123, U.S. NavComSta, FPO, San Francisco, CA 96630

KG6SAC, Box 6125, Guam, Guam, M.I.
 KX6LS, Box 537, APO, San Francisco, CA 96555
 MP4TDT (cia DJ9WY or DK3NG)
 ON8UL, G. Lindsay (W4EJP), 34 av de L'Aero-
 plane, Brussels 1150, Belgium
 SV0WPP, D. Douglas, c/o U.S. Embassy (ATO),
 New York, NY 09253 (or to WA5UKR)
 UA0YT, V. Maymiston, Box 60, Kyzyl, Tuvanian
 S.S.R., U.S.S.R.
 VP2LAA, P.O., Castries, St. Lucia, W.I. (or via
 RSGB)
 VP8FL, A. Bonner, P.O. Box 67, Port Stanley,
 Falkland Is.
 VP8LN, c/o British Antarctic Survey, Port Stanley,
 Falkland Is.
 VU2DIA, B. Hegde, A-29, Amar Colony, Lajpat-
 margar 4, New Delhi, India
 VU5KY, K. Venkataraman (VU2KV), P.O. Box
 3031, New Delhi, India
 W5ZIS/YV1, L. Weathers, Box 698, Maracaibo,
 Venezuela
 WA7QJW/HR1, R. Shaw, U.S. Embassy, Honduras,
 APO, New York, NY 09887
 YB0AU, Box 1761, Djakarta, Indonesia
 ex-YN1RTS (to WA7QJW/HR1)
 ZD7BB, Post Office, St. Helena
 ZL1SV, N. Hardy, 17 Tawa cres., Manurewa,
 Auckland, N.Z.
 ZS2IQ, A. Goodman, Kingswood College,
 Grahamstown, S. Afr.
 ZS6YK, R. Primack, P.O. Box 463, Johannesburg,
 S. Afr. (or via WB2JYM)
 5VZAT, P.O. Box 1660, Lome, Togo
 5Z4DW, G. Perrett, P.O. Box 25000, Lavington
 Gm., Nairobi, Kenya
 7X2HS, B.P. 2, Algiers, Algeria
 9J2EA, P.O. Box 1592, Ndola, Zambia
 9J2ME, P.O. Box 175, Lusaka, Zambia
 M6BB, Box 520, Sandakan, Sabah
 9Q5QR, T. Jeuken, Box 10061, Kinshasa, R.C.
 A2CAW (via WB8BTU)
 AX8RO (via VK5RG)
 CE3CF (via K6RA)
 CO7ET (via FRC)
 CT1ZW (via W3HNC)
 DF0AFZ (via DARC)
 EP2YL (to K3ZZS)
 F6AEV (via WB2QXX)
 FB8AT (to F1ATB)
 FR7ZX (via F6AZM)
 GD3GMH (to GW3NWW)
 HC1JU (via K6HM)
 HS1ADX (to W4VFP)
 HT1BW (via DL8DE)
 K2ALO/OH0 (to K2ALO)
 K9CQV/HK0 (via W8GDQ)
 KA2AI (via WA6AHF)
 KC4USN (see text)
 ex-KH6AK (to K4QG)
 KL7HAQ (via K6TIB)
 ex-KR6FT (to KG6JAR)
 KR6VX (to K0VXU)
 LU4YB (via LU6DAZ)
 OB8V (via W9GFF)
 ON5DO/AP (via ON5KL)
 OX3AX (via OZ5DX)
 SV0WOO (see text)

HR1MD is well known as Monday NCS for the
 14,328-kHz Intercontinental SSB Net. Mac settles
 himself for a traditional Tegucigalpa siesta while
 WA5YQV photographs.

March 1971



8P6s CP and AH are a cozy Barbados twosome well known on DX bands. Jill and Allan were among numerous hospitable Caribbean amateurs recently visited by DXpeditioning VE3s EWY and GCO, suppliers of this snapshot.

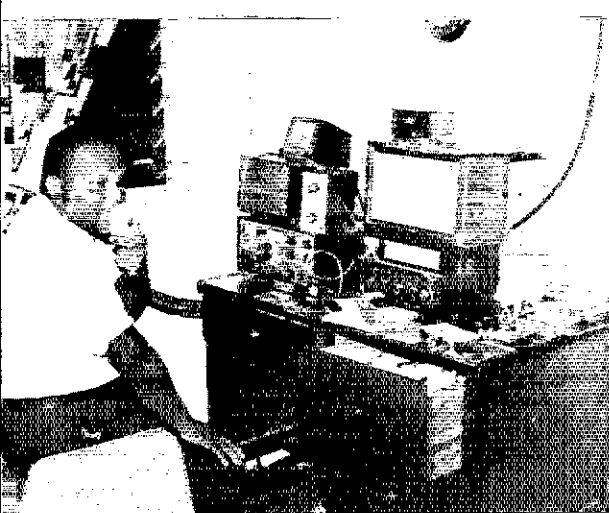
Your postal advisory committee on this run: Ws
 1PL 3CHH 4KO 4PKS 8JX, K4CBE, WA5 1HAA
 2HZR 6CPP 6PZL 9SXQ, WBs 2JYM 9CJS,
 WN7OLT, VEs 3CDP/W9 7BAF, VK3ARV, *DX
 News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich,
 Nor. 72 T., England), Columbus Amateur Radio
 Association *CARAscope* (W8ZCQ), Far East
 Auxiliary Radio League (M) *News* (KA2LL),
 Florida DX Club *DX Report* (W4FRO), Inter-
 national Short Wave League *Monitor* (A. Miller, 62
 Warward In., Selly Oak, Birmingham 20, England),
 Japan DX Radio Club *Bulletin* (JA3UI), Long
 Island DX Association *DX Bulletin* (W2GKZ),
 Newark News Radio Club *Bulletin* (J. Heien, 3822
 Marshall Ct., Bellwood, Ill., 60104), Northern
 California DX Club *DXer* (Box 608, Menlo Park,
 Calif., 94025), Southern California DX Club
Bulletin (WA6GLD), UBA's *On the Air* (ONs 4AH
 5VA), VERON's *DXpress* (PAps FX LOU to VDY
 WWP), West Coast *DX Bulletin* (WA6AUD) and
 3KM *DX Bulletin* (JA1KSO, 3H1EXV). Join the
 team, OM.

+ + +

Whence:

ASIA — It's amazing what can be done with a
 hundred watts and dipole here in Thailand. Sign an HS call and you hear stations calling from
 places you never knew existed. The prefix is
 equivalent to some 4-1000s and a 100-foot-high
 five-element beam. I think all of us need to be
 impressed that even if we have it, nobody needs to
 run high power *all* the time. — HS4ADT. . . .
 EX-W2AYN/EP who helped break the Iran ice
 years ago, now signs K4EC. — CARA. . . .
 UM8FZ, a musician, and UW0AA are among the





few Russians who will chew the rag a little. — **WA9ZCP**. . . . Throngs of JAs roll in here, especially on 15 cw. — **VE7BAF**. . . . There were five hams among the people working in our Vietnam office: **W0EOG**, **K5RGX**, **WA0TVI**, **VK3ZA**, and myself. I was on the air legally but only for phone-patching. **W6LWA/XV5** also had permission, no paper-type licenses. After returning to Biloxi in February I expect reassignment to Chanute AFB in Illinois. — **W3JZJ**. . . . The few amateurs in Kuwait are mostly inactive. QSL manager **9K2AN**, for example, worked only eight stations last year. — **JARHI**. . . . **JA3AA**, 1909 kHz, worked **DL9KRA**, 1827 kHz, at 2157 GMT January 3rd, a resounding 160-meter first. Around the same time **JAs** **ZCLI** and **3AA** were working about a dozen U.S. sixes and sevens. — **W1BB**. . . . **XW8AS** aims for a substantial Cambodian caper by June, **W4BPD** may launch his Himalayan encore this month, and **MP4BHH** threatens reactivation of Karaman isle, Trucial states, etc. — **WCDXB**. . . . **EP2TW**, **MP4BHH**, **ST2SA**, **SU1MA**, **YK1AA**, **7Z3AB**, **9K2AH** and other nifties show up in the Arabian net Fridays just above 14,195 kHz from 0500 GMT. **MP4MBB**, **VS9MB**, **9V1FF**, and friends are heard in the Commonwealth net daily on 14,154 kHz, 1430 GMT. — **DXNS**. . . . **ONs** **4JL/AP** and **SDO/AP**, 14,185 and 14,285 kHz at 1400 GMT, are with the Red Cross emergency crew in East Pakistan. — **VERON**. . . . **VU2s** **DI KV** and **RM** led that Laccadives assault in January on 40 through 10 with assorted voice and code equipments. — **LIDXA**. . . . Japan's **JARL**, with the cooperation of government monitors, has mounted a thorough investigation of nonamateur intruders in the 7000-7100-kHz range. — **SKM-DXB** (**JH1EXV**).

AFRICA — That was a nostalgic picture of **ET3USA** in November's "How's." The place was home to me for four years up to last April. Just worked **ET3USA** and am told that a **TA-36** now sits atop that water tower pointed Statesward (no rotator voltage yet). The quad, by the way, can work three bands simultaneously without cross-talk. — **SV0WPP** (**WA5UKR**). . . . Regarding **9Q5RD**, I recall being that station's first QSO back in June of '69. The operator later became **9Q5AJ** and made a fine DX record on 10 meters with no more than twenty watts of carrier a-m from an **HA-410**. He returned Stateside last fall. The **9Q5RD** call was conditionally assigned to U.S. consulate personnel. — **W3OFI**. . . . **EL2BI** is due for shutdown this spring. — **W3HNK**. . . . I run Sunday skeds with **ZS6YK** on 21,020 kHz at 1900 GMT. — **WB2JYM**. . . . **ET3UA**, sometimes found around 14,210 kHz at 1330-1530 GMT, is an Ethiopian Air Lines radioman. — **W6DDB**. . . . **ZDSX** intends to try 160 this month. — **WIPL**. . . . International Short Wave League's net on 21,360 kHz at noon GMT features

HK0BKX is one rarish South American item who doesn't ignore country-hungry **W/K/VEs**. **WA5YQV**, who contributes this picture, helped Francisco work some 200 Statesiders during a December visit to San Andres.

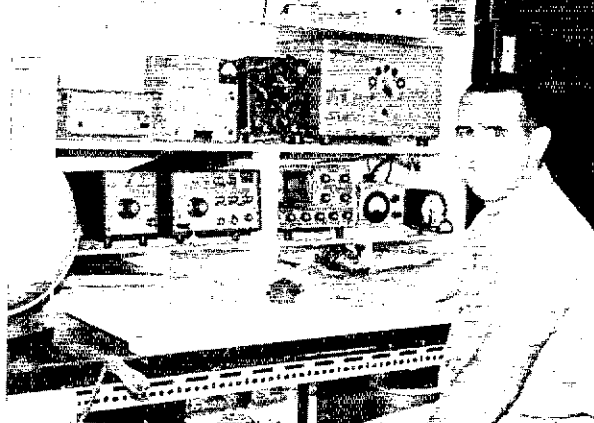
gems like **MP4BIM** and **7Q7BC**. — **DXNS**. . . . May is possible target month for **3B8DA's** Rodriguez run. — **WCDXB**. . . . I shall make two or three trips to Sierra Leone this year as **9L1GC**, licensed to operate 10 through 160 meters, also 2 meters. I expect to be active for two weeks in mid-March, again toward the end of June, mainly on transceive cw. A three- or four-month stay is possible commencing in October or November. — **G3DYY**.

EUROPE — Just received my SV ticket after E waiting months. Several other new SVs are active, so Greece should be a little easier. Say, I've been requested about twenty times to QSY to 80 meters for Five-Band DXCC QSOs. Sorry, fellows, no 3.5-MHz privileges for us SVs. — **SV0WPP** (**WA5UKR**). . . . I'm now on 40 through 10, favoring the latter, with a **350C**, **TA-33 jr** and **4BTV** vertical. — **SV0WOO** (**WA3KCP**). . . . As **K2ALO/OH0** in the Alands last summer I worked about 450 stations in 54 countries. Also there enjoying reciprocal privileges were a **DJ**, and **SM5**, and a **PA0**. Met **OH0NI**, a fantastic fellow who enjoys skiing and ice-skating despite loss of a leg. Sigge has amassed 30,000 QSOs. — **K2ALO**. . . . **LX1BW** sticks to 40 and 75 sidebanding lately. — **W3HNK**. . . . **UA3IN** formerly operated antarctic station **UA1KAE**. — **WIPL**. . . . Ship me forms for **WAC**, **WAS**, and **DXCC**! — **DL4DR** (**K1BGT**). . . . Our Trier DX club signs **DK0WA** in contests. — **DK2BI**. . . . **EA7DI's** ssb is often found around 1500 GMT near 14,300, 21,350, or 28,550 kHz. — **K1WPS**. . . . Details on **WMRC** (Worked Maritime Radio Club) of Gdansk are available from **SP2AVE**, P.O. Box 232, Gdynia 1, Poland, for s.a.e. and IRCs. They have thirty licensed members. — **W1BBJ**. . . . Inquiries about



LZ2EE relaxes for the camera between DX sessions at Shumen in Bulgaria's grain country. Harry likes cw in the lower reaches of 14 and 21 MHz around 2000 GMT. (Photo via **K2QHT**)

VK9BS is a Papua sideband regular. Bob keeps QSL manager W3HNK, donor of this photo, plenty busy with stacks of Stateside contacts.



our WGA-21 (Gotland) award are welcomed. Include s.a.e. and one IRC. — *SM1AWD*. . . . Eighty- and 40-meter cw DXing with an FL-500 and homebrew linear is my favorite pursuit at present. — *SM7ANB*. . . . Superactive DL1QT holds some 400 DX awards. — *DXNS*. . . . UR2RJ, an 18-year-old Tallin student, writes a nice letter. — *W4ZYT*. . . . The wife and I operate ON8UL in Brussels with a 260 and dipole on 7 and 21 MHz. We'll put up a beam when the weather moderates. We left ET3USA a year ago. — *W4EJP*. . . . U.K. rumors keep mentioning June and Rockall isle. — *LIDXA*. . . . King Hussein, who signs JY1 on 20 back home, tried his DX luck from GSATM. — *DXNS*. . . . Impatient bawlers infest the European end of the 3798-kHz DX slot. — *VERON*.

OCEANIA — Great to be back on the air in Guam after a six-month layoff following my KR6FT stint. Conditions here are frequently hot on 21 MHz and I've also hit 10 and 40 meters. Very high interference level from local gadgets on 80 but I'll give it a try. The States sure come through at oddball hours. Just acquired a linear to go with my multiband ground-plane. — *KG6JAR (W3CHH)*. . . . After 23 years and some 300 countries I finally worked North Dakota for WAS. — *VK3ARV*. . . . WG6ASZ is unusual Marianas DX, active evenings near 21.127 kHz. — *WN7OLT*. . . . Visited most pleasantly with VK3s AJK MR and ZP in October. I've never seen a ham set-up to equal that of VK3MR. Snow has eleven acres of rhombics on a hill. One of the diamonds is aimed at the U.S.A., making 14 MHz sound just as cluttered as it does in Miami. No wonder VK3MR rolls through in W/K-land when no other Australians break through. — *W4RB*. . . . KH6AZB/KB6 may stay on Canton till '72. — *WCDXB*. . . . AX9LV (GSRV) expects a two-year Papua tour. — *NCDXC*. . . . Pacific DX Net, on 14,265 kHz Tuesdays and Fridays at 0600-1000 GMT, meets with many a rarity attending. — *DXNS*.

HEREABOUTS — KG4NET, EZ5s GJN PNN SIN, WP4s DHD DHR and DLG are among the 15-meter Novice DX crowd. — *WN7OLT*. . . . Spent a week at HK0BKX's Beautiful QTH and found Francisco a perfect host. — *W4SYQV*. . . . CX7BF needs Wyoming for WAS and calls every U.S. seven he can hear. — *WA6CPP*. . . . I'm retiring in Florida after years of DX sport as DL4AY, KR6AM, EP2AM and KH6AK. — *K4QG*. . . . Much of this "lists" DXing sounds like questionable third-party traffic to me. — *WA1CYT/4*. . . . My first General QSO was with KV4AA, the second with UA9XU. — *WA0VJE*. . . . VP9GR (K2RSR), active on 10 through 160, works on a Bermuda communications project. — *W2GHK*. . . . How about considering DX contest club scores in an additional category, average score per participating member? In the '70 ARRL Test, for instance, Overlook Radio Club, only 17th in aggregate, beat top-aggregate Potomac Valley Radio Club by 120 kilopoints per man. Of course some entries minimum, say 10 or 15, would be required. — *WA4ZZU*. . . . W2BBK should be active from Anguilla this month. — *W1PL*. . . . That ARRL 160-Meter Contest was a terrific success but my rig folded halfway through the fun. — *W1HGT*. . . . According to the Washington Post, parapsychologists now visualize a form of communication by extrasensory perception consisting of emotion-formed Morse-like dots and dashes. — *K3CUI*. . . . K4EXT-PJ8NN is our new Florida Skip DX editor. — *W4IYT*. . . .

Caribbean DX Net congregates on 14,170 kHz Sundays at 1115-1200 GMT with YV4UA as NCS. — *DXNS*. . . . KP4AN often guides a Caribbean gathering around 3805 kHz at 1000 GMT or so. — *WCDXB*. . . . Insufficient available time causes WA6GLD to relinquish editorship of our *Bulletin*. — *SCDXC*. . . . Moved to Honduras last September after more than three years as YN1RTS. Reached 264 countries from Nicaragua without losing much sleep but I'm finding it frustrating and challenging to start all over again on DXCC! My HR1 location isn't the greatest but I expect a two- or three-year stay and will have to make do. My YN license will remain valid for possible operational returns. — *WA7QJW/HR1*. **QST**

RULES FOR LIFE MEMBERSHIP

1. Life Membership is granted only by the Executive Committee, upon proper application from a Full (U.S. or Canadian licensed) Member.
2. The Life Membership fee is twenty times the annual dues rate, or currently \$130.
3. An applicant may choose an alternative time-payment plan of 8 quarterly instalments, \$16.25 each. In such instance he will be provided an interim two-year Full Membership certificate. Upon completion of the payments, the application will be presented to the Executive Committee for approval.
4. Life Memberships are non-transferable and dues payments are non-refundable. In the event an applicant is unable to complete payments on the instalment plan, he will be given a term of membership, at the annual dues rate, commensurate with payments received.
5. Other licensed amateurs in the same family, and at the same address, of a Life Member may retain or obtain Family Membership upon payment of the annual dues of \$2, but without receipt of QST. The dues of the Family Member may be prepaid for any number of years in advance, but there is no special rate.
6. Application forms are available upon request from the Secretary, ARRL, Newington, Conn. 06111.



CONDUCTED BY BILL SMITH,* KØCER

220 and 432 E?

LAST MONTH Al Tyler, WØDRL, commented in these pages that he thought sporadic *E* might be possible at 432. An interesting speculation, and something I had thought little about so I did some research which included quizzing hamdom's *E* expert, Mel Wilson, W2BOC. "Possible, but improbable," was Mel's answer. Some of the answers were given in his December, 1970 *QST* article, "Midlatitude Intense Sporadic-*E* Propagation," page 52. Mel said available data indicate the probability of the muf increasing drops exponentially with frequency, and that the probability of it doubling is about 10 to 12 percent. Some arithmetic reveals the 432 probability to be one-tenth of one percent that at 50 MHz.

This is hardly encouraging, but Mel is of the opinion that the fantastic *E* event of this past November 8 may have been intense enough to have opened 432 for perhaps 20 or 30 minutes! Using the exponential factor, 220 may have been open for an hour or more! Mel bases this on the amount of time the 144-MHz. band was open and the number of *E* clouds present. Unfortunately, those who caught the *E* apparently spent their time on 50 and 144. There was no reported attempt made on 220 or 432. Mel says the possible 432 opening would have permitted work between stations in highly localized areas, something within a radius of a few dozen miles at either end of the path, due to the focusing effect of intense *E*. This is the reason why high band vhf and uhf TV are not necessarily good indicators of 220 or 432 *E* — there might not be a TV station at the signal return point.

Sporadic *E* has been observed several times at 200 MHz and W2BOC says the 220-MHz band is likely open for *E*_s skip "once or twice a summer." The lack of widespread use of 220, especially in the midwest, is perhaps why a 220 *E* contact has never been reported.

Intense *E* high muf that could be useful at 220 and 432 would probably be the result of a group of *E* clouds enhancing one another. The muf of such a group is anisotropic. This explains why there can be long-haul 2-meter *E* when short-skip 6-meter *E* is not heard.

Borrowing again from Mel's December article, page 56, we learn the days to watch next summer are those when there is long-duration intense *E* at 50 MHz. *E*-cloud re-enforcement may push the muf to 220, and perhaps 432 MHz. Just how much power would be needed for *E* work at these frequencies is uncertain. At least one professional propagation expert says the attenuation of *E* signals increases with frequency, which might leave the 432 varactor tripler clan in the cold.

The only way to test the theory is to try, and then to not be discouraged if positive results are not rapidly forthcoming. If enough interest can be generated, we may have another "first" to report this summer.

OVS and Operating News

50-MHz fans agree that the winter *E* season was disappointing. Openings were infrequent and those few there were apparently didn't live up to expectations. WASIYX says December, 1970, was the poorest for *E* since 1964. December's highlight was the excellent aurora the evening of the 13th. It came late in the evening, and apparently not too many operators observed it.

An idea of how intense the aurora was is indicated in a report from WA5HNK and K5LZJ in central Texas. It was the first aurora either operator had encountered. K5LZJ worked K8BBN, Ohio, at 0526 GMT, December 14, and heard K5WVX, Oklahoma, on aurora, working Illinois. At 0636 WA5HNK and K5LZJ both worked K9HMB, Chicago, followed a few minutes later by K4GL, S.C. Their last contact was with WA8WJO at 0829. WA5HNK runs 800 watts, K5LZJ 100 watts and both have 6-element Yagis. The aurora was also observed in southern California by WA6JRA and WB6NMT/6. Sam WA6JRA, worked northern California, Oregon, and Washington stations while WB6NMT/6 was working similar paths, all between 0715 and 0845 GMT. WB6NMT/6 also worked VE7ANP, Vancouver. WØPFP, Iowa, reported working aurora around 0600 GMT.

WA1NNW and W2AXU reported unusual conditions the evening of December 28. Jack, W2AXU, heard or worked stations in N.C., Va., Ohio, Mich., Tenn., Ill., and western Pennsylvania between 0345 and 0600 GMT, December 29 on a near-north beam heading. The signals were steady and clear with no aurora growl. Jack says the signals appeared to be backscatter. WA1NNW had similar observations, but his beam heading was 315 degrees. Ed worked 3s, 8s, and 9s with signals showing no signs typical of aurora.

Outside of good scatter observed during the December 12 and 13 peak of the Geminids shower, that was about all December had to offer.

We have these DX tidbits. Heinz, OA4C, has moved from Peru to San Jose, Costa Rica (P.O. Box 6136) where he hopes to resume his 6-meter DXing, time and equipment problems permitting. Heinz says TI2NA is not currently active and that there is no present vhf activity in Costa Rica. We hope Heinz will soon return to 50 MHz. Consistent TI activity would be most interesting. Remember Randy, VE6AHE? He is now VE2BYG in northern Quebec and is again active.

*Send reports and correspondence to Bill Smith KØCER, ARRL, 225 Main St., Newington, Conn. 06111.

Bob Cooper, formerly KV4FU, and now W5KHT in Oklahoma City, has developed a line of interdigital preamplifiers for 50 through 432 MHz. Bandpass filter characteristics reject signals from outside the device's range. Noise figure of the 2-meter model is less than 2 dB. Details are available from W5KHT.

Last month I made an error when I reported ZF1GC active on Grand Cayman with a Swan 250C. Frank is active, but is running a 2F26 on ssh and a 3-element beam. He is on around 1700 GMT, Sundays. Jack, K2OLS/ZF1AA, delivered the equipment in December. ZF1GC is using the beam left on Grand Cayman by ZF1DT. During Jack's two-week Cayman stay in December he was troubled with antenna problems and made no contacts.

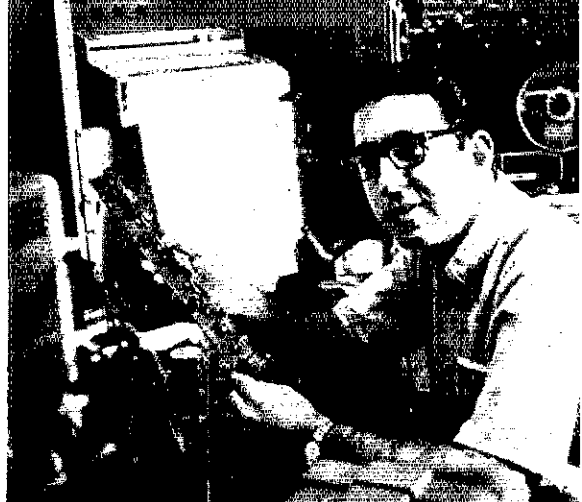
K7HTZ, W7CNK, WA7OTT, and VE7SV will travel to Ketchikan, Alaska during the June contest to activate W7CNK's KL7GZZ call with a kW and 6-element Yagi. We hope they have better luck working into the midwest and east than KL7ABR had last summer.

WA6JRA, proudly displaying confirmation of his Nov. 7 contact with JA1MRS, says the JA is now running 800 watts. Also in the Pacific, KR6RI and KR6RS are active, looking stateside and toward the Asian mainland.

David Short Ternent, ex CO2VY and CE3QC of the 1950s, is now living in Puerto Rico. Not being an American citizen he is unable to operate, but hopes to qualify for a reciprocal license through his British citizenship. He has a Drake TR-6 and 6-element Yagi and reports hearing numerous openings to South America in October and November. He also heard W6s ABN, FIG and K6PYH on October 17 and Florida stations December 14th. He lists KP4s CRJ, DKP, DKE, DCY, BNY, DFH, BRC, DKK, DEM, COM, AFK, and COI as active on 50 MHz. Take your pick of the KP4s! Les, K4RNG, Miami, says KP4AFK is running a pair of 3-500Zs and worked 15 Florida stations December 14.

And finally, it appears that WB8DKE was the West Virginia station which worked both KH6NS and KH6IJ around 0100 GMT, Nov. 9 during that fantastic E opening. Bill was apparently the most easterly station to work Hawaii on that opening.

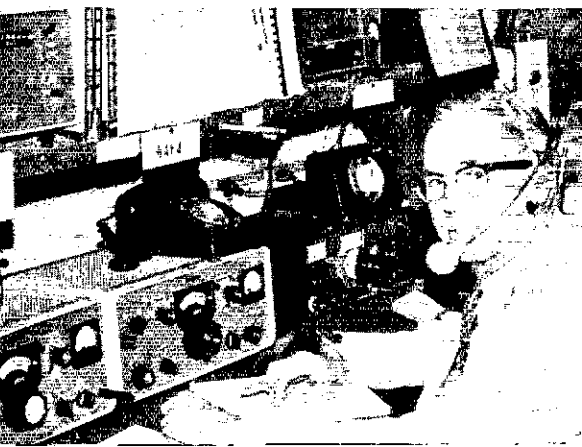
144 MHz is quiet now that the winter meteor showers have passed, but March should produce some good auroral openings. The January Quadrantids was rated by all participating operators as below the same shower one year ago. The predicted peak was around 2100 GMT, January 3, and apparently the experts weren't far wrong. The consensus is that the peak came between 1700 and



2030 and that paths from the East to the Midwest produced the best results. Here's who worked whom, all on January 3rd.

K2RTH: K9HMB
K3CFY: K5WXZ
W4CKB: WA0CHK
W5UKQ: W3TMZ
WA9DOT: VE2BZD
W0LCN: WA1JTK, W3BDP
W0LER: K1HTV without schedule
WA0CHK: K1BKK, W4CKB
WA0LIL: VE2DFO
VE2BZD: WA9DOT, W0EMS

During the peak there was much random activity on 144.1 and several stations say the interference was heavy. W0LER reports hearing answers to his CQ, including K1ABR, K1HTV, VE2BZD, and VE2DFO. VE2DFO listened to K0MQS scheduling a New England station and heard Dick 109 times during the hour schedule, including 8 complete sets of calls. VE3DSS likewise heard much from K0MQS, but the Iowa station was having receiving problems due to a blizzard and resultant snow static. Dick went without a contact in eight schedules! Another Iowa station, W0BFB, was seeking state number 46 in a schedule with Idaho's sole 2-meter DXer, W7UBI. W7UBI got complete calls, but no contact. WA5UNL, Texas, was another chap who had problems. He was heard well by stations Marshall was scheduling, but a faulty preamp caused receiving difficulties.



Ted, W4FJ, is one of the growing number seeking that elusive first 432-MHz meteor scatter contact. He has 20 states worked on 432 and will accept schedules.

Dozens of other schedules were kept throughout the U.S. and Canada with varying degrees of success. Many were long-haul attempts, and paths over 1300 miles are tough. W4CKB, Florida, has scheduled K0CER, S.D., for fourteen months with no results until the Quads when K0CER finally heard part calls and weak bursts. The path distance is approximately 1420 miles. WA0LIL, Nebraska, was pleased with the Quads, however, as Gary made his first ms contact, that with VE2DFO.

The December Geminids was a much more productive shower and these additional contacts have been reported.

K4EZU: W0EMS

K7BBO: WA6NRV (four times!), K6PXT,
W6ZBD

VE2BZD: W4CKB, K4GL, W0LER, WA0CHK
VE2DFO: W3EMD/4, K4GOF

Other Geminids results were reported last month.

Apparently aurora late the evening of December 13 was quite good. W1FZA, N.H., says it was the most intense aurora he has ever heard. Ken had contacts with K8GMR, Mich., K9UUT, Wisc., and W9PBP, Ill. Another New Hampshire station, WA1JTK, reported similar results including a 1040-mile contact with WA0CHK, Mo. Jim, who signs W9INW when in Illinois, has been running random meteor scatter schedules Sunday mornings with K0MQS from 1200 to 1300 GMT on 144.20. The schedules have been quite successful with several contacts being completed. WA1JTK runs a kW and 44-element Yagi array.

W5OUD, New Orleans, says there is growing 2-meter activity in Louisiana, with W5ABD conducting a 1500 GMT net Sundays on 145.8. There are several other stations active most evenings.

On the moonbounce scene, we have two reports from Canadian friends. VE2DFO is getting results with his 80-element collinear, hearing K6MYC and up to 6 dB of sun noise. VE2DFO hasn't tried echo tests yet, but had late January schedules with K6MYC, SM7BAE, VE7BQH, and a newcomer to EME, PY2CSS in Brazil. The informal EME net meets on 14.290 at 0200 GMT, Sundays, until the summer months, when the net returns to 15 meters. VE7BQH worked K6MYC via EME on December 18 and 19 and has exchanged some signals with SM7BAE, Sweden. VE7BQH is using his new 160-element collinear array. Lionel says Ricardo, PY2CCS, and K6MYC have heard one another. Ricardo has an array of eight Yagis.

220 MHz meteor scatter got good play during the January Quadrantids throughout the country. The first 220 m.s. contact was made by W0EYF and W6WSQ, 2 1/2 years ago during the August Perseids. Since then, perhaps two dozen contacts have been completed, and this past Quadrantids was the most productive shower to date. Although observers agreed the '71 Quads was not as good as the '70 shower, more stations were trying 220 and their efforts were rewarded. K4IXC, Florida, who was on one end of the second 220 m.s. contact made in 1968, had two Quads contacts. John worked K9AQP/1, Massachusetts, for the first Florida-to-Massachusetts 220 QSO, and K2RTH,

New York. Both contacts were made January 3rd, during the apparent midday peak of the shower. It took 55 minutes for the contact with K2RTH, and 2 hours 13 minutes to work K9AQP/1. The apparent reasons for the marathon schedules will be discussed later.

On a schedule with K9HMB, Chicago, K2RTH heard complete calls and pings during a 30-minute try. K2RTH heard nothing from K4GL, S.C., but both schedules were run after the shower peak.

Another successful schedule was between WA0QLP, South Dakota, and W7CNK, Washington. The contact was also a 220 first between their respective states and was completed in 20 minutes at 2320 GMT, well after the shower peak. WA0QLP heard pings from WB6NMT, and the California station in a schedule with W7JRG, Montana, heard pings and letter bursts. WB6NMT was instrumental in organizing several Midwest and Western stations into an all out 220 effort. There probably were other Quads contacts, but only these were reported at deadline.

Now some observations by those who have spent time chasing the elusive 220 meteor signals. Bob Reif, K9AQP/1 says bursts run in groups with long periods of time between bursts. Some bursts are long, 20 to 30 seconds, but they end abruptly without the gradual fade typical of some bursts at 50 and 144 MHz. Bob didn't say what his equipment is. WA0QLP made similar comments. Tom runs a kW and a pair of 8-over-8 skeleton slots.

Frank, K9HMB, is quite active on 220 m.s., with 600 watts and 80-element array. Frank seeks m.s. schedules with anyone, but especially W5s and 7s. He also needs tropo schedules with such states as Wisconsin, Iowa, Missouri, Ohio, and others.

K2RTH says he heard 91 pings, 8 letter bursts, a 15-second and a 5-second burst on K4IXC during their successful schedule. Bruce says signals are usually quite strong, especially from K4IXC and K9HMB, but compared to 2 meters, the burst duration is quite short. Bruce runs a kW and a single 11-element Yagi, and seeks schedules.

K4IXC is one of the real m.s. masters with many years of experience. John says 220 m.s. is not much different than 144, it just requires someone on the other end, but bursts are generally shorter and 10- to 15-second bursts are few and far between. The key to John's success must be his know-how with antennas. He is a firm believer in vertical stacking, and has four 7-element Yagis so stacked, fed with a kW. Other recent K4IXC 220 m.s. success includes K2RTH and K9HMB, worked during the December Geminids on schedules of 2 1/4 and 2 1/2 hours respectively.

I expect there will be a continued gradual increase in 220 m.s. activity. After many years, the band is finally getting some attention. Many of the long-time 144 m.s. enthusiasts have worked nearly all the states they can by m.s. and are looking for new challenges. W5UGO, Oklahoma, is tooling-up for 220, and K0CER, S.D., is ready with 500 watts waiting for warmer weather to put up antennas.

K7BBO, Tacoma, will have a kW completed by spring. WB6RAL sent a list of 22 stations which regularly check-in into a southern California 220

Jay, W5ORH, represents Oklahoma on 50 through 432 MHz, and has given many operators their first Oklahoma contacts on those bands, using mostly homebrew equipment.

net at 0400 GMT Mondays (8 P.M. PST Sunday) on 222.07. WB6RLP is usually net control.

432 MHz activity is at its seasonal low this time of year, but the m.s. operators tried again during the Quadrantid shower to break the 432-meteor barrier. While results were marginal, still they were encouraging. Apparently this was the first shower W0WYZ, Colorado, tried and during a schedule with K8REG, Ohio, both stations heard pings. At 432 that is a good beginning. W0LER, Minneapolis, heard pings from W0WYZ, and the Colorado station heard several letter bursts and calls from John. W0WYZ has 600 watts, and a 256-element collinear array. He will accept schedules. W0DRL, Kansas, who has been doing so much 432 m.s. work, was unable to keep Quads schedules due to heavy antenna icing. On December 23, during an Ursids shower schedule with W4FJ, Virginia, Al got a 4-second burst from Ted, and on the same burst, Ted got 10 to 12 seconds of calls from W0DRL. K4IXC, Florida, is trying 432 m.s. and has been heard by W2AZL, N.J., and K8DEO, Ohio. John runs 600 watts and four Tilton 11-element Yagis in a quad configuration.

FM and Repeater News

Northwestern North Carolina Travellers along the Blue Ridge Parkway and elsewhere in the northwest corner of North Carolina will be interested in WB4PPS, 2-meter repeater of the Blue Ridge Amateur Radio Association. Jerry Dickerson, WB4PY, wants it known that this is an open repeater, 146.22 MHz in, 146.94 out. Located at Roaring Gap, just under 3000 feet above sea level, it runs 20 watts output to a 10-dB antenna, giving a range to mobiles of some 50 miles. An auxiliary system, 146.94 in, 145.5 out, is in process, for retransmission of stations other than repeaters, operating on 94.



Birmingham Area WB4QEX, operated by the Birmingham Amateur Radio Club, Inc., is on 34-94, open access. Coverage is roughly a 50-mile radius around Birmingham, Alabama. This information is from W. W. McLeod, W4FKG, Information Officer of the Birmingham Amateur Radio Emergency Service, a BARC affiliate.

Atlantic City, N.J. WB2EYE reports several stations ready to go on uhf fm. He wants advice on frequencies for direct work around Southern New Jersey. Write William B. Thompson, Jr., 626 N. Connecticut Avenue, Atlantic City, NJ, 08401.

Midland, Texas, VHF Conference WA5RAG, president, Midland Amateur Radio Club, Inc., announces that the annual MARC hamfest will feature a vhf conference this year, with emphasis on fm and repeaters. Program is in three parts: VHF Conference, March 20, social evening and dance that night, and contests and swapfest on Sunday, March 21. Separate low-cost admissions to each portion. More in Hamfest Calendar, in this issue. Reservations: MARC, Box 967, Midland, TX 79701.

QST

Strays

QST Congratulates . . .

Charles Dorian, W3JPT, re-elected as international chairman for the fifth successive year of the Intergovernmental Maritime Consultative Organization sub-committee on radio communications.

Harold Sheets, W0DM, on being chosen "Man of the Year" by the Sertoma Club of Grand Forks, ND.

Maurice Holding, K5AJW, commended by the president of the St. Louis-San Francisco Railway Company for his performance during an emergency.

Charles S. Greene, MD, W2CPI, on receiving the New Jersey Council of Churches' commendation

for over two decades of outstanding service to migrant farm workers.

Richard Santin, K0ULQ, and his twin brother Robert, K0VTD, chosen by the President's Committee on Employment of the Handicapped to be the 1971 recipients of the President's Trophy, the nation's highest tribute to its handicapped citizens.

OZ7RF and K2PLT invite all professional musicians who are also hams to join the International Music-Hams Club, IMHC. Initial activities will include a weekly net and an attractive award for working 5 members. Write Jan Williams, K2PLT, 63 Anderson Pl., Buffalo, NY 14222; outside U.S.A. write Torbin Elmoe, OZ7RF, Frankrigsgade 27 I, 2300 Copenhagen S, Denmark.

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

The Name of the Game

GETTING EVERYTHING ready is half the fun, for it is checking gear, making sure everything is as close to perfection as it can possibly be, the SWR so low that the standing waves are on their knees, the antennas just right, logs and papers ready, pencils lined up, the *Do Not Disturb!* sign out, a private petition that Murphy go into hibernation. Then throw the switch and dig in — for the name of the game is contest!

The YL contests are a different breed from those that periodically range across the bands. Some, such as YLAP and Howdy Days, are strictly of the ladies'-day-in-the-ballpark variety when the gals work only each other, and woe betide the OM who tries to work a YL while either of these is in progress. It is also just a bit tough for some of the gals who are blessed (or cursed) with deeper voices. One wrote "I never was so surprised in all my life when another YL told me, 'OM this is a YL contest!'" After that, I carefully added YL after I called." The difference appears again in the annual YL-OM, as the gals dance off with partner after partner in the February and March YLRL-sponsored event. Again there are regrets as a YL hears some other gal that she needs badly for a certificate, but can never seem to find when it is possible to work her.

There are other rules that don't seem to crop up in any contest except these. The Ontario Trilliums, for example, are lined up and waiting on the suggested frequencies during their Memorial Contest, yet all any of them can do is make contacts and give points to others — for they are not eligible to win the trophy. The same with the Floridas in October, who have as restricted a set of rules as can be found. Not only is it YL-to-YL, but both operators must be located in Florida at the time of the contest.

Rules and restrictions are only a part of it, for a contest is first of all skill. It's the expertise of the

veteran operator who works first for points, digging down under and in between QRM to find the tough ones first and then, Murphy willing, picking up the easy, strong stations later. It's knowing what band will be open, and when, as well as the peculiarities of each. It is using every bit of savvy and know-how that were acquired by working contest after contest to the best advantage and filling the log. For the newcomer to this fascinating game it doesn't take long to discover the short cuts, the quick return, and off to catch another who is waiting. When the beginner starts out she may throw her hands in the air in almost mystified surrender, but after an hour of working with those who have been there before, she is knocking them off with the ease of long experience, for a contest is too exciting to give up easily.

"There is nothing," one YL commented in her log, "that builds operating skill like this form of activity. I found I had far more ability than I knew."

A contest is skill and expertise; it is the fumbling of the first experience that sharpens the appetite for more. It is the exultant logging of an especially rare one at 3 in the morning and no one to share it but the cat. It's full ashtrays, hasty meals, logs, operating aids, scores and rules. Whether it is the hard nose-to-the-grindstone of YL-OM or AP, the idle leisure of Howdy Days, or the restricted operation of special YL club-sponsored contests, it is check the listings, mark the calendar, and plan for action, because a contest is one time when interest never flags, and even Murphy can't discourage us.

1970 YLAP Award Change

Audrey Beyer, K5PEF, 1970 YLRL Vice-president and contest chairman, advises that the YLRL members who will receive the awards as winners of the 1970 AP will find a change from the conventional gold cup that has been awarded up to this year. The new award will be an eleven-inch-high trophy in the silver and royal blue YLRL colors. These are designed to identify them as indicative of YL contest activity.

YLRL Certificates

In response to several requests: The YLRL-sponsored certificates are WAS-YL, WAC-YL, YLCC, available to all amateur radio operators who submit proof of eligibility. The DX-YL award is available to women operators only. There is *no* DXCC-YL award issued by either ARRL or YLRL.

Lynn Stribny, WN9FDV, shares the shack with her OM, WB9CJB, and big brother WB9CJC. Lynn, age 12, is the only amateur radio operator in her school in Palow Park, Illinois.

*YL Editor, QST. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, CA 91001.



YLRL

There have been a number of inquiries to this column about membership in YLRL. Any YL who holds a current amateur radio operator's license of any class, is eligible for membership. Dues are \$3.00 per year. Any gal who is interested in becoming affiliated with this oldest of world-wide amateur clubs for women operators may write to the Membership Chairman, Marge Campbell, K4RNS, 65 North Arbor Drive, Ormond Beach, FL, 32074, for those living in the eastern half of the United States; or to Beth Taylor, W7NJS, 14637 S.E. Fair Oaks Avenue, Milwaukie, OR, 97222. The International Membership Correspondent for DX YLs is Verda Siebenthaler, 905 Hastings Avenue, Coeur d'Alene, ID, 83814.

K7UBC - Verda Siebenthaler

To Verda, Cloud 9 is DXCC/Dolls, and in November she realized that goal when the hundredth doll arrived. A member of ARRL, YLRL, YLISB, MINOW Net, Verda is the YLRL International Membership Correspondent with the responsibility of keeping in touch with the DX members of the club, and the clubs affiliated with the international organization refer to her when they wish to sponsor a DX-Adoptee, a part of the YLRL activity.

She was first licensed in 1962, has been active in RACES, and is past president of the MINOW Net, an on-the-air club that covers five states. Since receiving her call, Verda has earned RCC, WAS, WAC, DXCC, DX-YL, WAC-YL, and WAS-YL, the Robin Hood Award as well as certificates from many YL nets. She enjoys rag chewing and contests most of all, but in her public service activity she has had the unique experience of being able to provide a phone patch between a man in a plane over the Philippines and his home in Chicago.

Her quest for dolls began long before radio when she was employed in the Post Office in Fairbanks, Alaska. Her activity on the air has assisted her search and she is grateful to the many people who have helped her to find dolls that are truly representative of their countries. **QST**



Verda Siebenthaler, K7UBC, with her collection of dolls that represent DXCC-Dolls in her shack.



One of the sightless YLs, Jean, WN2MJM, worked 32 states and 19 countries since receiving her license. Jean may be found on all the Novice bands, but prefers to hunt DX on 15 meters.

Strays

YOUR CERTIFICATE OF MEMBERSHIP

Royal Society of Cosmophonists

THE COSMOPHONISTS
A complete station
for the amateur
operator

Executive Director: _____
Comptroller: _____
Treasurer: _____

It is hereby noted that _____ is accepted into the Royal Society of Cosmophonists as a member of the _____ class.

The above named person is hereby granted all privileges of membership, and is authorized to use the call sign _____ in all communications.

COSMOPHONIST DESIGNATION: _____

MEMBER: ☐ (Permanent) ☐ (Temporary) ☐ (Guest)

ASSISTANT CHIEF: ☐ (Permanent) ☐ (Temporary) ☐ (Guest)

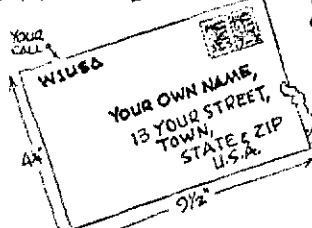
ENGINEERING CHIEF: ☐ (Permanent) ☐ (Temporary) ☐ (Guest)

Members of the Buffalo Amateur Radio Repeater Association will conduct a ham expedition to Squaw Island for one-day operation, 0000 to 2400 on April 1st. Squaw is an uninhabited island in the Niagara River and FCC, apparently under the rules provision for events of public interest, has issued the special call sign KD2UMP. Listen for the station on 80 through 10 meters, sideband or cw — and 2-meter fm.

Cosmophonists rally round! W6BVN and K6VOI invite all owners, former owners, and other hams who really understand how those fabulous machines actually work, to join the Royal Society of Cosmophonists. For the uninitiated, the Cosmophone was a complete amateur station using dual bi-lateral receiver-transmitter operation (Recent Equipment — *QST*, June 1958), probably well ahead of its time.

If you're eligible and interested (membership is free), apply to Dave Bell, W6BVN, Box 488, Altadena, CA 91001.

IS YOURS ON FILE WITH YOUR QSL MGR?



A.R.R.L. QSL Bureau

The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 4 1/2 by 9 1/2 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

- W1,K1,W1,W114 - Hampden County Radio Association, Box 216, Forest Park Station, Springfield, Mass. 01108.
W2,K2,W2,W22,W22 - North Jersey DX Assn., PO Box 508, Ridgewood, New Jersey 07451.
W3,K3,W3,W33 - Jesse Brebnerman, W3K1, RD 1, Box 66, Valley Hill Rd., Malvern, Pennsylvania 19355.
W4,K4 - H. L. Parish, K4HXP, RD 5, Box 804, Hickory, North Carolina 28601.
W4,K4,W44,W441 - J. R. Baker, W4ER, P.O. Box 1989, Melbourne, FL 32901.
W5,K5,W5,W55,W55 - Kenneth E. Rebell, W5QMJ, 306 Kesterfield Blvd., Fair, Oklahoma 73701.
W6,K6,W6,W66,W661 - No. California DX Club, Box 11, Los Anos, California 94022.
W7,K7,W7,W77 - Willamette Valley DX Club, Inc., PO Box 555, Portland, Oregon 97207.
W8,K8,W8,W88,W881 - Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, Ohio 43215.
W9,K9,W9,W99 - ARRL 9th area QSL Bureau, Box 519, Elmhurst, Illinois 60126.
W01 - Reggie Hoare, W0YOP, P.O. Box 115, Mitchellville, Iowa 50169.
W01 - Lloyd Harvey, W0QGL, P.O. Box 7, Attna, Iowa 50024.
K0,W0,W01 - Dr. Philip D. Rowles, K0ZIL, Route 1, Box 455, Mamasa, Colorado, 81101.
KP4 - Alicia Rodriguez, KP4CL, PO Box 1061, San Juan, P.R. 00902.
KZ5 - Canal Zone Amateur Radio Association, Box 407, Balboa, Canal Zone.
KH6,W6 - John H. Oka, KH6DQ, PO Box 101, Aiea, Oahu, Hawaii 96701.
KLT,WLT - Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.
VF1 - L.J. Eader, VF1FO, PO Box 663, Halifax, N.S.
VF2 - John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.
VE3 - R.H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.
VE4 - D.E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 - A. Lloyd Jones, VE5JL, 2328 Grant Rd., Regina, Saskatchewan.
VE6 - Karel Jettelaar, VE6AAV, Sub. Po 55, N. Edmonton, Alberta.
VF7 - H.R. Hough, VF7HR, 1291 Simon Road, Victoria, British Columbia.
VE8 - George T. Kondo, 200 Ministry of Transport, Norman Wells, N.W.T.
VO1 - Ernest Ash, VO1AA, PO Box 6, St. John's Newfoundland.
VO2 - Goose Bay Amateur Radio Club, PO Box 232, Goose Bay, Labrador.
SWL - Leroy Waite, 39 Hanout St., Ballston Spa, New York 12020.

† These bureaus prefer 5x8 inch or #10 manila envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the June and December issues of QST.

Note: Stations operating portable should continue to receive their QSL cards at the bureau in their home call area; i.e., WA1QRX/VE8 gets his cards through the W1 Bureau.

Silent Keys

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

WA1AED, Lawrence A. Chaput, Warehouse Point, CT

W1BNZ, George F. Davidson, Hyde Park, MA

W1CZE, David W. Hamilton, Rockland, ME

W1KON, Raymond B. Morrison, Beverly, MA

W1SDE, Maurice L. Wildes, Portland, ME

EX-2AOB, Lloyd Jacquet, Douglaston, NY

K2ECM, Delbert E. Mower, Medina, NY

WA2GRW, Richard Duggan, Lavalette, NJ

W2JTV, Thomas C. Zogbelein, Frankport, NY

WA2NFD, Henry Moorehead, Cedar Grove, NJ

K2PK1, Robert C. Stewart, Syracuse, NY

W2RIA, Clark V. Stafford, North Tonawanda, NY

W2TFN, Gustav P. Coopersmith, Ballston Spa, NY

K2YNO, Max R. Seitzman, Paterson, NJ

K3AUN, Paul Louis Chabot, Lanham, MD

K3AXO, Max C. Sadler, Boyers, PA

K3ICE, Thomas S. Hawley, Bradford, PA

W4BDJ/W1BRA, Willard A. Van Heiningen, Wilton, CT

W4FNQ, Edward Zimmerman, Pembroke Pines, FL

K4ICQ, Michael S. Harper, Douglas, GA

WB4IMD, Earl C. Schrimsher, Mobile, AL

K4LOA, Col. Alger Hanks, Bowling Green, KY

W4MIZ, Joseph J. Farmer, Jekyll Island, GA

W4OOY, Major John B. Kingsbury, Callahan, FL

W4FY, Robert S. Fenimore, Sr., St. Petersburg, FL

W5BLQ, James W. Gaines, Jr., Monroe, LA

K5DJF, Willard J. Lawlis, Houma, LA

W5GOT, Oron Lee Bickley, Houston, TX

W5MSG, Edward G. Miller, Jr., Henderson, TX

W6FAV, William W. B. Stone, Monterey Park, CA

W6GRS, Neil W. Arnett, Alameda, CA

W6RTU, Marvin A. Powers, Huntington Beach, CA

W6SEU, Royal L. Bailey, Reseda, CA

W6TDB, Dr. Wayland Wheeler, Redding, CA

W6UQI, Fred T. Alderson, El Centro, CA

W6VBY, Herbert H. Haley, Tarzana, CA

W6ZOX, Robert H. Bennett, San Diego, CA

W7JGG, Charles R. Grey, Great Falls, MT

K7LVL, Elmer J. Bergstrom, Tacoma, WA

W7PPG, William J. Taylor, Milwaukie, OR

K7OHJ, Marcus Daly III, Las Vegas, NV

W8JZV, Wyatt E. McKinsey, Dearborn, MI

W8LMS, Cornelis Van Zoest, Grand Rapids, MI

K8ZFX, Robert C. Mulhauser, Novelty, OH

W9CLM, Ansel A. Seales, Indianapolis, IN

W9DLI, Elmer Ballantyne, Hohart, IN

W9HX, Warren C. Baker, Evansville, IN

W9MSG, Ray P. Birren, Elmhurst, IL

W9SNI, Russel E. Miller, Fort Wayne, IN

W9SRO, Milton G. Hawkins, Prospect Heights, IL

W9VIT, William R. Briscoe, Mattson, IL

W9YTO, Harvey Korshak, Skokie, IL

W9NCH, Melvin E. Archambeau, Duluth, MN

K9HTG, James K. McFee, Sr., Minneapolis, MN

W9NIV, John Soth, Alliance, NE

W9PSP, William G. Davis, Mitchellville, IA

K9SPH, Fay S. McCalley, Fargo, ND

W9UCG, John R. Borton, Hutchinson, KS

VE2LJ, Isabel E. Denmark, Pointe Claire, PQ

VE3FSL, W. G. "Bill" Smith, Scarborough, ON

VOIDW, W. J. J. Stoyles, St. John's, Newfoundland

LU5AAO, Rolando Illa, Buenos Aires, Argentina

Feedback

Apologies to Homer C. Ford, W6GBB, incorrectly listed in the Silent Keys column in QST for January, 1971, based on a "deceased" report on mail returned by the Post Office.

The December QST report of the September FMT should show that 4 ppm listing with the call WA7DUY/7, not WA7UDY, and that 46 ppm average accuracy noted in December belongs to VE3AFA. Sorry, OMs.

Operating Events

.....de W1YYM

MARCH

4 W6WP Qualifying Run (W6ZRL alternate) at 0500 GMT, 3590/7129 kHz, 10-35 wpm. This is 2100 PST the night of March 3. Copies to ARRL for grading.

6-7 The VE2 Contest (phone section) limited to Quebec amateurs will start at 1500Z Mar. 6 and end at 0100Z Mar. 7. Full rules p. 95 Feb.

6-7 DX Competition phone, rules p. 72 Dec.

12 WIAW Qualifying Run, 10-35 wpm, at 0230 GMT on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02 and 145.6 MHz. This is 2130 EST the night of March 11. Underline one minute of top speed copied, state no aids used (typewriters OK), sign and mail to ARRL.

13-14 YL/OM Contest cw, starts/ends 1800 GMT. All licensed OM, YL and XYL operators throughout the world invited to participate. Exchange QSO number, report and ARRL section or country. Full rules detailed on page 101 of the December issue.

13-14 H-22 Contest starts 1500Z Mar. 13 and ends at 1700Z Mar. 14. Use all bands 160-10 meters, cw to cw or phone to phone. Report consists of RST(1) plus 3-figure serial number starting from 001. Swiss stations will send the number plus abbreviation of their canton, i.e. 5799001 ZH. Each contact with an HB station counts 3 points. Each station may be worked once per band either on cw or phone. Multiplier is the sum of Swiss cantons worked per band (a possible multiplier of 22 per band). Final score is sum of QSO points multiplied by the sum of cantons worked on each band. Certificates go to the highest scorer in each country (U.S.A. and Canadian call areas will receive separate awards). Logs postmarked no later than 30 days after the contest go to 1M USKA, HB9AAA, P.O.B. 17, 2500 Biennet 4, Switzerland. Abbreviations of the 22 cantons are: AG AR BL BS FR GL GR LU NE NW SG SH SO SZ TG UR UD VS ZH ZH.

13-15 Virginia QSO Party, 1800Z Mar. 13 to 0200Z Mar. 15. See p. 95 Feb. for additional details.

13-15 BARTG Spring RTTY Contest from 0200Z Mar. 13 to 0200Z Mar. 15. Details p. 45 Feb.

13-21 QRP Contest from 0000 Mar. 13 to 2300 Mar. 21. Times in GMT. Rules p. 95 Feb.

14 Worked All Britain, hf phone (10-15-20 meters); from 0900-2100Z only, 12-hour period. Four points for each different station worked. The same station may be worked again on a different band for 5 points. Non-UK competitors multiply points times the number of different WAB areas worked in the contest (multi, count only once). The same area number but a different country, counts as 2 separate areas (i.e., SP57/Lancashire, and SP57/Warwickshire are 2 areas). UK competitors use as multi, the total number of different WAB areas worked plus one multi, for each different DXCC country. All British Isles prefixes count as only one country and one multiplier for UK competitors.

20-21 DX Competition cw, rules p. 72 Dec.

22 CWA High-Speed Code Test, sponsored by the Conn. Wireless Assn. Transmission starts at 0115 GMT, instructions at 0130 GMT. First test transmission at 0150 GMT (40 wpm) followed by 45 wpm at 0200, 50 wpm at 0210, 55 wpm at 0220 and 60 wpm at 0230 GMT. (This is Sunday evening local time.) W1EJA will be on 3637 and 7120 kHz simultaneously and will announce all other stations and their frequencies with each identification. Tentatively, here is the lineup: WB4GLS on 3525, 7025 and 14025 kHz; W5QMJ on 3665 kHz; W6LOT on 7070 and 14070 kHz; WB4GTS on 3525, 7025 and 14025 kHz; W5QMJ on 3665 kHz; W6EOT on 7070 and 14070 kHz; K6DYX on 3690 kHz; W6FA on 3653 kHz. All participants should be sure to copy the instructions, starting at 0130 GMT at 25 wpm.

27-28 New Mexico QSO Party 2200Z Mar. 27 to 0100Z Mar. 28. Details p. 114 Feb.

28 Worked All Britain, hf-cw (10-15-20 meters). See rules under March 14.

29 WIAW Morning Qualifying Run at 1400 GMT. Check March 12 listing for additional details.

APRIL

2-5 The Old Old Timers' Club will hold its 171 QSO Party starting and ending at 2300 these dates. Suggested frequencies for locating the gang are plus or minus the following: 3520, 3530, 3820, 3830, 7020, 7030, 7240, 7260, 14270, 14290, 14291, 21020, 21230 and 21280. Participants should avoid any possible interference on any of these frequencies which may be used for net operation. Further info from W6MLZ.

3-4 Florida QSO Party Sat. 1500-2000; Sun. 0000-0500 and 1400-2359, all times GMT. Additional information p. 114 Feb.

3-4 SP DX Contest, 1500Z Apr. 3 to 2400Z Apr. 4. See p. 114 Feb.

3-5 Connecticut QSO Party, sponsored by the Candlewood AR Assn. starts 2300Z Apr. 3 to 0400Z Apr. 5. Each station may be worked once on each band and mode. Conn. stations send QSO nr., RST(1) and county. All others substitute ARRL section or country for county. Score 1 point per QSO. Out-of-state stations multiply contacts times number of counties worked (max. 8). Conn. stations multiply contacts times the number of ARRL sections and counties worked. Certificates go to high scorer (6 or more contacts) in each ARRL section and country, also to the two highest scorers in each Conn. county. Novice awards. Suggested frequencies: 3540, 3925, 7040, 7275, 14040, 14300, 21050, 21300, 28040 and 28880 kHz. Novices try 3740, 7175 and 21125 kHz. Logs must show dates, times in GMT, band, mode, QSO numbers, RST(1) and QTH. Logs before May 20 go to the Conn. QSO Party, c/o Tom O'Hara, W1DDI, 7 West Wooster St., Danbury, Conn. 06810. Include an S.A.S.E. for results.

4 Worked All Britain, 160-7540 phone. See rules March 14.

7 W6WP Qualifying Run, same details as March 4 listing.

11 Worked All Britain, 160-8040 cw, see rules March 14.

13 WIAW Qualifying Run.

17-18 Tidewater QSO Party, sponsored by the Tidewater ARC. From 0900 GMT Apr. 17 to 2359 GMT Apr. 18. Phone and cw may be used. All invited to participate. Contact must be made between a Tidewater station and a non-Tidewater station or two Tidewater stations. A Tidewater station will be located in Norfolk, Portsmouth, Chesapeake, Virginia Beach, Hampton, or Newport News, Va. Stations may be worked on phone and cw each band. 1 reqs.: up 10 kHz from 3570 7070 14070 21070 3970 7270 14275 21370 28800 kHz. Exchange QSO nr., RST(1) and city (for Tidewater stations), other substitute their section/country. Scoring: Tidewater stations multiply total number of QSOs times the sum of section-countries worked on cw plus the total number of sections/countries worked on phone. Outside Tidewater, multiply Tidewater QSOs times number of different Tidewater cities worked on cw plus number worked on phone (possible 6 each mode). Appropriate certificates. Logs must contain exchanges, date, RST(1), time, mode, multiplier lists and computations and must be postmarked on or before May 1. Enclose an S.A.S.E. commemorating the anniversary of the Chesapeake Bay Bridge Tunnel, the club will operate W4BBT from one of the four man-made islands used to hold up the bridge tunnel. Logs and QSLs for W4BBT go to the club, Box 9861, Norfolk, VA 23505.

17-18 Wyoming QSO Party, sponsored by the Shy-Wy and Casper ARCs starts 1700 GMT April 17 and ends 2400 GMT Apr. 18. Each station may be worked twice on each band, once per mode. Complete exchanges consist of QSO number, reports and Wyoming county for ARRL, section/country for non-Wyo. stations). One point per complete exchange. Wyo. stations are not permitted to work stations in their own state for point credit. Freqs.: 3560, 3920, 7060, 7260, 14060, 14280, 21060, 21410, 28060 and 28660 kHz. Scoring: non-Wyo. stations multiply points by the number of Wyo. counties worked. Wyo. stations use nr. of ARRL sections/countries as multi. Appropriate awards. Multipliers, not eligible. Logs with usual info. in GMT go to the Casper ARC, Box 2802, Casper, Wyo. 82601. Logs must be postmarked no later than June 1, 1971.

17-19 CD Party, cw. This is a quarterly event for League appointees and officials, notified separately by bulletin. Check with your SCM, page 6, to see if you can qualify for an appointment. The July Party is open to all ARRL members.

24-26 CD Party phone, see above.

MAY

1-2 New York State QSO Party.

1-3 Georgia QSO Party.

6 W6WP Qualifying Run.

8-9 Russian Contest, cw only. Full rules April.

12 WIAW Qualifying Run.

15 Armed Forces Day.

15 Frequency Measuring Test, open to all.

21-23 YL-ASSB QSO Party.

JUNE

2 W6WP Qualifying Run.

6 Minnesota QSO Party.

10 WIAW Qualifying Run.

12-13 VHF QSO Party.

20 Worked All Britain, vhf phone, see rules March 14.

26-27 Field Day.

SEPTEMBER

11-12 VHF QSO Party.

NOVEMBER

13-14 SS, phone.

20-21 SS, cw.



Operating News

GEORGE HART, WINJM
Communications Manager

EILEEN WHITE, WIYYM
Deputy Comms Mgr.

DXCC: ROBERT L. WHITE, WICW
Contests: ALBERT M. NOONE, WA1KQM

Training Aids: GERALD PINARD
Public Service: WILLIAM O. REICHERT, WA9HHH

SKN a Big Success. By the time we are ready to button up the results of "Straight Key Nite" there will be over 150 reports received. For an activity which received a minimum of *QST* blow-up, this is an astonishing response. It appears that over 600 amateurs were on the air with their straight keys, pumping away, on New Year's Eve, 1970.

They weren't all old timers living in the past and too played out to enjoy the usual New Year's Eve frivolities, either. Actually, we never realized so many people stayed at home on New Year's Eve. There was more than a scattering of WA and WB calls. Nearly every one of those who sent in a "report" clamored for a repeat next New Year's Eve.

SKN was an experiment in a slightly different kind of operating activity — different, that is, from the customary contest. The writeup elsewhere on these pages dwells not on who worked the most, but on the extent of the activity and the quality of some of our straight key fists. Some seldom-heard calls showed up during the activity.

The success of this and the 160-Meter Party is encouraging; it shows that the fraternal aspect of ham radio is still very much with us and that hams are still amenable to new types of activity. No doubt "repeats" will be called for. But let's not load up our calendar with too many "regular" activities, eh? How about some variety? SKN was swell. Now how about an activity for mobiles, or a low-power activity, or some other activity that emphasizes a particular facet of amateur radio that anyone can do with a little effort? If the "soft sell" can bring out over 600 participants for SKN, what other types of activity are there which are latently popular that we might foster?

Mobile WAS and DXCC. Speaking of mobiles, this March issue of *QST* brings the beginnings of balmy weather back to the northern parts of the country and there will be more mobile activity as a result. Some members have inquired concerning the availability of awards for mobile operation. In

particular, a mobile WAS and DXCC have been mentioned.

WAS is now endorsed for just about anything reasonable, and as long as confirmations plainly show that the contacts were made while operating mobile there is no reason why it cannot be endorsed for mobile also. (No doubt some already have been.) DXCC is endorsed only for phone — or, more correctly, the Phone DXCC is awarded separately from the all-mode, or general, DXCC. Five-band awards are available also for both WAS and DXCC.

DXCC (with 5BDXCC) has become such an operation that it is handled by a separate branch of the CD, which is hard-pressed, with two full-time people, to keep abreast of the present workload. WAS (and 5BWAS) is handled at a "miscellaneous awards" desk in the Administrative Branch, which is similarly overloaded. This in itself is not a compelling reason to avoid additional awards, but it is a consideration. We have reached the point where we must tread lightly in imposing additional burdens without adding additional facilities (and Personnel) — or the point at which we must drop an award for each new one added. In the end, your majority wishes will dictate.

Five-Band DXCC and WAS Update. And speaking of 5-band awards, at the time copy is being prepared for this March issue it comes to mind (with a start) that over two years have gone by since 5BDXCC got off the ground and over a year since 5BWAS was initiated. These "impossible" awards have proved to be attainable by 58 (5BDXCC) and 32 (5BWAS) aspiring (and perspiring) amateurs. There is little doubt that these awards have spurred all-band activity. The following is a rundown of those acquiring these cherished awards so far:

5BDXCC: W4QCW DL7AA W1EVT W8GZ W8RT W4IC W1AX W4BRB K2BZT LA7Y W4AQW OH2YV K4HFX K6KA W6NJU W3MFW W4GK W2PV 11AMU 11ZV K3JH HB9J DL9OH W8JIN HK3WO W6ANN W9HUZ W2NQ DL3RK SM0AJU OZ1LO 11KDB W9BGX ZL3GQ G3HCT K4ZCP W1WQC OK1ADM KV4FZ YV4UA DJ7ZG G3FKM W6JKR LA7TH XF1KS LA0AD WA6GLD CT1BH W2QD W2SSC W2JVU OE1NY OZ3SK W6AM DK2BI DL7EN DL1CF and K2DCA.

5BWAS: W1AX W4IC K9LBQ/7 W6ISQ W8YFK K0GJD KH6SP K4GHR W4YWX XE1WS K4IEK WA1HN W3WGH W0WLO W8RT W2PV K1VTM W8SET WA9WJE W0IS PJ2VD KH6HCM W7OK W5RUB K4FN W3LDD K3MAT WA3FGS W8CJW WA7LDZ W5QNY and W7YBX.

W5NW, one of the top fists of SKN. Soupy is an Honorary Vice President of the League, after 20 years as First ARRL Vice President.



Note that only four have made them both: W1AX, W2PV, W4IC, and W8BT.

Planning to submit cards for either of these awards? If so, be sure (1) that you know the rules, and (2) that you use the standard entry forms (\$10 per entry from headquarters) in submitting your cards.

Evolution of a Rule. The 25-mile rule for change of location for WAS is under attack from some foreign aspirants. To them, it seems unfair to require all contacts to be made within 25-miles of each other, considering that a move of such a comparatively short distance would have little effect on the difficulty of making WAS from a foreign country.

Admittedly, the rule is somewhat arbitrary, as are most rules when you come right down to it. The original rules (p. 33, Jan. 1936 *QST*) required that all contacts "must be made from the same location." Yet in the 19th edition of *Operating an Amateur Radio Station* (1936), there it is, big as life: "Within a given community one location may be defined as from places no two of which are more than 25 miles apart." The matter must have come up and the limitation set. In the late 40's, the reference to "within a given community" was dropped, and today's rule does not "define" one location but gives the 25-mile rule as an alternate. In fact, about all that is left of the rule imposing the 25-mile limit is the 25-mile limit itself.

We are agreeable to changing it to a more practical figure — but what? Those who have already made WAS will probably want to retain the restriction, those who haven't will want to liberalize or eliminate it. Give you until June 1 to express yourselves on this matter. In Sept. '71 *QST* we'll announce the change, if any.

Call and Name? This column has several times emphasized the importance of including your call as a part of all identification, whether on the air, in person, or in writing. But with amateurs constantly on the move between call areas and license status, calls are being changed at the drop of a hat (or, in some cases, \$25) while names remain the same, even though there may be thousands of people with the same name but only you with that particular call at that particular time. It defies any test of logic, but in these irrational days so do many things.

What brought this on? Oh, a complaint to the effect that certificates showing only the call letters of the recipient are of little significance when hung on his wall if the call has been changed. It's a good point, too; however, there aren't very many such certificates issued now (most show *both* name and call). Sara Thompson, WA5WYD, suggests that the name and call on the envelope can be cut out and pasted on a corner of the certificate to show that the certificate was indeed awarded to the person proudly displaying it in his shack, even though the call was changed.

Meanwhile, try to remember when writing, telephoning, or visiting headquarters, give both your call (if you have one) *and* name. If you give only your call, we might confuse you with the two or three or half dozen others who might have held it before; if only your name, we might confuse you

with hundreds of other people who either now or in the past have had the same name.

Contest Committee Reappointed. The ARRL Contest Advisory Committee (CAC) was originally appointed for an 18-month trial period, which period expired some time ago. Considered a success, the committee continued to function beyond the trial period, with the acquiescence of everybody concerned. Now finally it has been reappointed, both to give a rest to those who have so graciously given of their time, effort, and advice and to give other aspirants a crack at it.

Consequently, effective Jan. 1, President Denniston, W0DX, has reappointed Chairman Len Chertok, W3GRF; Vice Chairman Roger Corey, W1AX; Jack Ravenscroft, VE2NV; and appointed new members as follows: Bud Hippisley, K2K1R; Fred Deziel, W0HP; Ron Sigismonti, W3W1D; Katashi Nose, KH6IJ; Ken Bay, W4UQ; and Bill Wortman, W5QNY. Keep these amateurs advised as to your ideas about the ARRL contest program.

We are all indebted to the outgoing CAC members who served in the initial trial period which got this concept of member participation off the ground: Jack DuBois, K2CPR; Gene Sykes, W4BRB; Jim Maxwell, W6CUF; Vince Gulden, W8DB; Reno Goetsch, W9RQM; and Tom Russell, WA0SDC.

— WINJM.

STRAIGHT-KEY NITE



The first (but not the last!) Straight-Key Nite, suggested originally by K4MD and held this past New Year's Eve, can't be called anything but a resounding success. Scheduled as a "low-keyed" affair (ouch!), those spending some time at home on the air, while seeing the new year in, numbered in the hundreds. In fact, as of the time of preparation of this report, 158 individual reports were received, showing SKN activity by 664 different stations!

The caliber of operating was exemplary. To wit, 92 different individuals were nominated for top "fist" of the evening. Most votes for "best fist" were received by W8JO, followed next by W4KFC (it figures!). Tied for third spot are W2YI W5NW and W8ELL. Picking up more than one vote were, additionally, W1ADW K4CAX W4NG W4DQS W4YZC/4 WA7OBL W8AJW W9BX W9II and W0FK.

Almost as much fun as the event itself is reading comments by the participants. — W1YYM
Soapbox

SKN pleasurable and relaxing. — W6CQO. My elbow is sore, but not for the usual New Year's reason. — W2ESF. Thanks for dreaming up these added fillips to enjoyment of our common interest.

DX CENTURY CLUB AWARDS

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. All totals shown represent submissions received through December 31, 1970.

Honor Roll

DL1IN	322/340	W8ZCO	321/337	W2RDD	319/335	OH2NB	317/340	YV5BOA	316/319
G3FKM	322/341	W91NM	321/346	W2SAW	319/338	PA2CO	317/320	DL7ZG	315/318
G8KS	322/342	W0LLA	321/346	W2WMG	319/332	W1QSO	317/330	DJ0KO	315/318
GW3AHN	322/343	W0MLY	321/339	W2YY	319/329	W1CRZ	317/334	G3DO	315/339
HB9J	322/348	W0OGL	321/341	W42RAU	319/322	W1GL	317/322	G3FXB	315/335
K4LNM	322/338	W0SYK	321/341	W3CGS	319/340	W1JNV	317/336	HB9TL	315/333
W1HX	322/344	W13AG	320/346	W3GRS	319/333	W2EXH	317/325	JA2JW	315/328
W2AGW	322/348	DL3RK	320/339	W3MP	319/343	W2JJ	317/338	K2UVU	315/330
W2FZY	322/337	DL9OH	320/333	W4MR	319/340	W2MS	317/337	K4CKC	315/329
W2OKM	322/342	G3HCT	320/333	W5UKK	319/335	W82HXD	317/320	K6IV	315/319
W2SSC	322/340	IJ2L	320/334	W5UX	319/336	W3AFM	317/329	K6NA	315/338
W4GXB	322/345	K4TIL	320/331	W6HX	319/344	W3JLZ	317/327	K7ADL	315/322
W4PLI	322/339	K6AN	320/343	W6JD	319/340	W4IC	317/324	W13CFG	315/331
W4VPD	322/341	IU4DMG	320/338	W6TA	319/345	W4TM	317/341	YKJQM	315/340
W5ABY	322/341	LU6DIX	320/346	W6UOV	319/335	W5HE	317/320	W1NU	315/332
W6AM	322/349	PA0EX	320/342	W6WX	319/328	W5KFW	317/323	W2FXN	315/331
W6BZE	322/344	PY2CK	320/345	W7CMO	319/331	W5OGS	317/335	W2ZGB	315/332
W6CYL	322/342	W1CKA	320/332	W7OI	319/348	W6LL	317/322	W4ZDIG	315/326
W6KZL	322/340	W1EZ	320/341	W8DMD	319/343	W6LZJ	317/324	W4ZELS	315/321
W6PT	322/341	W2BOK	320/339	W8KIA	319/345	W6MYL	317/330	W3CLR	315/334
W7KH	322/347	W2BXA	320/346	W8QJR	319/338	W8EVZ	317/322	W4MCM	315/328
W8BF	322/345	W2CP	320/328	W9HLZ	319/341	W8KPL	317/337	W4RLS	315/321
W8EWS	322/348	W2DXX	320/328	W9CJZ	319/325	W9GLL	317/336	W5EGK	315/335
W8JBI	322/341	W2HO	320/338	W9KE	319/348	W9HB	317/334	W5GO	315/321
W9BG	322/349	W2JVV	320/343	ZL1HY	319/345	W9SLR	317/334	W5HDS	315/334
W9NDA	322/348	W2OM	320/337	412BOZ	318/338	W9YTV	317/343	W5MMD	315/336
W0BW	322/345	W2WZ	320/345	11AMU	318/339	W0BOM	317/332	W5PWW	315/329
W0DU	322/346	W2LZS	320/338	K1JXG	318/327	W0LWG	317/331	W5WZO	315/331
DL7EN	321/338	W31MA	320/344	K1SHJ	318/324	W0NVZ	317/331	W6CHV	315/336
DL7AA	321/345	W31MO	320/335	K4KO	318/340	DL7BA	316/335	W6CSO	315/324
HB9MQ	321/341	W3NKM	320/339	K4TWI	318/326	DL7FN	316/333	W5ZJY	315/321
K2BZT	321/340	W3WGH	320/337	K6DC	318/327	G3HDA	316/330	W9AMU	315/333
K2LWR	321/336	W4BJ	320/334	K6CJ	318/341	G61A	316/333	W0GKL	315/332
OP1FR	321/345	W4BYU	320/340	K91LI	318/327	IT1TAI	316/344	W0NLY	315/333
VE2NV	321/340	W4DOS	320/329	ON4NC	318/341	JA1DM	316/333	DL7HU	314/325
W1AX	321/346	W41RN	320/334	W1HH	318/331	K2YXY	316/325	GI3JIM	314/328
W1BAN	321/336	W4ML	320/342	W1HZ	318/338	K4EZ	316/326	K2PXX	314/322
W1HII	321/347	W4QCW	320/339	W2CR	318/327	K4IC	316/321	59BGM	314/317
W1CLX	321/346	W5AO	320/341	W2GON	318/321	K4PDV	316/332	SM3RZ	314/333
W1GKK	321/348	W6LN	320/342	W2MJ	318/322	K6VVA	316/327	V2BVB	314/333
W1MV	321/340	W6RKP	320/336	W2NO	318/324	K6YRA	316/320	W1DGI	314/322
W2CTO	321/343	W6LZD	320/342	W3ELW	318/342	LA7Y	316/340	W2GLF	314/330
W2HTI	321/339	W7AC	320/346	W3MWC	318/334	OH1RH	316/320	W3MQ	314/321
W2NUT	321/339	W8BF	320/339	W3RNO	318/338	VK3KB	316/341	W4AAU	314/335
W2PCI	321/340	W8FV	320/340	W4NJI	318/323	W2BMK	316/340	W5FLW	314/334
W2RGV	321/339	W8WZ	320/344	W5GC	318/329	W2CYS	316/340	W5GJ	314/323
W2SUC	321/340	W8YCP	320/333	W5GR	318/340	W2DOD	316/336	W5PM	314/331
W2TP	321/332	W9DWQ	320/335	W5KBU	318/338	W2LAX	316/335	W5TIZ	314/330
W2ZX	321/342	W9GFI	320/335	W5OIG	318/341	W2PDB	316/329	W6HYG	314/328
W3GAU	321/346	W0AHI	320/337	W5AEL	318/322	W2UVE	316/336	W6RGG	314/318
W3KT	321/347	W0BIB	320/340	W6DZ	318/333	W2ZTV	316/318	W6VUW	314/323
W4AIT	321/346	W0PGI	320/338	W6GPE	318/341	W2ZCKS	316/319	W6FPO	314/321
W4OM	321/345	W0PNQ	320/344	W6KUF	318/340	W4AVY	316/330	W8DE	314/317
W4OPM	321/338	G2BVN	319/339	W6REH	318/326	W4HE	316/330	W8KBT	314/329
W5KC	321/346	G4MH	319/338	W6AGLD	318/321	W4JDR	316/334	W9FKC	314/327
W5MMK	321/344	GL3VF	319/336	W86OOP	318/325	W4SSU	316/326	W9HIV	314/336
W5POA	321/341	JA1BK	319/329	W7JG	318/328	W4VMS	316/320	W9MQK	314/328
W5OK	321/334	K2BK	319/335	W8CUT	318/327	W5QKZ	316/327	W9TKD	314/327
W6CUQ	321/348	K2DCA	319/338	W8KJT	318/326	W6ANN	316/338	Z5GLW	314/329
W6EPZ	321/344	K6EC	319/335	W8ONA	318/336	W6HNY	316/344	DL3BK	313/329
W6NJU	321/337	K6LGF	319/333	W9ILW	318/327	W6ERS	316/325	K2UKO	313/320
W6OSU	321/335	K7GCM	319/329	W9RCL	318/332	W6EOZ	316/336	K4AIM	313/329
W6WVO	321/340	K8IKB	319/332	C6R6X	317/336	W6HOC	316/331	K6CH	313/334
W6ZO	321/344	K9KYF	319/329	DJ2RW	317/336	W6KTE	316/319	W21QC	313/334
W7AOB	321/335	ON4DM	319/340	DL1KB	317/338	W6SOP	316/333	W2FMK	313/317
W7MB	321/347	W1AZY	319/336	G5VT	317/340	W7ADS	316/335	W5AFK	313/340
W7PHO	321/340	W7GYE	318/336	K2QFA	317/335	W7ENW	316/342	W6DQ	313/320
W8DAW	321/347	W2AYJ	319/340	K2YLM	317/319	W8ARH	316/321	W6KG	313/328
W8LIN	321/348	W2BOM	319/334	K8LSC	317/330	W8CT	316/323	W6YV	313/335
W8MPW	321/341	W21XA	319/334	K8ONV	317/328	W8MB	316/330	W7ADS	313/332
W8NGO	321/340	W2GKZ	319/323	K9ICE	317/328	W9QON	316/319	W7POK	313/320
W8PHZ	321/338	W2LV	319/340	K9ELH	317/321	W9WYB	316/332	W8RRA	313/338
W8UAS	321/344	W2PV	319/323	KP4RK	317/329	W0BN	316/324	4X4DK	313/333
		W2QHH	319/342			YV5AB	316/337		

Radiotelephone

W6GVW	322/345	G8KS	319/335	WA2JZS	318/327	GSVT	315/338	W3DJZ	314/321
W8BI	322/345	K4TIL	319/330	W3NKM	318/336	H89J	315/337	W3KT	314/335
W8GZ	322/347	K9KYI	319/329	W3RIS	318/345	K2YLM	315/318	W5LZW	314/324
W2HTJ	321/338	L14DMG	319/337	W5GS	318/329	K4HFL	315/326	W6WX	314/317
W2TP	321/339	PA0HHO	319/334	WA5FLL	318/321	K6YRA	315/319	W6ZJY	314/320
W2ZN	321/347	W1ONK	319/337	W6RHH	318/322	W21XH	315/321	W7CWO	314/319
W4PDI	321/333	W2YY	319/323	W6RKP	318/329	W2JT	315/331	W8VZJ	314/318
W6AM	321/347	WA2RAU	319/322	W8QJR	318/337	W4ANF	315/332	WA8AJ	314/317
W0BW	321/338	W4OM	319/337	W9JLW	318/323	W5KBO	315/334	W9DWQ	314/319
DL9OH	320/333	W4QCW	319/334	W9NZM	318/324	W8JIN	315/332	W9LNM	314/327
K8RTW	320/331	W6BAF	319/331	DJ2YI	317/334	W8UAS	315/335	ZPSCF	314/322
PY2CK	320/345	W8MPW	319/330	K6LGO	317/329	W9RNX	315/335	ZS6LW	314/329
1J2HP	320/344	W0CM	319/338	W4SGF	317/332	W0MLY	315/329	D17GZ	313/316
W1BAN	320/334	S24ERR	319/343	W6LI	317/321	YVSAJP	315/325	H89IL	313/330
W1JLG	320/337	DL6AN	318/333	G6TA	316/337	K5H A	314/327	W1DGI	313/321
W2BXA	320/344	GI3VJ	318/333	ON4DH	316/334	OE1ML	314/329	W2GON	313/316
W2RGV	320/336	11AMU	318/339	W2ZTV	316/318	PY4TK	314/333	W6TA	313/322
W7PHO	320/340	K1HX	318/327	W3WGH	316/327	VK5MS	314/336	W6VUW	313/322
W8RT	320/339	K91UL	318/327	W4NJT	316/321	W2BOM	314/329	W6YY	313/335
W9NDA	320/342	ON4DM	318/339	W0GAA	316/321	W2GLE	314/330	W7PQK	313/319
DL1IN	319/336	W2OKM	318/336	YV5AB	316/337	W2WML	314/330		
G3FKM	319/335	W2PV	318/322						

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings.

DECEMBER 1 - 31, 1970

New Members

11JX	287	WA8LVH	138	JA3AYU	112	K3BJJ	106	OK1AGV	103	K4FJL	101
W5KYD	242	E33RF	137	WA5UHG	111	YU2OK	106	OZ2LW	103	SP9HP	101
JA8AWH	192	K0VVO	133	DL1MC	110	DL7IG	105	W3FAA	103	K6DM	100
K4CKA	167	DJ9NW	131	K3NF	110	WA91AJ	105	W3FHR	103	K6HSC	100
F8VO	159	DJ4FT	125	W2JGR	110	DL0HM	104	W5KKZ	103	O76AQ	100
DJ5IU	155	WA4VJW	125	PA0ABM	109	WB2HVM	104	W5YMW	103	W2VAG	100
DL3VI	151	WA3GVP	121	DJ4WT	108	WA3MSU	104	WA2AUB	102	WA2TNV	100
PY4ABH	149	WA7MGK	120	OK4PH	108	WA6FWI	104	W4ZBOU	102	W5BZK	100
JH1WIX	140	WARMOP	120	PY4ATG	107	DL7IL	103	WB2JLW	102	W5ASYQV	100
DJ6QX	139	W6RXW	119	JA1AFI	108	JA3YJ K	103	W6BOJ	102	W9CB	100
		DK2OU	112	DL1LD	106	K4TUV	103	WA8ORL	102	WA0VPO	100

11JX	277	WA8LVH	138	WA5LYX	120	11ADN	105	WA3HDI	104	K6R1X	101
EA4LH	202	DJ9NW	131	W6YVK	120	WB6LQ	105	W6LWI	103	CX7BI	101
W5KYD	198	K0VVO	125	WA4VJW	113	W8LBM	105	CR6TP	102	K5YRK	100
W84LQ	169	O76SM	125	W1MYA	112	11TMZ	104	K6WS	102	WA4EZA	100
K4CKA	159	11JLQ	121	W8WBD	110	OZ1WL	104	WA2GAV	102	WA5VYQ	100
JA8AWH	158	W6UNF	121	VF6SB	108	VF6JN	104	HC2KY	101	W8BOV	100
EA4DM	145									WA91LP	100

Endorsements

In the endorsement listings shown, totals from 120 through the 249 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

YS1O	330	W2CNO	280	F2QO	220	W31VB	200	SM6CZU	160	W4HU	140
W5VA	315	W4AOU	280	G3AWP	220	W41ZO	200	WJARR	160	W86SLA	140
SM0CCE	310	F8SK	270	K7BJE	220	WA8CIA	200	W1PJ	160	W7UO	140
SM0KY	310	G6VQ	270	EA2B	220	WA91UD	200	W4YU	160	W4CGR	140
DJ7CX	300	K6OZL	270	OK2DB	220	G5CP	180	WA4H1W	160	W81BM	140
11CQD	300	DL6KG	260	W3UHV	220	K3AIG	180	WB4GPJ	160	W9JVF	140
11ZPB	300	YV5AK	260	W4DQD	220	K4CLL	180	W6PIT	160	JX5CI	120
K1HGO	300	5H3KJ	260	W4DUQ	220	K5KYD	180	DL0AA	140	O82LU	120
W1DIP	300	CR6CA	250	W4PLM	220	OH3ME	180	K6GKU	140	OK3BH	120
DL1CT	290	DK2BL	250	WA9OAM	220	OK2RBJ	180	LA1KFN	140	W1YK	120
111VK	290	K1KNO	250	K1UDD	200	O77DN	180	K3SLP	140	W2WQ	120
JA1IBX	290	PY4AJQ	250	K0FKR	200	W4AQI	180	SV1AA	140	W82VFT	120
OH2BC	290	LA9HC	240	ON4OR	200	18BC	160	W21HY	140	W82DZZ	120
W1JMT	290	W1WAI	240	SM7BWZ	200	K8QYG	160	WA2EJH	140	WA3DVO	120
W4BR1	290	W3HMK	240	V1SDP	200	K8RCT	160	WB2JBJ	140	W84ONC	120
DJ51A	280	W9NNC	240	WB2GOK	200	PY7VGN	160	WB2SH	140	W7MKG	120
DL1CG	280									W8YIC	120

K2BZ1	320	W9HPS	290	W8MB	270	K1KNO	240	W6HUR	200	WB6WHM	160
JA1BK	315	DJ5LA	280	DL1CG	260	WA4OPW	240	W8DLX	200	W7LR	160
W1AX	315	11FVK	280	18CW	260	5H3KJ	240	W8OSI	200	H89AKO	140
W6JC	315	OJ2LGL	280	K1DRN	260	K3RIP	220	5N2AA	200	H1W5G	140
W0MX	315	W1JMT	280	W4MP	260	KP4BBK	220	KP4CDB	180	K8LUB	140
GY3JM	310	W2CNO	280	W0YDB	260	W1HGA	220	OZ7DN	180	K9HFR	140
PL4KL	310	W4HRI	280	CR6CA	250	WB2JGO	220	WA1BJY	180	WA2DVO	140
WA4WTP	310	W8ZOK	280	OK2BL	250	W4QAW	220	WB2GOK	180	WA3NRV	140
W61UF	310	W9ABM	280	DL6KG	260	W0GYM	220	W4KOU	180	WA3QT	140
W5HI	305	F8SK	270	JA1AG	250	DL3VX	200	W4PLM	180	W0LCK	140
11CQD	300	11CQD	270	V1AAS	250	K6KUN	200	KH6BZ	160	YU3TNT	140
111J1	300	JA1IBX	270	G55DW	250	VF4XN	200	OK2DB	160	ZS6ACK	140
W4F1U	300	W4AOU	270	DL3CN	240	WA3HGA	200	WB4CPI	160	W4NBO	120
		W4LLB	270	DJ7CX	240	W4ORT	200	W5A1M	160	W0IKD	120

WIAW FALL-WINTER SCHEDULE

(Oct. 25, 1970—April 25, 1971)

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EST, Saturday 7 P.M.-1:00 A.M. EST and Sunday 3 P.M.-11:00 P.M. EST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your original operator's license with you. The station will be closed Nov. 26, Dec. 23, 1970; Jan. 1, Feb. 15, Apr. 9, 1971.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000	CODE PRACTICE DAILY ¹ 10-13-15 wpm						
0030					RTTY OBS ²		
0100					CW OBS ³		
0120-0130 ⁴			3.700 ⁶	7.020	3.520	7.150 ⁶	7.020
0130			3.700 ⁶	7.080	3.555	7.150 ⁶	7.080
0200					PHONE OBS ⁵		
0205-0230 ⁴			3.820	50.120	145.600	1.820	3.820
0230							
0330-0400 ⁴			3.555		1.805		3.555
0400	RTTY OBS ²				RTTY OBS ²		
0410-0430 ⁴			3.625	14.095	7.095	14.095	3.625
0430	PHONE OBS ⁵				PHONE OBS ⁵		
0435-0500 ⁴			7.220	3.280	7.220	3.820	7.220
0500	CW OBS ³				CW OBS ³		
0520-0530 ⁴			3.700 ⁶	7.020	3.945	7.150 ⁶	3.520
0530-0600			3.700 ⁶	7.080	3.945	7.150 ⁶	3.555
1400							
1800-1900		21.28 ⁸	21.28 ⁸	21.28 ⁸	21.28 ⁸	21.28 ⁸	
1900-2000		14.280	7.255	14.280	7.255	14.280	
2000-2100		14.280	21.28 ⁸	14.095	21.28 ⁸	7.080	
2130-2230			CW OBS ³	14.100	CW OBS ³	14.100	
2230-2330		7.255	RTTY OBS ²	21.1 ⁸	RTTY OBS ²	7.255	

¹ CW OBS (bulletins, 18 wpm) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.6 MHz.

² Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.6 MHz.

³ RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 28.095 MHz.

⁴ Starting time approximate. Operating period follows conclusion of bulletin or code practice.

⁵ Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.

⁶ WIAW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.

⁷ Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.

Maintenance Staff; W1s Q18 WPR. *Times-days in GMT. Operating frequencies are approximate.

WIAW CODE PRACTICE

WIAW transmits daily code practice according to the following schedule showing speeds, local times/days and GMT times/days. Frequencies are: 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.6 MHz. For practice purposes, the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

10-13-15	7:30 P.M. EST dy	0030 dy
	4:30 P.M. PST	
5-7 1/4-10-	9:30 P.M. EST SaTThS	0230 MWFSn
13-20-25	6:30 P.M. PST	
5-7 1/4-10-	9:00 A.M. EST MWF	1400 MWF
13-20-25	6:00 A.M. PST	
35-30-25-	9:30 P.M. EST MWF	0230 TThS
20-15	6:30 P.M. PST	
35-30-25-	9:00 A.M. EST TTh	1400 TTh
20-15	6:00 A.M. PST	

The 0230 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending in step with WIAW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and January QST practice text to be sent in the 0230 GMT practice on the following dates.

Mar. 15:	It Seems to Us
Mar. 18:	Correspondence
Mar. 24:	League Lines
Mar. 30:	ARPS

The subject of practice text for the following sessions is *Understanding Amateur Radio*, First Edition.

Apr. 5:	Building Transmitters, p. 169
Apr. 7:	A Low-Cost Transmitter, p. 171

- W6FB. An interesting exercise. - WIMO. Brought back many memories of the old days when all keys (or most) were straight keys and one could tell from a fist who was who. - WIBDV. Finally a tribute to the cw man, SKN was at once a stroke of genius and a blow to many of us. - K6CNV. Two and a half hours of real pleasure. - WB4PCZ. Schedule another soon. - WICTI. Met and heard many old friends. Almost every QSO was a lengthy exchange of comments and best wishes. - WIQV. A grand success. It was refreshingly different. Most amazing was the high enthusiasm and the layers of QRM. T12AP was a big surprise, but he was in SKN all the way while

complaining about his sore arm. - W3CY. I think a lot of us rediscovered why we began using improved methods in the first place. No wonder OTs developed glass arms. - K4KNP. SKN a five-hour delight. It sounded like a very fine idea from the start and apparently the novelty of it caught on with many many other hams. My contacts were continuous, with amazing pileups after each QRZ. - W4NG. Had a swell time and hope ARRL keeps this going. - W6EYR. Only flaw in the deal was the QRM which showed the great response to the idea. - WA9WC. Especially noticeable was the easy-going style of operating.

(Continued on page 114)

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

DELAWARE - SCM, John L. Penrod, K3NYG - SEC/PAM: W3DKX, RM: W3EEB, Club elections: First State ARC - K3JXR, pres.; WA3HDS, secy.-treas.; K3NCL, dir.; K3YBU, pub. chmn. Delaware ARC - W3NNK, pres.; W3HGA, vice-pres.; WA3AVD, secy. Down in Kent County, the Kent ARC elected K3NYG, pres.; Frank Kreisher, vice-pres.; K3OCE, treas. The Dickinson High School has formed a radio club under the direction of K3R1N and WN3OYA. WA3LMY has his WAS. WA3LTA is working 20 with a dipole, but expects to get a quad going soon. W3EEB had a very busy month for traffic. 2-meter OVS W3BDP worked his 27th state over a path of 1230 miles. W3HKS has been endorsed as ORS. Look for WA3GSM, who now is on 160, The U. of Del. is getting a kw-sh station. Traffic: (Dec.) W3EEB 225, W3DKX 38, WA3GSM 21, WA3DUM 19, WA3HFL 6, W3TRC 5, WA3LTA 4. (Nov.) WA3DUM 8.

EASTERN PENNSYLVANIA - SCM, George S. Van Dyke, Jr., W3HK - SEC: W3JCC, RMs: W3EML, W3MPX, K3MVO, WA3AFI. PAMs: WA3GL1, K3PSO, VHE PAM: W3EGQ. OO reports were received from W3KEE, K3RDT, K3HNP, K3EMA, K3TXG, W3NNC, OVS reports from WA3EEC, WA3NVO, WA3KFT, WA3MI, WA3MCK, W3CL, W3JD, W3ZRR, K3QCQ/3. OBS reports from WA3EEC, W3CBH, WA3AFI, WA3KFT, K3EMA, WA3FMI, K3SLG, K3BHU, BPLs: W3EML, W3MPX, WA3EXW, WA3FMI, WA3MKQ, PSHR: WA3FMI, W3MPX and K3OIO.

Net	Freq.	Operates	QNI	QTC	RM/PAM
PTTN	3610	6:00 P Dy	278	393	WA3AFI
EPA	3610	6:45 P Dy	377	678	W3MPX
PFN	3960	5:30 P M-F	554	516	K3PSO
EPAEP&TN	3917	6:00 P Dy	270	143	WA3GL1

W3EML reports the usual Christmas deluge of traffic. W3MPX needs liaison stations for cw to phone nets. After 5 years WA3EXW made the BPL list, then he noticed he failed to renew his ticket in time to keep going! WA3LMO reports the best year he has ever had. School duties and ham skeeds are creating a conflict of interest with WA3AFI. WA3BSV donated many magazines for use by the Ingis House ARC. WA3LYC reports a K7IN checked into PITT on one night. W3RV also is W5UF/3 and is still active. WA3IUV met WA5VDH while on vacation in Ark. and WB4FLW in Fla. W3EU's 160 rig booted over! New officers for the Frankford Radio Club are W3WJD, pres.; WA3ATP, vice-pres.; K3ILL, secy.; WA2BLV, treas. WA3AFI and K3MVO also made PSHR. Hope Santa was good to all of you and thanks for the many wishes sent this way. New officers of the Philmont Mobile Radio Club are W2FUW, pres.; W3ADV, vice-pres.; WA2RDC, secy.; W3OOH, treas.; W3YHV, K3NYL, K3TKZ, dir. WA3OVZ and WA3MQP are trying out a long-haul traffic net, 14355 at 2130Z Fri. The Novice Round Table Net is giving an award to any station that checks in for at least 15 minutes, Mon-Fri, 2200Z 7176 kHz. Traffic: WA3MKQ 1553, W3EML 792, W3MPX 760, WA3EXW 548, WA3LMO 458, K3BIU 449, WA3AFI 585, K3MVO 311, K3PIE 290, WA3JZB 200, WA3FMI 194, W3CDB 145, WA3ATO 125, K3OIO 114, WA3LVC 109, K3PSO 81, WA3BSV 79, K3SLG 68, WA3MUL 52, WA3LYC 49, W3HK 44, W3VAP 34, W3ZLD 28, WA3DE 25, W3CHH 24, W3OY 23, W5UF/3 19, K3HKW 16, W3JXK 16, W3HNC 14, W3BPR 13, W3BNR 12, WA3EEC 12, W3VA 12, W3ZRR 12, W3FPC 9, W3CL 7, K3KTH 6, WA3NVO 6, W3JSX 4, WA3IUV 2, WA3BJQ 1, K3EMA 1, W3EU 1, K3FOB 1, WA3IAZ 1, W3JD 1, K3JLI 1, W3KEE 1, WA3KFT 1, W3OML 1, W3YPF 1.

MARYLAND-DISTRICT OF COLUMBIA - SCM, Karl R. Medrow, W3FA - SEC: W3LQY, PSHR (Dec.): W3EZT, W3TN. BPL: WA3IYS, W3EZT, W3TN, WA3NYU. A good 57% of the

section membership voted for SCM, K3JYZ and his 40-meter beam keep fighting a losing battle with the winds. At the PYRC awards "dn" W3JPT received the Al Cole Clock award. SVICI and PY3ID were DX guests. W3FLO now is putting Churchton on the map. Goddard ARC celebrated the year's end with a gift party. W3IN was the "G'slayer in the 160-Meter test. MEPN and MDCNT keep MDD on its toes with good liaison. So, Dak.'s loss is MDD's gain as W0IP1 became W3GLM and an ORS. W3PYW handled loads of MARS traffic and reappplies for OO. W3LDD is the first section 5BWAS with No. 26. K3NCM stirred up the nets while son WN3OYP keeps them hopping on 3 novice bands. K3LED says its back to card reporting after 2 good years leading the pack. W3ZSR carries on for the Md. license tags for W3ABC while ABC does a short tour in 5R8-Land. WA3APO checks the signals on the low bands and keeps looking for auroral openings on 50 MHz. W3EOV likes the cold so much he plans to go to KL7-Land this summer via the high VE numbers. W3CDO makes the long contacts on 14 MHz and the short ones at the WAYLARC's party. W3QCW likes his inverted "V" but not his working hours which make him miss the phone nets. K3GZK, W3EZT and W3ECS are versatile band and mode hoppers. W3GEL and WA3CFR have been keeping Hagerstown active. WA3LKI sports a new call as W3GLI. WA3HIV, K3LFN, WA3GKN keep the phone traffic up. W3FZY uses an indoor antenna. MDD in 30 sessions had 316/303 with QNI 9.7; MDCNT in 18 sessions had 117 with QNI 15.2 and MDDJ in 30 sessions had 173/148 with QNI 5.2. Traffic: WA3IYS 957, W3EZT 607, W3TN 332, WA3NYU 148, WA3LWI 131, W3ECS 115, K3LED 90, K3FZV 75, K3GZK 73, W3FA 61, W3QCW 43, K3JYZ 34, WA3HIV 31, W3FOV 27, W3GLI 27, W3LDD 27, K3LED 20, W3QY 11, W3GF1 10, WA3GKN 10, W3HXF 4, WA3APQ 3, K3QDC 1.

SOUTHERN NEW JERSEY - SCM, Charles E. Travers, W2YPZ - SEC: W2LVW, PAM: W2FEJE.

Net	kHz	Time(PM)	Sess.	QNI	Tfc.	Mgr.
NJEPNT	3950	6:00 M-S	31	696	400	WA2TA6
NIN	3695	7 & 10:00 Dy	62	767	803	WA2BAN
NIPON	3930	6:00 Su	4	69	29	WB2FJE
Nov. report			4	74	41	

It is gratifying to note the splendid report of WA2BAN, NIN Net Mgr. W2FBE reports the Gloucester County ARC recently demonstrated the value of ham radio to the public with an elaborate set-up at one of the Glasboro shopping centers. The cw classes are progressing very well with an enrollment of 15 students under the tutelage of WB2MSH, WN2OLS and WN2OVQ. Excellent activity reports were received in Dec. WB2VEJ was in his usual place and WA2TGS, our very capable and popular XYL from Salem, N.J. in second place. W2ZQ, club station of the DYRA is an official Trenton City club station. It is a pleasure to report that W2ZJ is well on the way to recovery and it won't be long before he will be on the nets once again. Dick Lennon, who had a very busy last season, is custodian of the RCA Institute ARC, WA2HFZ. We hope the new year will provide more time for net activities. W2HAY reports that the facilities at his QTH were made available to K2AA, the SIRA club station for participation in the 160-Meter Contest. W2YPZ and XYL have returned from a Caribbean Cruise. W2J1 is wintering in Fla. Traffic: (Dec.) WB2VEJ 251, WA2TGS 126, K2RXB 80, W2ZQ 61, WA2KAP 56, W2BLM 30, W2YPZ 29, W2ORS 23, WB2FJE 16, WB2HPU 16, W2IU 14, WB2SIX 10, W2J1 3. (Nov.) W2BLM 16, WA2KIP 16. (Oct.) WA2KIP 13, W2BLM 7. (Sept.) W2BLM 12.

WESTERN NEW YORK - SCM, Richard M. Pitzeruse, K2KTK - Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2RUF. Please check the expiration date on your appointment and if it is due for renewal, send it along. New officers for the North Country Radio Club are WB2BFF, pres.; WB2ERK, vice-pres.; WA2HIC, secy.-treas. WN2OKK passed his General and Advanced Class exam. WA2ICU has a new Ico-755. WA2DHS is now DXing with a new kw. WA2JBV visited FA-Land and dropped in on FA7DJ. WA2AWK is taking a night course in computer technology and is thinking of applying it to amateur radio. W2KWD didn't waste any time two hours after his retirement, he QSYed to Fla. Congratulations to former officers WB2VJR, WA2ILE, WA2HYB and K2VCZ for the fine job and to newly-elected WB2HIV, WB2MWZ, K2YJR and WB2VND, all of NYSPTN. W2DRU has a new 40-meter dipole that sets the world on fire on 15. Speaking of 40, W2FMW worked his first JA on that band. Not bad for a DX-40.

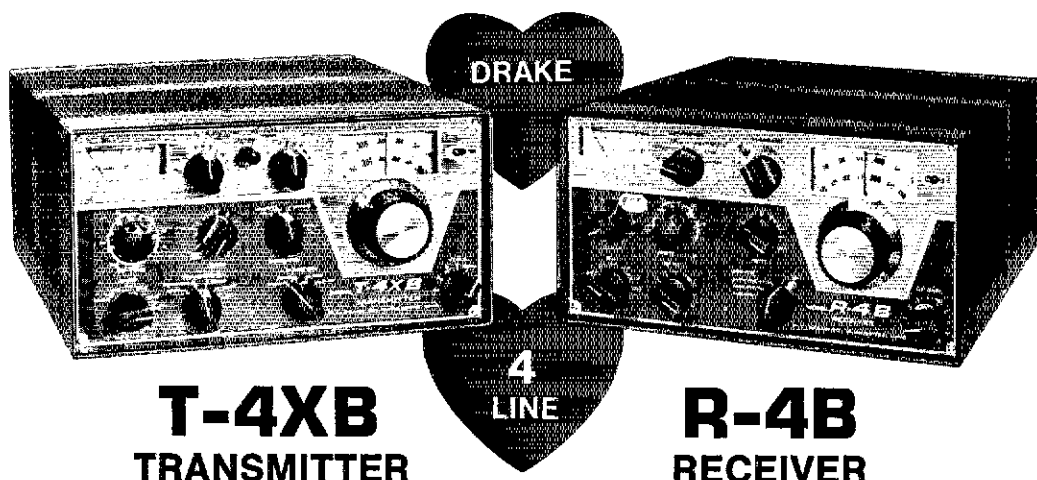
(Continued on page 116)

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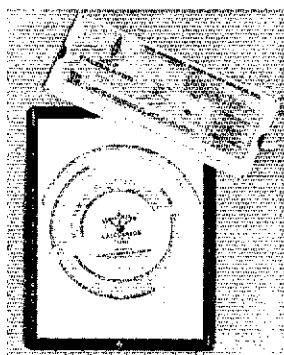
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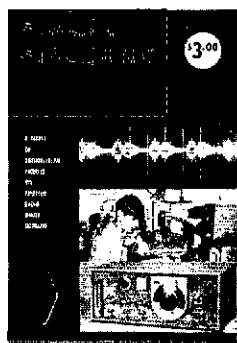
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SB-102 SPECIFICATIONS — RECEIVER SECTION: Sensitivity: Better than 0.35 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. **SSB selectivity:** 2.1 kHz minimum at 6 dB down, 5 kHz maximum at 60 dB down — 2:1 nominal shape factor — 6:60 dB. **CW Selectivity:** (With optional CW filter SBA-301-2 installed) 400 Hz minimum at 6 dB down, 2.0 kHz maximum at 60 dB down. **Input impedance:** Low impedance for unbalanced coaxial input. **Output impedance:** Unbalanced 8 ohm speaker, and high impedance headphone. **Power output:** 2 watts with less than 10% distortion. **Spurious response:** Image and IF rejection better than 50 dB. Internal spurious signals below equivalent antenna input of 1 microvolt. **TRANSMITTER SECTION:** DC power input: SSB, 180 watts P.E.P. continuous voice. CW, 170 watts — 50% duty cycle. RF power output: 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 ohm non-reactive load). **Output impedance:** 50 ohms to 75 ohms with less than 2:1 SWR. **Oscillator feed-through or mixer products:** 55 dB below rated output. **Harmonic radiation:** 45 dB below rated output. **Transmit-receive operation:** SSB, Push-to-talk or VOX. CW, Provided by operating VOX from a keyed tone, using grid-block keying. **CW side-tone:** Internally switched to speaker in CW mode. Approx. 1000 Hz tone. **Microphone input impedance:** High impedance. **Carrier suppression:** 50 dB down from single-tone output. **Unwanted sideband suppression:** 55 dB down from single-tone output at 1000 Hz reference. **Third order distortion:** 30 dB down from two-tone output. **RF compression (TALC):** 10 dB or greater at 1 mA final grid current. **GENERAL:** Frequency coverage: 3.5 to 4.0; 7.0 to 7.3; 14.0 to 14.5; 21.0 to 21.5; 28.0 to 28.5; 28.5 to 29.0; 29.0 to 29.5; 29.5 to 30.0 (megahertz). Frequency stability: Less than 100 Hz per hour after 10 minutes warm-up from normal ambient conditions. Less than 100 Hz for — 10% line voltage variations. **Modes of operation:** Selectable upper or lower sideband (suppressed carrier) and CW. **Visual Dial Accuracy:** Within 200 Hz on all bands. **Electrical dial accuracy:** Within 400 Hz after calibration at nearest 100 kHz point. **Dial mechanism backlash:** Less than 50 Hz. **Calibration:** 100 kHz crystal. **Audio frequency response:** 350 to 2450 Hz. **Phone patch impedance:** 8 ohm receiver output to phone patch; high impedance phone patch input to transmitter. **Front panel controls:** Main (LMO) tuning dial; Driver tuning and Preselector; Final tuning; Final loading; Mic and CW Level Control; Mode switch; Band switch; Function switch; Freq. Control switch; Meter switch; RF gain control; Filter switch. **Audio Gain control. Internal controls:** VOX Sensitivity; VOX Delay; Anti-Trip; Carrier Null (control and capacitor); Meter Zero control; CW tone volume; Relative Power; Adjust control; Bias; Phone Vol (headphone volume); Neutralizing. **Rear Apron Connections:** CW Key jack; 8 ohm output; Spare A; Spare B; Phone patch input; ALC input; Power and accessory plug; RF output; Driver output. **Power requirements:** 700 to 850 volts at 250 mA; 300 volts at 150 mA; — 115 volts at 10 mA; 12 volts at 4.76 amps. **Cabinet dimensions:** 14 1/2" W x 6 1/2" H x 13 1/2" D.

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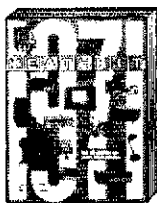
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Kit SB-220, 55 lbs. 349.95*

SB-220 SPECIFICATIONS — Band coverage: 80, 40, 20, 15 and 10 meter amateur bands. **Driving power required:** 100 watts. **Maximum power input:** SSB: 2000 watts P.E.P. CW: 1000 watts. RTTY: 1000 watts. **Duty cycle:** SSB: Continuous voice modulation. CW: Continuous (maximum key-down 10 minutes). RTTY: 50% (maximum transmit time 10 minutes). **Third order distortion:** — 30 dB or better. **Input impedance:** 52 ohm unbalanced. **Output impedance:** 50 ohm to 75 ohm unbalanced; SWR 2:1 or less. **Front panel controls:** Tune, Load, Band, Sensitivity, Meter switch, Power CW/Tune — SSB, Plate meter, Multi-meter (Grid mA, Relative Power, and High Voltage). **Rear Panel:** Line cord, Circuit breakers (two 10 A), Antenna Relay (phono), ALC (phono), RF input (SO-239). **Ground post.** RF output (SO-239). **Tubes:** Two Eimac 3-500Z. **Power required:** 120 VAC, 50/60 cycles, at 20 amperes maximum. 240 VAC, 50/60 cycles at 10 amperes. **Cabinet size:** 14 1/2" W x 8 1/2" H x 14 1/2" D. **Net weight:** 48 lbs.



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Operating News

(Continued from page 108)

and the willingness to take the time to visit. — W7DQS. Well what do you know, the old hand pump still works. Sure was great, and no hangovers! — W6USY. I'll have you know I gave up a wine tasting party for this. I don't know if I need my head examined. (Yes! — anon.) — W89BGA. One of the most pleasant experiences of my amateur radio career. After a few contacts, a sense of warmth and good fellowship seemed to fill the shack, dispelling that little touch of sadness many of us feel with the passing of another year. I think that most of us turned instinctively to 80, the mother band, which somehow seemed most appropriate for the occasion. — W3WI. A heart-warming experience, reminding me of the good old days. — W3CU. One thing I noticed was a lack of QRM once a contact was established, indicating a lot of listening was going on. — W7JHA. Too short, should be at least till 3 am local. — W3ADE. My first CQ SKN kept me in QSOs from 8 until midnight when I knocked off for a few minutes. The second kept things going until the curtain came down. — W4KFC. Everyone sounded A-1 to me. — VE3CQA. Wonderful idea, great party, hope it becomes a yearly schedule. These are the comments I heard and they express my sentiments 100%. — W0AEN. Interesting to see which lasts longer; your fist, the old year, or the bottle. — W5SQN. Some ops insisted they heard a spark rig tuning up during the evening. — W8JWX. Dear whoever-is-in-charge-of-this-kind-of-stuff, I was really surprised at the participation, you would think these people would have some better way to spend New Year's Eve. — WB2DRW. Kudos to whoever dreamed up the idea of SKN (to K4MD!), it wasn't a battle-type contest thus allowing us to gab with others in a leisurely fashion. — VE3XN. Make it a semi-annual or quarterly event. — K8ENQ. I'm now busy practicing up for the first QLF Nite, please don't disappoint me. — K9BGL. The best fists I heard belong to a pair of YLs, WB2JCE and W0KJZ. Even Guy Lombardo's rendition of Auld Lang Syne couldn't compare to the great sound of perfect code. Excuse me while I cry a bit. Then there was the kindly old W8 who must have let the spirit of the holiday season get to him. I don't know who the lucky YL was, but he was heard to wish her bushels and bushels of 88s. Sure would like to know that YL as he might know something I don't. — W40IAW. It was a lot of fun and 5 hours of it was just enough to avoid thinning the ranks of the WW-1 veteran hams. I was really agreeably surprised at the brass pounding mileage left in some of the old buzzards. One chap wondered if using the dash paddle on his bug was legal. I could truthfully say, being a lawyer, that I had never heard of a crime in this category. As host of the evening at my QTH, I had to pour with my left hand the remainder of this New Year's Eve. — W8BU. If I can just decipher my log it would be fun to find out whom I worked. — K4PJ. 

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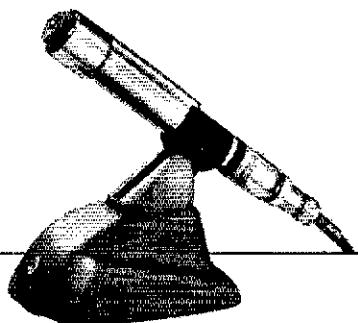
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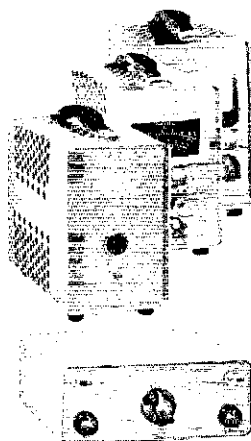
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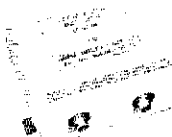
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eh? Sorry to report the passing of W2ISI. NYSCN celebrated its seventh birthday, first session being held Jan. 6, 1964. WA2IGL, W2AND and K2HMY have built and are using homebrew transistorized 2-meter transceivers. They are ORV from Seneca Falls on 145.32 and 146.83 MHz. W2AND made WAS. WA2IGL regularly QSOs the UAs on 20. W2MTA reports NYS handled 505 messages with 832 check-ins during Dec. Dec. traffic is up with the large volume of holiday traffic. BPLs went to W2OE and K2KQC who turned in 2 FB totals. WB2VND is still hobnobbing along without his phone rig. W2AFB is working on Project Good Neighbor down in the Penn-York Valley. W2CFP attended the SAROC convention in Jan. RAGS invites all WNY hams to attend their hamfest at Song Mountain in Tully, Apr. 17. Information and tickets are available from RAGS, Box 88, Liverpool, N.Y. 13088. Traffic for Dec. with asterisk indicating PSHR: K2KQC 1196, W2OE 571*, W2QC 469*, W2ER 453*, WA2ICU 436*, WA2BFX 264*, W2MTA 264*, WA2DHS 257*, W2HYM 129, K2KTK 121*, W2BU 91*, WB2LQP 83, W2FLB 82, WB2JNW 59, W2MSM 56, K2RTQ 55, K2OFV 47, W2ROE 45, W2CFP 42, K2UIR 39, WB2VND 31, K2DNN 28, WB2YEE 27, WA2PZD 26, W2DBU 24, W2PZK 17, WA2MPC 17, WA2ILE 14, W2PNW 12, W2PVI 11, K2IMI 10, WA2ANE 5, W2RUE 4, WB2FPG 4, W2AFB 3, WA2AIV 2, WB2OEI 1. (Nov.) K2DNN 11, WA2ILE 10, WA2MPC 8, WB2FPG 2.

WESTERN PENNSYLVANIA - SCM, Robert E. Gawryla. W3NEM - SEC: W3KPI, PAM: K3ZNP. RMs: W3LOS, W3KUN, W3IPU. WPA CW Traffic Net meets daily on 3585 kHz at 7:00 P.M. local time. WPP meets daily on 3955 kHz sat at 10:00 P.M. local time. K55N meets on 3585 kHz at 6:30 P.M. local time. Beaver Valley AR Assn. elected the following officers for 1971: WA3JLG, pres.; WA3JPJ, vice-pres.; WN3OTO, secy.; K3LGM, treas. The Nittany ARC has reorganized their TVI committee. The Etna RC has elected K3EGQ as pres. and WA3CHC as treas. for 1971 to fill the two vacancies. The Radio Assn. of Erie reports a 700-mile county expedition of the rare northern counties of Pennsylvania by W3GV/M operated by K3VXI, K3VLP, WA3HSR. Also, WN3LKR now is a General Class licensee. W3LOD and WA3EEG journeyed to Pittsburgh to become Advanced Class operators. The Presque Isle ARC is finalizing plans for their expedition to the North Atlantic and East Mediterranean areas for DX purposes. The PARC also reports that WN3OOT and WN3PES now are General Class licensees and W3NGI had 65 enrolled in the recent PARC novice class. Steel City ARC says W3KPI needs 1 and W3NKM 2 to have all countries confirmed. Two Rivers ARC reports the Mobiles are conducting hidden transmitter hunts and also The Radio Assn. of Erie are having regular hunts through the winter months too. WPA traffic report for Dec., 31 sessions, 462 QNL, 358 messages, WPP traffic report for Dec., 26 sessions, 107 QNL, 48 messages, Traffic: WA3IPU 449, K3HKK (W2KAT, W3NEM, ops) 221, W3NEM 214, W3ATQ 206, W3KUN 173, K3ZNP 149, W3LOS 147, K3HCT 34, K3SMB 26, W3UHN 22, WA3LDA 21, K3SJN 16, K3VOV 16, W3SN 14, W3IYI 12, W3UIT 10, W3IDO 9. Total 1739 a new record for WPA.

CENTRAL DIVISION

ILLINOIS - SCM, Edmond A. Metzger, W9PRN SEC: W9RYU. RM: WA9ZUF. PAMs: WA9CCP and WA9PFI (vhf). Cook

Net	Freq.	Times (21) Days	Tfc.
LEN	3940	1400 Su	12
FIN	3690	2330 Th	223
NCPN	3915	1300/1800 M-Sa	143
III PON	3915	1430/2245 M-F	660
III PON	145.5	0200 MWL	35
III PON	50.28	0200 M	4

With this report I complete 13 years as your SCM of the Ill. section of the Central Division. My heartfelt thanks to all the ARRL members and particularly to the many appointees who have very conscientiously forwarded their many monthly reports. Without them this column could not be a success. W9HRY Net Mgr. of 9RN reports a traffic count of 604 for Dec. W9AZP is celebrating his 50th year of his call. It originally was 9AZP. W9EFAM is working FB with many contacts. WA9ZLN is now on 2 fm. New officers of the Chicago Amateur Radio Club are WA9ONN, WA9JLZ and W9KUJ. W9GSB is back on the air after a lapse of 11 years. The Dewitt County Radio Club has a new radio class in progress in Clinton. W9DOF, WA9NPZ and K9ROV are the new officers or The Fox River Radio League (Aurora). New appointees in Dec. include WA9ZLN and WB9ADO as OPSs and WA9ZLN as OO and OVS. W9LYK formerly W1YU is working on 420 MHz equipment for cw and ATV and hopes to activate it soon. K9ORD, K9DCG, WA9BWK and WA9BLI are the incoming officers of the Big Thunder Amateur Radio Club (Belvidere). RM WA9ZUF's new QTH is 674 Surrey Road, Zurich, Ill. WB9REK now is operating on

AHA! YOU THOUGHT GOTHAM

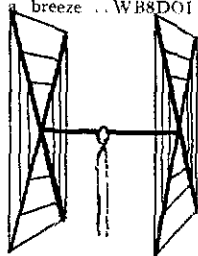
made ordinary, everyday, run-of-the-mill antennas. No, no, no. We make winners through superior materials and design. WA1JFG won the New England Round-Up championship with our 3-element 15-meter beam by a margin of 5,982 points! In QST since '53.

QUADS

Totally satisfied with quad. Worked DK4VJP, SM7DLH, XE1AR, DM4SEE, FL8SR, F6AUM, HK7VR in few hours. Instructions a breeze. WB8DOI

CUBICAL QUAD ANTENNAS

these two element beams have a full wavelength driven element and a reflector (the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!



10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 3/8" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD. \$37.00

10-15 CUBICAL QUAD. 32.00

15-20 CUBICAL QUAD. 34.00

TWENTY METER CUBICAL QUAD 27.00

FIFTEEN METER CUBICAL QUAD 26.00

TEN METER CUBICAL QUAD. 25.00

(all use single coax feedline)

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect. DEALERS WRITE!

BEAMS

"Just a note to let you know that as a Novice, your 3-E1. 15 Beam got me R1 Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 3/4" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 E1 20. \$21	4 E1 10. \$20
3 E1 20. 27*	7 E1 10. 34*
4 E1 20. 34*	4 E1 6. 20
2 E1 15. 17	8 E1 6. 30*
3 E1 15. 21	12 E1 2. 27*
4 E1 15. 27*	*20-ft. boom
5 E1 15. 30*	

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MNV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE21, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15,

10, 6 meters. \$14.95

V80 vertical for 80, 75, 40,

20, 15, 10, 6 meters. \$16.95

V160 vertical for 160, 80, 75,

40, 20, 15, 10, 6 meters. \$18.95

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2-meter air. WB9GP is using a colinear on 2. W9IDU reports that the Ill. Weather Net meets 7 days a week at 0000 GMT on 3940 kHz and invites all members to check in. WB9HXX is the only RPI recipient for Dec. Traffic: WB9HXX 630, WA9WNH 305, W9NXG 304, WB9DPU 210, WA9ZUP 178, W9IXV 125, W9HOT 48, W9EHS 47, W9DOQ 46, W9INQ 40, WA9ILR 32, WA9SLB 32, WA9NZE 30, K9AAQ 24, K9RAS 20, WA9ZLN 20, K9HNS 18, W9PRN 16, W9LEL 12, W9IDU 10, W9IIM 9, WA9LHU 5.

INDIANA — SCM, William C. Johnson, W9RUQ - SEC: W9IC, RMs: W9FC, W9HRY, WA9WMT. PAMs: K9CRS, WA9OHX, (vtd) W9PMT.

Net	Freq.	Time(Z)/Days	Tfc.	Mgr.
111cN	3910	1330 Dv 2130 M-S 2300 Dv	576	WA9OHX
QIN	3656	0000 Ttt 0400 Dv	216	WA9WMT
TIN	3740	0100 Dv	83	W9ZKX
PDN	2910	1245 Su	122	WA9UMH
PDN VII	50.7	0200 M-Su	92	WA9TIS
Hoosier VII			31	W9PMT

With deep regret I report the following as Silent Keys: W9JHX of Evansville, W9SNI, Fort Wayne, W9NSH, Liberty, K9SNQ, Gary and W9CTM, Indianapolis. New officers of the Indianapolis Radio Club, Inc. are W9ISU, pres.; W9POB, vice-pres.; W9JVF, sec.; W9AL, treas.; W9IGZ, chief op.; W9EL, W9PSI, dir. WB9BAQ, 12 years old, has received his General Class license, K9FCG and W9BUD are vacationing in Fla. K9VHY visited his son in Tex. K9CBY has a new SB-220. WA9WMT moved to a new QTH, K9IU, the Indiana U. club station is very active. K9YBM, Lafayette ARC was very active with Christmas traffic. W9HRY reports that 9RN has two sessions on 3640 kHz at 0145Z and 0330Z. If you miss them QIN has two sessions on 3656 kHz at 0100Z and 0400Z. The Central Area Net on 3670 kHz at 0230Z. The Indianapolis Red Cross ARC has issued identification cards with a picture of the member on it. WB9HSL, 2-meter fm was hit by lightning. WA9ZLN is on with RTTY. As more fm repeater stations are being used and located state-wide we soon will be able to cover the state on fm. QIN Honor Roll: WB9ANI 20/0, W9IBQ 19/0, W9QLW 19/0, W9QZF 17/0, WA9VZM 16/0, WA9WMT 16/17, WA9ZKX 16/0. Amateur radio exists because of the service it renders. BPL certificates went to K9YBM, W9IYO. Traffic: (Dec.) K9LZX 352, WA9WMT 199, W9HRY 196, WA9WJA 192, WA9OAD 188, K9YBM 183, W9IYO 184, WA9OHX 145, W9ICU 132, W9IBQ 94, WA9OOQ 79, W9QI W 76, W9IWH 70, WA9BWW 59, W9BUD 46, WA9TIS 43, WA9RHG 38, K9CBY 38, W9MZV 20, WA9VZM 25, K9IQY 24, W9IWR 23, K9RPZ 23, W9IOH 21, W9YXK 21, K9DIY 20, WA9UMI 19, WA9AXE 18, K9QVT 18, W9DZC 16, K9ILK 16, W9KWB 15, K9RWQ 14, WA9VYG 8, WB9BAP 7, W9FC 7, WA9OW 4, WB9BAQ 4, W9BUD 4, WA9CHY 4, WA9YXA 3, W9FGW 2. (Nov.) W9JL 14, WA9YXA 6.

WISCONSIN — SCM, S.M. Pokorny, W9NRP - Asst. SCM: Joseph A. Taylor, W9OMT, SEC: W9NGT, PAMs: WB9KFI, WA9IZK, WA9OAY, K9FHI, WA9QKP. RMs: WB9IFY, K9KSA.

Net	Freq.	Time(Z)/Days	QNT	QTC	Mgr.
WSSN	3662	0030 TTS	51	6	K9KSA
WIN	3662	0115 Dv	367	172	WB9IFY
WRN	3626	0130 Su (RTTY)			K9GSC
SW2RN	148.35	0230 Dv	169	3	WA9IZK
SW6RN	50.4	0300 M-S	174	6	WB9CKL
BWN	3985	1245 M-S	464	206	WA9OAY
BFN	3985	1800 Dv	853	138	WA9QKP
Wi-Pon	3925	1801 M-S	349	142	W9FMC
WSN	3985	2300 Dv	1528	245	K9FHI

WA9ONT requested cancellation as PAM for WBSN and K9FHI has been selected as PAM for WBSN. W9FCW and W9SZR/HSSABD/HUXAL put on a fine program at the Dec. WYRA club meeting. W9FCW gave a color slide presentation of his trip to South Africa and W9SZR discussed his experiences in HUX and HSS-Land. K9POT/K9BHDU spent a week with his folks W9ROM before returning to Honolulu. The first on-the-air meeting of Wis. OCWA members was held Sun. Jan. 3rd with W9NRP acting as NCS. Wis. OCWA will continue to hold Sun. morning sessions on 3988 kHz at 1500 GMT. W9CXY participated in the Dec. 13th 160-meter test. OPS certificates went to W9KXE and W9OMT; ORS to W9OMT and PAM to K9FHI. Traffic: W9CXY 489, WB9BIR 312, K9CPM 274, W9DND 209, W9PSJ 176, WB9IFY 139, WA9YSD 119, K9FHI 108, WB9WBX 92, WA9OMO 66, W9NRP 51, WB9DKK 49, K9KSA 48, WA9ONI 45, K9IPS 44, W9KRO 35, W9IHW 31, WA9YEC 30, WA9OAY 26, WB9DVG 20, W9OMT 16, WA9LRW 14, WA9PKM 14, W9DXV 12, W9RTP 12, WA9FCH 11.

DAKOTA DIVISION

MINNESOTA — SCM, John H. Halstead, K0MVE - Asst. SCM: Edna M. Thorson, WA9RA. SEC: WA0MZW. RMs: WA0LAW,

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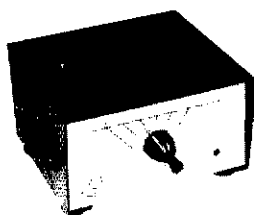
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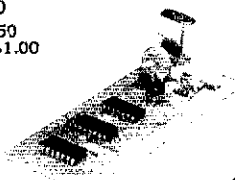
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W0AAU, PAMS: WA0HBM, WA0OEJ, WA0DWM, WA0MMV. Dec. has shown increased net activities with greater participation on MSN, MSPN noon, and MSPN evening. WA0HBM reports highest QNI in 3 years as PAM, MSPN evening. We would like to commend the novice operators who have participated on MJN. WN0YVT, WN0YWA, WN0ZCG, WN0CAP, WN0CYN, WN0CEY and WN0ASX. WN0CAP had a traffic count of 23 in Dec. We invite other novices to listen on 3685 kHz at 7:00 P.M. local time every night except Sun. Transmit close to low end of novice segment if possible. MJN net control listens carefully for novices. WA0PPF and NYL, WA0OEJ, will be operating from 9-Land at Hudson, Wis. Unofficial high Sweepstakes scores in Minn. were WA0HVR on phone with claimed 118992 and K00RK on cw with claimed 107237, 5 Minn. stations claimed a clean sweep of all sections on phone, W0AIH, K0HJL, W0IYP, WA0UCU and WA0VQX/0 (multi-op). High speed code practice (30-50 wpm) is at 7:00 P.M. local time, Mon. on 3751 kHz by members of the Minn. Wireless Assn. W0IYP transmits DX bulletins Tue. same time and frequency. WN0ZCW earned WAS as a novice and also passed his General and Advanced Class exam. WA0VPK worked Calif. and Ala. on 40-meters with 800 nullwatts output. K0VPM reports activity Sun. at 9:00 P.M. local time on the Minn. RTTY Net. Traffic: (Dec.) WA0GRX 723, WA0VAS 692, K0CSE 530, W0ZHN 512, WA0IAW 793, W0BUC 114, WA0EPX 107, WA0RRA 106, K0MVF 103, WA0YV 94, W0BBRG 93, WA0ELJ 87, WA0WDX 87, WA0YMU 82, K0ZRD 65, WA0VDG 57, WA0NQH 54, WA0VTZ 46, W0AAU 45, W0WFA 40, WA0HRM 38, WA0ONE 38, W0WAS 38, WA0RKV 31, WA0EBZ 29, WA0VUP 28, K00RK 26, WA0TEC 26, W0KNR 24, W0BUO 23, WN0CAP 23, WA0DOT 20, K0FLT 19, K0ICG 17, WA0UAH 17, WA0YVB 17, W0MOC 16, W0HHH 15, WA0STJ 15, WA0MMV 13, W0UMX 11, WA0JPR 10, WA0YER 10, WA0CGZ 9, W0EQO 9, WA0YAH 8, WN0YWA 8, W0ATO 7, WA0FEU 7, W0IYP 7, W0BE 6, WA0IB 6, WN0YVT 6, K0ZBI 5, W0RLG 4, WA0MNE 4, K0ZKE 4, W0SZJ 3, W0LSJ 2. (Nov.) K0HJL 10, WA0VPK 1.

NORTH DAKOTA - SCM, Harold L. Sheets, W0DM - SEC: WA0AYL. OBS: W0BATJ. PAM: W0CAO. RM: WA0RSR. OO: W0BF. Once again one of our outstanding hams has been called to his reward. K0SPH, our efficient and genial state RO officer of RAC HS, suffered a severe heart attack and passed away on Dec. 18. Delegations from Grand Forks and Bismarck attended services for him. He will be greatly missed. W0BATJ is our new OBS appointee. The Theodore Roosevelt Radio Club of Dickinson elected the following slate of officers: W0BHF, pres.; W0ZCM, vice-pres.; W0RTK, secy-treas.; WA0ZPI, pub. rel. WA0AAD spent his honeymoon in KH6-I and. WA0SJB is on the air with an SB-102. W0BBIN now has a new linear in operation. WA0OVW helped his sister W0BUE get on the air. WA0GQI has left Iceland where he used TF2WLW and now is with the fleet in the Mediterranean. While in Iceland he worked WA0AAD and WA0OVW in the DX contest. WA0IOB is on the air with a new antenna. WA0MSJ spent the holidays in Wyoming; W0WWL went West and South; W0DM spent Christmas with his son in Stanley; WA0HUD has been doing some building. W0DM was awarded the "Man of the Year" award of the Sertoma Club of Grand Forks. TEN reports that WA0RSR and WA0LLQ have been active. WA0YMA is quite busy with his law school work and teaching. K0FRP is on navy duty in the Pacific. WA0SDQ is making plans for covering the Winnipeg-St. Paul snowmobile race with help from WA0AYL.

Net	KHz	CST/Days	Sex	QNI	Tfc.
Goose River	1990.0	0900 Su	4	55	—
NDPCN	3996.5	1830 Su-Su	12	269	29
		0900 Su			
ND RACES	3996.5	1730-1830 M-F	40	1118	97
YL WX Net	3994.0	0730 M-Su	31	686	598
CW Net	3640.0	2100 M-F	21	44	4

Traffic: WA0RSR 115, W0DM 50, WA0REU 40, WA0HUD 32, WA0KKS 22, W0FHR 31, W0CJO 30, W0WWL 28, W0BHT 26, WA0MND 25, K0RSA 25, WA0ZPI 22, WA0SUF 18, WA0SJB 11, WA0PT 7.

SOUTH DAKOTA - SCM, Ed Gray, WA0CPX - WA0YAK of Colome mobilized on his trip to Ore., Wash. and back. He reports that the South Dakota late net came in quite well on the west coast and he also contacted several of the South Dakota amateurs on 20-meters. He also visited some W7 friends from previous QSOs. W0HYQ now is in Sacramento, Calif. and says he is retiring from the service shortly and hopes to be in South Dakota this summer. WA0YRI of Madison now is on 160-meters. The interest of South Dakota amateurs in 160 seems to be growing very rapidly. A number of Brookings amateurs are on 2-meter fm and they are working toward the goal of repeater operation. Net reports: Late Net 1334 QNI, 41 QTC; Early Net 736 QNI, 21 QTC; NJQ Net 471 QNI, 22 QTC; SD AREC Net QNI 36.

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IN THE HOME ...



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\$199⁹⁵ Amateur Net*

The TR-22 is a 2-meter VHF-FM completely transistorized, compact, portable transceiver with capacity for six channels. It can be used over the shoulder, mobile, or in your home. Has a built-in telescoping antenna, and SO-239 connector provided for external antenna. May be used barefoot or with accessory two-way amplifier. Operates on external 12 VDC or on internal rechargeable nickel-cadmium batteries. Has built-in 120 VAC 50-60 Hz battery charger.

SPECIFICATIONS

GENERAL • Frequency Coverage: 144-148 MHz • 6 channels, 3 supplied: (1) Rcv: 146.94 MHz, Xmit: 146.34 MHz; (2) Simplex: 146.94 MHz; (3) Rcv: 146.76 MHz, Xmit: 146.34 MHz • Frequency modulation • Push-to-talk Xmitr Control • DC Power Drain: Rcv: 45 mA, Xmit: 450 mA • Power Source: 12 VDC \pm 20%; 120 VAC 50-60 Hz (for recharging nickel cadmium batteries only.) • Size: 5 $\frac{3}{8}$ " x 2 $\frac{1}{16}$ " x 7 $\frac{1}{8}$ ", Wt: 3 $\frac{3}{4}$ lbs.

RECEIVER • Completely transistorized crystal controlled double conversion superheterodyne circuit. • 1st IF 10.7 MHz • 2nd IF 455 KHz • Antenna Input Impedance: 50 ohms • Sensitivity: 1 microvolt or less for 20 dB S+N/N ratio • Audio Output: 0.7 watt at 10% or less distortion • Built-in speaker.

TRANSMITTER • RF Output Power over 1 watt • Frequency Deviation adjustable to 15 kHz maximum; factory set to 5 kHz.

*PRICE OF TR-22 INCLUDES: Dynamic Microphone, Over-the-Shoulder Carrying Case, 120 VAC and 12 VDC Power Cords, Speaker/Headphone Plug, and 10 Nickel-Cadmium Batteries.

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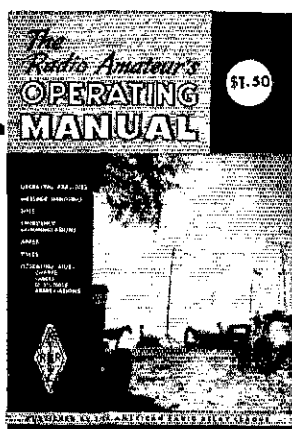
AA-22

Model AA-22 Accessory Amplifier \$149.95. Improves receiver sensitivity and rejection of undesired signals. Provides at least 25 watts output with $\frac{1}{2}$ to 3 watts drive. Fully automatic.

Model MNK-22 Mobile Mount for TR-22 \$6.95



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Want to try a contest, but
not sure what to do?

What is ARPSC? What's
an EC? What is AREC?

Want to know how to work
DX without a kilowatt?

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to the Region Net. Huh?

Setting up a station at a
county fair?

What the heck is the
Wouff-Hong?

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DELTA DIVISION

ARKANSAS — SCM, Jimmie N. Lowrey, WA5VWH — SEC: W5PBZ. RM: WA5TFS. PAM: *A5KJT. Congratulations to W5RXU on passing the Advance. Class exam. WA5YXH and WA5YHN have new Regency HR2s. WA5YMW has received his DXCC and is closing in on 5BWAS. W5KLL has moved to Arkansas. is an ORS appointee and is busy installing towers and equipment and hopes to be operating very soon. WA5WMD is getting a new rig for his station. W5KJT has ordered a new SW-303 receiver. WA5WMC is working towards 5BWAS. K5YCM soon will be mobile on 2-meters. W5OWB has erected a 2-meter beam at his portable location in Arkansas. Net reports for Dec.:

Net	Time/211 Day	Freq	Tfc.	QNI	Mins.	Mgr.
C7K	0100 Dy	3790	37	189	463	WA5TFS
RN	0030 Dy	3995	44	517	600	WA5KJT
PON	2130 M-F	3925	102	346	660	W5MJO
APN	1200 M-F	3937	17	562	1628	W5VFW
DX Info	0045 M	3860				WA5EFL
CAREN	0200 W	146.94/34				W5ODU

Traffic: W5NND 301, W5VEW 43, WA5VWH 19.

LOUISIANA — SCM, J. Allen Swanson, Jr., W5PM — SEC: W5OB. RM: WA5VQE. I hate to start with a little horn blowing but yours truly made the DXCC Honor Roll after 15 years of effort. Mighty proud I am! Total 314/331. Welcome to W5SCOR, a new ham in Amite. W5PFT has resigned as pres. of the Ozone Club and W5CEJ was named pres. to fill Willy's uncompleted term. W5JB continues to be busy handling phone patches to South America. W5KJO reports the Metropolitan Target Area Amateur RC recently graduated 4 Techs. and 8 Generals. Congrats! W5WPO now is operating 2 and 6 with availability on 2 in mobile, portable and fixed. In the last issue of LARK a summary of the club's highlights during the year were discussed. An idea to remind members what actually is accomplished during the year. W5NNUK is active on LAN. W5EA still is working on RTTY installation. W5QVN says that WA5YTA now is an Advanced Class licensee and WA5GP received his Tech. license. WA5VQE requests that all those interested in traffic report in any evening on LAN. Director W4WHN renewed acquaintances at recent meetings of the GNOARC and the Southwest La. ARC. W5SKW, newly-elected pres. of the Southwest La. ARC has been honored as "Ham of the Year" for club and public service. Not many reports fellows! Traffic: W5MI 315, WA5VQE 305, WA5WBZ 60, W5CEZ 45, WA5QVN 27, W5EA 18.

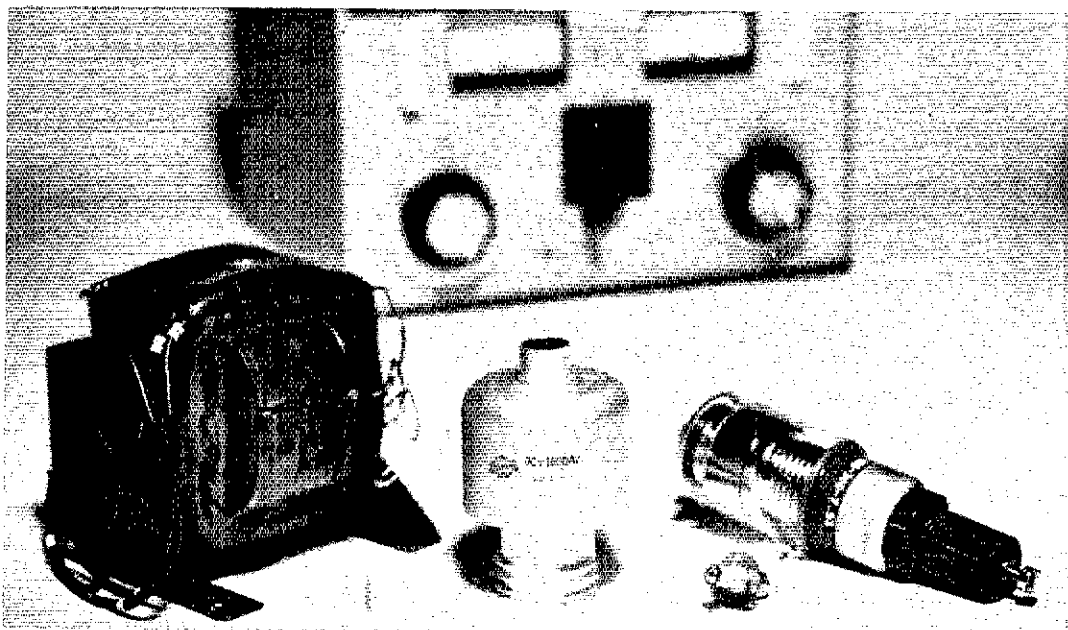
MISSISSIPPI — SCM, Walker Coffey, W5NCB — SEC: WA5JWD/ W5SAHE. RM MTTN: W5SBM. PAM GCSBN: W5JHS. Our sincere thanks for the many expressions of support as your SCM. Appointments: W5SABR, W5BUE, WA5KEY, K5HYE, W5JHS, W5KPS, W5LL, W5PDG, K5MDX, WA5MLW, WA5SNX, WA5TMC, W5TOD, WA5TWL, WA5UJH, WA5VFP, WA5VOR, K5VVM, WA5YNZ, K5YPV, W5WMQ and W5WZ as OPSs; W5JHS, WA5TMC and W5WZ as ORS; W5AO as OO. W5SAHZ passed his General and Advanced Class exam in Dec. Congrats to new General Class licensees W5SAKR and W5BWL, ex-WN9ZJE who is getting ready for the Advanced Class exam. W5AXL built an HW-16 and has 200 OSIs including 15 DX. Welcome to W5SDCY in Long Beach. W5SBM made PSIR and BPL, second month in a row. WA5TMC/5 made BPL. The SEC needs ECs. Give us a hand fellows when he asks you. W5BW now is on 2 with both fm and am. WA5IXC is our consulting engineer on 2-meters. We regret to report that W5NCVL is a Silent Key. Last call for that Natchez Hamfest, Apr. 4th. See you, Traffic: (Dec.) W5SBM 516, WA5TMC/5 169, WA5EIN 116, W5NCB 96, W5WZ 79, W5E1DT 66, W5SAHE 46, W5SABR 39, W5BW 39, WA5YJA 21, WA5KEY 13, K5MDX 4, WA5UJE 3, K5KIR 1. (Nov.) W5SAHE 13.

TENNESSEE — SCM, Harry A. Phillips, K4RCT — SEC: WB4ANX. RM: K4AMC. PAMs: W4PFP, K4MOI, WA4EWW.

Net	Freq	Time/71 Days	Sess.	QNI	QTC	Mgr.
TSSB	3980	2330 T-Su	23	1416	109	K4MOI
TPN	3980	1145 M-F	31	1316	80	W4PFP
		1300 S-Su				
ETPN	3980	1040 M-F	23	575	27	WA4EWW
TN	3635	0000 Dy	31	150	60	K4AMC
E1VHF	145.2		13	153		WB4IOB
ETVHF	50.4		10	49		WB4IOB
ETIM	28.7	0200 W&F				WA4QXC
MTTM	28.8	0200 T&F	9	103		WA4GIS

The MARA (Memphis) is planning to offer code and theory classes and could use some volunteers to help out. If you want to work some good DX with low power you should try 10- or 15-meters while they are still open. 2-meter activity is increasing in the Oak Ridge area and there has been some talk of putting in a repeater. It's

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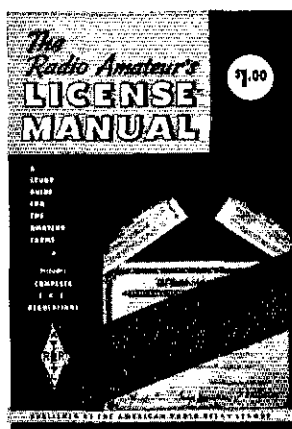
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easy to misunderstand someone when accepting or sending traffic on the crowded phone bands so it is doubly important to have each word clearly understood when handling traffic under adverse conditions. It might be a good idea to have a third party double check as you read it back to the sending station. Have you helped a prospective ham lately? I want to thank those responsible for sending me their club bulletins and hope you will continue. K4LTA had lots of 2-meter mobile fun on his trip to the Sugar Bowl. Traffic: W4OGG 179, W4SQE 97, W4UAZ 73, W4WBK 58, K4AMC 48, W4ANX 36, W4DAJ 31, W4AZBC 29, W4MYZ 27, W4PFP 23, W4GLS 17, W4MPJ 13, K4MOA 9, W4YEM 7, W4CGK 6, W4GSS 6, W4ZXZ 6, K4UMW 4, W4FVW 3.

GREAT LAKES DIVISION

KENTUCKY — SCM, Ted H. Huddle. W4CID — SEC: K4YZU. Appointment: W4ILF as EC, Endorsed: W4MEX as OPS and EC, W4EOR as OBS.

Net	QNI	QTC	Net	QNI	QTC
KRN	447	48	KYN	363	292
MKN	623	119	KNTN	86	53
KTN	1239	264	FCATN	75	16
KPON	79	51			

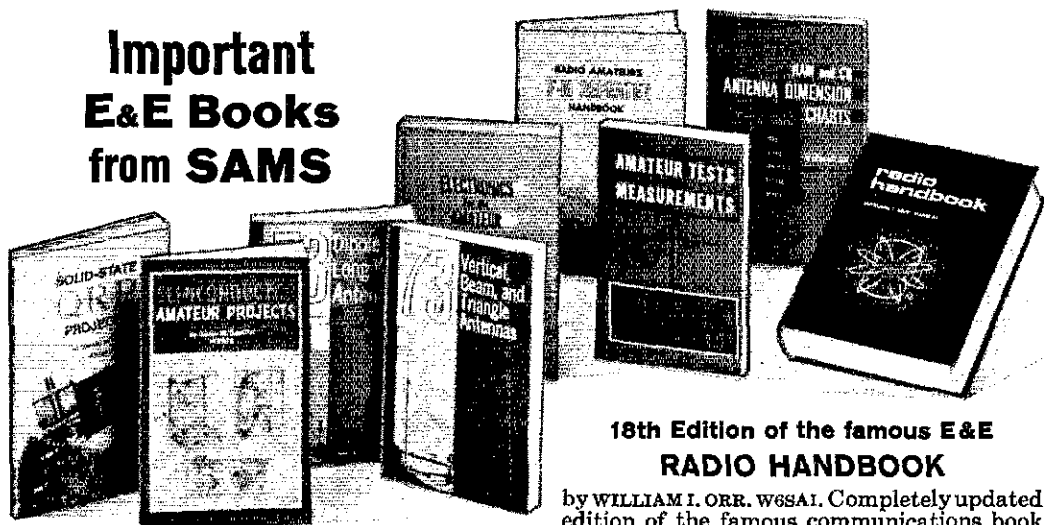
Looks like the Louisville Kenvention will be held this year. Chairman W4NWT is trying to attract some "big name" amateurs for Kenvention activities. W4MXD is back after laying pipelines all over the South. W4MTT has a new SB-102. W4WWA is building a new 4-1000A final. KR6QL (W4UMR) is looking for Kentucky stations around 14300 kHz until Sept. He needs help getting back into the home state. Another call letter license plate drive is mounting throughout the state and should really get going at the summer hamfests. W4QMC passed his Advanced Class exam. Traffic: (Dec.) W4MKH 316, W4NQZ 229, W4LIL 213, W4KPE 195, W4HQW 134, W4VZZ 119, W4BAZ 113, K4MAN 110, W4OYT 95, W4AUN 88, W4EOR 73, K4TRT 60, W4CID 55, W4ADO 51, W4GHQ 51, K4YZU 49, W4MTT 41, K4UNW 40, W4FSX 37, W4GCV 34, W4AGH 33, W4OYL 32, W4PSJ 29, W4DYL 28, W4AXQ 18, W4EQY 14, K4UMN 9, W4BBDG/4 8, K4AVX 7, W4FAF 5, K4HOE 5, K4VDO 1. (Nov.) W4HQW 43, W4ILF 33, W4LFZ 2. Total traffic 2308, reports 33.

MICHIGAN — SCM, Ivory J. Olinghouse, W8ZBT — SEC: W8MPD. RMs: W8PIM, W8RTN, W8WVL, K8KMO, W8BDT. PAMs: W8VXM, W8TAN, K8PVC, K8MIK. VHF PAMs: W8CVQ, K8AEM.

Net	Freq.	Time/Days	QNI	QTC	Sess.	Mgr.
QMN	3663	2300 Dy	1217	566	93	W8PIM
WSSB	3935	0000 Dy	935	238	31	W8VXM
BR/MEN	3930	2230 S-F	905	65	27	W8TAN
UPEN	3920	2230 Dy	537	50	29	K8MIK
PON-Ph	3953	1600 Dy	791	321	31	K8LNE

W8CZJ has joined Silent Keys. Our sympathy to W8WIP in the loss of his wife. New officers for CMARC are W8CRP, pres.; W8ADE, vice-pres.; W8EGI, secy.; W8LAY, treas.; W8TJO and W8LWK, dir. The CMARC theory class started Jan. 13. Muskegon Area ARC officers for 1971 are W8QVP, pres.; W8SARC, vice-pres.; W8EEQ, secy.; K8CCJ, treas.; W8GCVK, act. mgr. Be sure to mark Mar. 27 on your calendar for the Great Lakes Division Convention at Muskegon. K8WRJ and W8UGD are convalescing at home and are back on the nets. GRARA, Adrian ARC and the Association for Advancement of Amateur Radio started code and theory classes in Jan. W8IKC, W8IKF and W8IGT are new grads of the Mason Co. ARC, with K8CKD as instructor. W8BFA and K8NNZ just received their General Class tickets. The Milford ARC set up a booth on Main St. and passed 26 Christmas greetings. K8SWW has 2 new standard 2-meter fm rigs and thinks 2 fm is great. W8BYB has a new 80-meter dipole and QRP rig (100 milliwatts) 80 through 15 meters. W8ETB received a quad and phone patch from Santa and ran a medical emergency patch from Ecuador to Los Angeles, then worked 9XS and J77 for DX. W8VRB has a new tribander up 45-ft. and worked 14 new countries in the first 2 weeks and now has a total of 171. Rick also got the new 80-meter dipole up during Christmas vacation. W8TDY just got his last county in Mich. The Cass Co. CD net meets every Thurs. night at 0130Z on 50.9. MSU (W8SH) club room was broken into and their HRO-500 was stolen. New appointees are K8JHA as OO; K8MIK as PAM; K8ACO as OBS and W8QBE as OPS. W8PIM, W8IZ and W8DUL made PSHR again in Dec. W8MPD reports 32 AREC drills on 50 MHz fm. Traffic: (Dec.) K8KMO 388, K8ZJU 305, W8DUL 259, W8LXY 212, W8IYA 164, K8LNE 143, W8RTN 141, W8PIM 125, W8ZAV 118, W8WZF 108, W8MO 101, W8QGI 90, W8RPY 89, W8IZ 81, W8GRG 78, W8EC 76, W8NOH 76, W8ZBT 75, K8MIK 67, W8ONZ 67, K8SWW 60, W8TAN 59.

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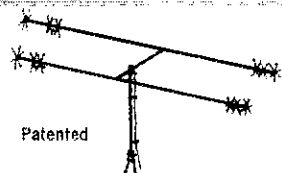


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Single Feed Line	52 ohm
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OHIO SCM. Richard A. Egbert, W8ETU - SFC: W8OUU. RM: W8MIL. PAM: K8UBK. VHF PAM: W8ADU. Dec. section net reports:

Net	QNT	QTC	Sess.	Freq.	Time(Z)	Mgr.
OSSBN	2403	1331	62	3972.5	1530/2345	K8UBK
BN	261	244	62	3580	0000/0300	W8MIL
O8MtrN	398	55	62	50.61	0000	W8ADU
				50.16	0200	
OSN	237	62	31	3680	2325	W8WAK

W8BETX, W8AVS/8, W8QCU, K8ONA, W8DVS and W8TEL made BPL for Dec. A total of 53 BPL cards were sent to 13 dedicated traffickers during 1970. K8ONA made BPL every month of the year. K8BLC is running regular phone patches for servicemen in Guantanamo Bay. OVS K8BHH reports that 2-meter activity is picking up in the Akron area. W8HKK, W8CBU and K8RAT are Silent Keys. The Buckeye Net RTTY session meets nightly at 2300Z on 3605 kHz. Buckeye Radiohams new officers are W8LJV, pres.; W8NTW, vice-pres.; W8ZMU, secy.; W8TTY, treas. Butler Co. VHF Assn. recently elected W8ORT, pres.; W8ULC, vice-pres.; W8TYE, secy.; W8ULW, treas. It was my pleasure to help the Northern Ohio ARS celebrate their first place victory in the two transmitter class of the 1970 Field Day at their Christmas party in Plyra. The club's officers for 1971 are W8LCE, pres.; W8CLJ, vice-pres.; K8KRN, secy.; W8ELO, treas. Newark ARAS leaders for the new year are W8JGE, pres.; W8BPH, vice-pres.; W8NWM, secy.; W8CGR, treas. The Canton chapter of OQWA announces that its new chmn. is W8JIC, vice-chmn., W8CXY and secy.-treas., W8QV. EC W8ERR reports that his ARC/CJ group provided communications for a Lions Club auto show. OSSBN certificates were earned by W8SFD, W8TKM, W8TV, K8TVX, K8UBK, W8UPH, W8LPI, W8UX, W8VYO, W8WLM, W8WPO, W8BYB, W8YLU, K8ZBL, K8ZER, W8ZIF and W8ZNC. O6 MtrN regulars qualifying for net certificates were W8JHE, K8JLW, W8JSM, W8JWS, W8KPN, W8LAD, W8NBN, W8NED, W8PFC, W8SSJ, K8TKC, K8UOZ, W8VUB, W8WCL, W8VWH, W8VVP, W8WJR, W8WPO, W8WQI, W8WUN, W8YHN, W8YWZ, W8ZHR, W8ZRZ and W8ZLU. OVS W8STX reports that the Greater Cincinnati ARA sponsored a booth at a Hobby Craft Show and used hand bills to promote its upcoming code and theory class. W8FTX is a new OO Class 1. Akron area EC W8FOW reports providing communications for the Muscular Dystrophy Drive and "Hike for Hunger". Dayton ARAS RE Carrier reports that DARA's General Class license course was completed with an average attendance of 26 for the twelve-week course. Westpark Radiops 1971 officers are W8IDN, pres.; W8FEL, vice-pres.; W8MEM, secy.; W8FNE, treas. Canton ARCS Deadline reports losing the Sweepstake Trophy to arch rival Massillon ARC. Traffic (Dec.) W8ETX 942, W8AVS/8 580, W8CXY 419, W8QCU 373, W8PMJ 367, K8ONA 366, W8LAG 339, W8IMI 332, W8DSV 318, W8ALU 282, W8GVX 254, W8LPI 188, W8SFD 184, W8DWL 175, W8WAK 174, W8TEL 171, W8RAK 170, K8LGA 156, W8JD 151, W8LT 145, W8UDG 140, W8MOK 139, W8CWD 133, W8NOO 125, W8BYB 121, W8BHL 119, W8VND 106, W8OIK 105, W8OZK 102, W8CWT 94, W8CFL 88, W8CUT 85, W8JH 84, W8DHY 82, K8UBK 80, K8BHH 73, W8GNE 68, W8BZX 65, W8UX 64, W8WSP 62, W8VKE 60, W8OF 54, W8ETW 49, K8QYR 44, W8FGD 43, W8VVL 43, K8LTG 42, W8WVH 41, W8BZK 40, W8HGH 39, K8DHJ 34, W8WPO 34, W8GRG 32, W8LZE 32, W8AIC 31, W8TYE 31, W8GQD 28, W8ADU 27, W8MIL 27, K8BYR 25, K8FT 25, W8QJ 22, W8AJW 20, W8AYC 20, W8BXX 20, W8RSP 20, W8JH 19, W8BET 18, W8ZNC 17, W8SXX 16, W8AJZ 14, W8BPP 14, W8JFS 14, W8STX 14, W8RAK 13, W8COA 13, W8FTU 12, K8RXD 12, W8NAL 11, W8ARW 10, W8B 10, W8CQC 9, W8HLL 8, W8FL 8, W8ERD 8, W8OUU 8, W8PFA 7, W8VRK 7, W8BYR 7, W8DHO 6, W8GRG 6, W8MCR 6, W8MGC 6, W8BPP 4, W8CKI 3, K8CY 3, W8EBS 3, W8AQ 2, W8IO 2, W8VNU 2, W8WEG 2, W8BEH 1, W8FWX 1, W8UPD 1. (Nov.) W8SHP 25, W8ZNC 6, W8YHN 2.

HUDSON DIVISION

EASTERN NEW YORK - SCM, Graham G. Berry, K2SJN - Asst. SCM/PAM: Kenneth M. Kroth, W2VJB. SEC: W2KCC. RM:

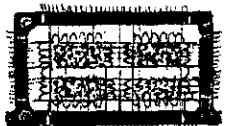
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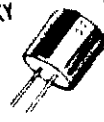
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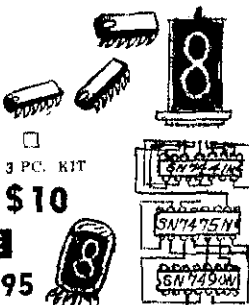
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WA2VYS. VHF PAM: WB2YQU. Section nets: NYS on 3675 at 2300; ESS on 3590 at 2300; NYSPT&EN on 3925 at 2300; ECARS on 7255 from 1200 daily. NYS County Net slow speed training session Fri., Sat. on 3677 kHz at 0045. All net times GMT. On the club circuit: New officers of the Albany ARA are WB2VJB, pres.; WB2KLY, vice-pres.; WB2OHQ, secy.; WB2DXM, treas. In Dec., W2SKL was the speaker at the Westchester ARA Dinner. W2JIO spoke at the Harmonie Hills RL Schenectady ARA Dec. Ladies Night featured a talk "The Historic Hudson" by Emil Sticht. Communications Club of New Rochelle new officers are K2SJN, pres.; WA2VEG, vice-pres.; W2YLE, secy.; WB2VOR, treas.; WB2MOG, sgt.-at-arms; K2JOB, WA2ILQ, WA2VYF, WB2RLS and VK1ZAR/W2, dir. On the nets: New ENY section officers for NYSPT&EN are WB2MWZ, asst. mgr.; WB2VJB, policy committee chmn. WB2HIV is the WNY Net Mgr. ESS mgr. WA2VYS reports total 2615 traffic for '70! Individual station activities: Congrats to W2PY on winning QST cover plaque award for the Nov. antenna article. WA2VOZ acted as dispatcher for the RACES drill in Nov. in Albany and reported on in later issue of the NY state CDC News Digest. Newcomer WN2OPS is teaching class at the Guildland Middle School ARC. WN2OLQ is waiting for the General Class ticket. WA2VOZ and WA2EAH finished a 200-hour job building console for WA2BRA, the Albany Co. RACES Hq. station. WA2DFI is planning a 50-state mobile expedition for the summer months. Send an SASE to him for detailed sked. of when and where or to set up your own. Appointment renewals: WA2MID, K2HNW, WA2VYS as OPSs, WA2VYS, K2UYK, WA2HGB as ORNs; WA2VYS as ENY RM; K2YJC as OVS. Attention club secys.. Please send day and place of meeting to SCM: I plan a full list as soon as possible in the column. Ditto classes by level with day/time information. Welcome to WA2AUC and WB2DKL. Traffic: WA2CRW 331, WA2EBI 181, W2MTA 106, WA2VLS 85, WA2VYS 77, W2ANV 50, WA2FIQ 47, K2SJN 40, W2URP 37, WA2HHO 36, WA2MGT 25, WB2XW 23, WB2VJB 23, WA2EAH 9, WA2AUC 6, WA2JWL 6.

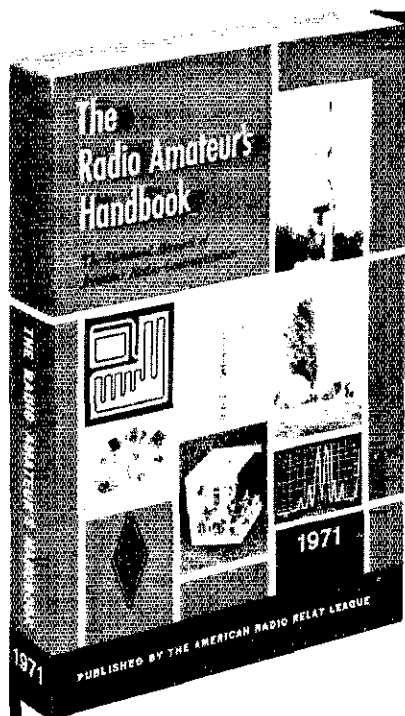
NEW YORK CITY AND LONG ISLAND - SCM, Fred J. Brunjes, K2DGI SEC: K2OYN. RM: K2UAT. HF PAM: WA2UWA. VHF PAM: WB2RQB. The following nets are major ARCC Nets, join one!

Brooklyn	28.64 MHz	50.35 MHz	146.17 MHz
Brooklyn	28.64 MHz	50.40 MHz	145.26 MHz
Nassau	28.72 MHz		145.32 MHz
New York	29.50 MHz	50.48 MHz	
Richmond			147.12 MHz
Queens	29.50 MHz	50.20 MHz	145.62 MHz
Suffolk	29.56 MHz	53.51 MHz	146.82 FM
Brookhaven		50.46 MHz	146.82 FM
Huntington	28.73 MHz	50.46 MHz	145.59 MHz

Note: Nets usually open 2100 local Mon. My thanks to WB2TUL for holding the fort on NLI in the absence of K2UAT. Dan invites all cw enthusiasts to check in on NLI on 3630 kHz at the 7:15 or 10:00 P.M. sessions. (Write to W2DSC NYU for net bulletin). New club officers for 1971: Massapequa RC - WA2IVK, pres.; WB2BHP, vice-pres.; WA2NFI, secy.; WA2EAN, treas.; WA2PUS, rec. secy. Mid-Island RC. WA2EXP, pres.; W2SEU, vice-pres.; K2LCK, secy.; WA2CSE, treas. WB2RBA hasn't really disappeared, he's just buried knee deep in studies at Harpur College. WB2LGA now is active on ssb as well as am (?) and cw. W2LAG, EC for Queens County ARCC/RACES is looking for new members interested in the 10-meter am and ssb nets. Contact him per any Callbook or give a listen for him on Mon. (see above listings). W2DBQ is a new member of the Old Timer's Club. W2PF lost the director and reflector from his beam. "H at first you don't succeed" sure worked for WB2JOW. he's put the General Class ticket under his belt! Congratulations! Well, it's that time of year again! The Annual Rockaway Amateur Radio Club Spring Auction will be in full bloom Fri., Apr. 23 at 8 P.M. at the Irish American Hall, Beach Channel Dr. at Beach 81st St., Rockaway Beach, N.Y. This is the one where everything goes (or comes). Speaking of radio clubs, is yours listed with the SCM. I am often asked for a radio club in my area and where can we get members. Clubs should forward date/time/location information, even a phone number or address to help in getting the two parties together. I'd like again to solicit items of interest for this column. Items should be forwarded to nyc by the 10th if possible, but no later than the 15th. BPLs went to W2DSC and W2TUK. Traffic: W2DSC 532, WB2LGA 281, WB2LZN 134, W2TUK 115, W2EW 96, W2EC 81, K2DGI 35, K2AAS 31, WB2RBA 21, W2LGF 17, WB2FIH 16, WA2LJS 14, W2IAG 13, W2DBQ 9, W2PF 8, WB2HWI 3.

NORTHERN NEW JERSEY - SCM, Louis J. Amoroso, W2ZZ - SEC: K2KDO. RMs: WA2BAN and WA2TAF. PAMs: K2KDO, K2SGX, WA2TAF and WA2TBS.

Net kHz Time (PM) Days Sess. QNI Tfr. Mgr.
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NASN	3740	8:00 Dy	18	49	28	WA2DRH
NJPON	3930	6:00 Su	4	29	69	WB2FEJ
NJEPTN	3950	6:00 M-S	32	696	400	WA2TAF
NJAN	50425	8:00 M-F	23	186	22	K2SGX
PVETN	145710	7:30 Dy	33	674	324	K2KDO
ECTN	145800	8:30 M-S	12	43	21	WB2YPQ

New appointments: W2FJK as OO Class III and IV. Both NIN and NJEPTN set traffic total records with the Christmas rush. Congratulations to the mgrs. and NCSs. BPLs issued for the year has WA2EPI with 6, WA2FRZ 5, K2DEI and WA2BAN 4 and K2KDO with 3. PSHR listing totals for 1970 give WA2DRH and WB2FEJ with 8 and WA2BAN, WA2EPI, WA2FRZ with 6. Congratulations to all. A new group called the Carteret Amateur RC meets the 1st and 3rd Thurs. of the month at the Carteret Free Public Library. The officers are WB2EYC, pres.; WN2JZR, vice-pres.; WB2YTPW, treas. Code classes are included. WA2ASM is enjoying DX with his Extra Class ticket. WB2POW has a new Clegg-22. WA2JXE joined Navy MARS. WA2NLP put up a new trap dipole. WA2AYZ is building a TU for his RTTY. WA2EUX won 1st place in the N.J. in the Wash. state QSO Party. WA2LDX took 1st in the W.Va. QSO Party. The West Jersey RC officers for 1971 are W2BWL, pres.; WA2IDU, vice-pres.; WA2IUR, secy.; WN3PHL, treas. New officers for the Fairlawn ARC are WN2MEL, pres.; W2NPT, secy.; W2TWW, treas. WB2BCS is looking for members for his RTTY net in Ocean and Monmouth County. WN2RTW is a new ham in South Orange. K2CBG is building the SR-500 transverter. W2CVW has a twenty-element beam for 432. K2SGX has a new eleven-element 2-meter beam. OO reports were received from W2TPJ and WB2NYK. WA2DIG is home from the hospital and doing I.B. Traffic: (Dec.) WA2EPI 1238, WA2BAN 776, WA2KHQ 522, WA2JNO 377, WB2TUL 377, WB2VPR 374, WB2OHV 303, WB2DDQ 286, WA2DRH 281, WB2RKK 200, K2RXQ 182, WA2FUI 180, WB2WNZ 144, K2OQI 115, WA2DMH 114, WB2BCS 85, WA2FVH 81, K2DQT 74, WA2JNO 70, WB2YPO 68, WA2JXE 56, WA2RBY 54, WB2IAE 52, W2CVW 43, WA2EUX 41, WA2JIM 41, K2MFX/2 40, W2EWZ 38, WN2MXY 33, WA2LDX 30, W2ZZ 29, WA2CCF 18, K2SGX 17, K2EQF 13, WA2UOO 13, W2ABL 8, K2CBG 8, W2PEV 8, W2TFM 4. (Nov.) W2PLV 47, WB2BCS 4, WA2UOO 4.

MIDWEST DIVISION

IOWA - SCM. Al Culbert, K0YVU - SEC: K0LVB. New appointment: K0LUZ as ORS. W0GO lost his beam in the storm after the New Year, hope too many didn't have the same fate. Cedar Rapids now has a licensed 2-meter repeater on 146.34 in with a 2000 cycle tone access and 250 watts on 146.94 out and the call WA0VVA. Welcome back to W0WIT after a year in EA6-Land. Congratulations are in order for K0AZJ, W0DIT and W0EFN for their fine showing in the Nov. FMT. W0EFN is a new OO and is doing a fine job. Speaking of some well deserved congratulations, at the Dec. meeting of the Des Moines Radio Amateur Assn., W0LCX was presented the Winthrop J. Major award for his contribution to the growth and stature of amateur radio in Iowa. Red recently earned his 100th BPL. For you non-traffic types, just examine the requirements for BPL and contemplate the effort and time required to achieve this for 100 months. K0LKH has finally completed WAS after futile attempts from 4 other locations.

Net	GMT	MHz	QNI	QTC
Iowa Fone	1830	3.970	1532	172
Iowa Fone	0000	3.970	1344	86
FLCN (cw)	0030	3.560	247	194

Traffic: (Dec.) W0LCX 1287, WA0VKI 377, K0AZJ 192, W0MOQ 92, WA0AUX 91, WA0VZH 82, WA0ZID 75, K0LUZ 59, K0JZ 45, WA0YJW 18, WA0AIW 11, WN0AAM 9, WA0OTQ 9, W0BBW 7, WA0EFN 4, K0LKH 2. (Nov.) K0JCH 39, WA0EFN 4.

KANSAS - SCM, Robert M. Summers, K0BXF - SEC: K0LPE. RMS: K0MRI, WA0TZK. PAM: K0JME. VHF PAMs: WA0CCW, WA0TRO. A new year always brings new election results and from the Johnson County Radio Amateur Club we find WA0ZJY, pres.; WA0UMH, vice-pres.; WN0CEF, secy.; W0HAJ, treas. The Wichita Amateur Radio Club reports WA0UIT, pres.; K0WOP, vice-pres.; WA0ZIG, secy.; WA0VIO, treas.; WA0ZYU, pub. dir.; WN0AJU, cir. mgr. WARC also was active in the 1970 SS with claimed score of 104,086 points on cw and 73,140 points on phone. The Jayhawk Amateur Radio Society, Inc., Wyandotte County and KC area elected W0MCH, pres.; W0AYL, vice-pres.; WA0PKF, secy.; K0BXF, treas.; WA0PRO and K0VQA, board; WA0BQI, appointed to fill the unexpired term of W0MCH on the board. Zone AREC information is missing with one exception Zone 1. SFC K0LPE has been on the sick list. WA0OZP KC Zone 1 reported a total QNI of 160 and QTC 2 on both his 75-meter and 2-meter AREC nets. The Kansas Post

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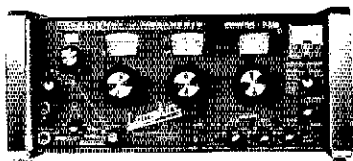
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Office Net report for Dec., QNI 1869, QTC 541 in 31 sessions. Congratulations to W0CHJ on earning his WAC. Kansas CW Net QKS total for Dec., QNI 526, QTC 427 in 62 sessions making the year total of QNI 5596, QTC 2493 in 735 sessions. KSBN for Dec., QNI 1295, QTC 173 in 27 sessions and KPN, QNI 236, QTC 14 in 17 sessions. Year-end totals KSBN, QNI 9945, QTC 1135. KPN, QTC 2575, QTC 230. KWN in 31 sessions Dec. QNI 751, QTC 51 and for the year QNI 7434, QTC 416. Kansas EC Net now meets Sun. 1 P.M. on 7278. All are welcome to QNI. Traffic: W0INH 823, W0HI 486, K0MRI 247, W0LBB 184, W0NEE 165, W0LLC 126, W0MA 106, K0JMF 82, K0BXE 70, W0JFC 60, W0CHJ 50, W0UTT 35, W0FCC 32, W0GJ 28, K0LPE 24, W0GUR 22, W0ICV 20, W0SEV 19, K0CII 14, W0QOWH 14, W0SRO 14, K0JD 13, K0KED 13, W0BGX 12, W0FJJ 11, W0MCH 9, W0PB 8, W0OZP 7, W0LYC 4, W0SXR 3.

MISSOURI - SCM, Robert J. Peavler, W0BV - SEC: W0ENW. New appointment: W0IH as RM.

Net	Freq.	Time(D)/Days	Sess.	QNI	QTC	Mgr.
HBN	7280	1805 M-F	23	756	84	W0LPA
MoPON	3933	2300 M-S	41	549	115	W0ATA
MEN	3905	2330 MWF	13	145	9	K0KUD
MoSSB	3963	2400 M-S	28	1455	197	W0RTO
MON	3585	0100 Dy	28	173	162	K0AEM
MON 2	3585	0345 Dy	31	124	57	W0HH
PHD	5045	0130 Tu	4	110	4	W0KUH

W0RTO reports QNI 47, QTC 4 per session on MoSSB during 1970. W0LTP reports a 2-meter net, as yet not named, which meets at 0200Z on 145.3 MHz every night in the Kansas City area. New officers of the Northeast Missouri Amateur Radio Club are W0YRI, pres.; K0EMF, vice-pres.; W0UOX, secy.-treas.; W0DHR, act. mgr. New officers of the PHD Amateur Radio Association are K0EET, pres.; W0WPU, vice-pres.; W0SOK, secy.; W0ZCO, treas.; W0WWO, act.; W0KUH, editor; W0ZSU, pro.; W0YOW, pub. W0DHP in St. Louis, ex-W0EEC, ex-W0OGF, ex-W0NGF, has returned to amateur radio after 20 years. Congratulations to: W0YZS, who passed the Extra Class exam and first class phone; to W0BLUO, who passed General Class, and to new Novices W0NDCK and W0NDDP. K0JPI has built the ST-3 RTTY converter described in QST and it works very well. W0YCN got a new receiver for Christmas. Traffic: (Dec.) K0ONK 1785, K0AEM 439, W0HI 302, W0BV 210, W0HTN 209, W0LPA 125, W0ATA 48, W0OUD 35, W0WLN 24, W0KUH 10, W0HVI 6, W0YCN 4. (Nov.) W0LPA 48, W0HVI 13.

NEBRASKA - SCM, V.A. Cashion, K0OAL - Asst. SCM: Velma Sayer, W0GHZ. SEC: K0ODF. Congrats to the following new officers: Lincoln ARC - W0YHF, pres.; W0OVL, vice-pres.; W0WKP, secy.-treas. Hastings ARC - W0JUF, pres.; W0FNY, vice-pres.; W0QGB, secy.-treas.; W0UJZ, trustee. The President's Committee on Employment of the Handicapped announced that K0VTD and K0ULQ will receive the 1971 President's Trophy in Apr. at Washington. Congrats. Blizzard conditions hit portions of South Central to Eastern Neb. beginning 1971 with a jolt. Many amateurs had their hands full passing information regarding stranded motorists, road conditions, etc. Renewed appointments: W0VOR, W0ADXY, W0EWZ and W0HQE as ECs. New appointment: W0CAU as OBS. Dec. net reports:

Net	Freq.	GMT/Days	QNI	QTC	Mgr.
NSN I	3982	0030 Dy	1260	56	W0LOY
NSN II	3982	0130 Dy	962	49	W0LOY
Neb 160	1995	0130 Dy	676	4	W0CBJ
NEB	3590	0400 Dy	176	57	W0HWR
NMN	3982	1330 Dy	1124	30	W0JUF
WKN	3950	1400 M-S	571	95	W0NIK
AREC	3982	1430 Su	185	1	W0LRZ
CHN	3980	1830 Dy	1147	87	W0GHZ
DFN	3982	2200 Dy	487	14	W0FNY
DEN(Nov.)	3982	2200 Dy	488	0	W0FNY

Traffic: W0LOD 218, W0CAU 62, W0CBJ 42, W0NIK 41, W0HWR 40, W0GHZ 39, W0TMY 32, W0DMY 28, K0OAL 24, K0UW 19, W0LOY 18, K0ODF 18, K0RPU 16, W0PCC 16, W0OQX 15, W0BEI 14, W0YNT 13, W0AGK 12, K0DGW 10, W0YFR 10, W0KPA 8, W0FPP 7, W0BEI 7, W0QEX 7, W0VEA 7, K0HNT 6, W0YGI 6, K0EJT 5, W0JUF 5, W0RPR 5, W0ADH 4, W0HAL 4, W0JH 4, W0JA 4, K0SFA 4, W0SWG 4, W0TMM 4, W0BOK 3, W0LJO 3, W0OKC 3, W0SPF 3, W0LRZ 2, W0PFF 2, W0RAM 2, W0WKP 2, W0SGA 1.

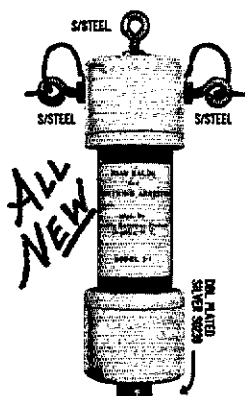
NEW ENGLAND DIVISION

CONNECTICUT - SCM, John J. McNassari, W1GVT - SEC: W1HHR. RM: K1EIR. PAM: K1YGS. VHF PAM: K1SXF.

Net	Freq.	Time/Days	Sess.	QNI	QTC
UN	3640	1845 Dy	31	305	404

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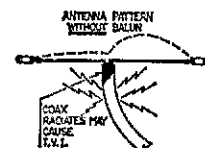
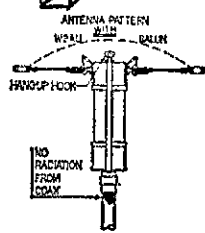
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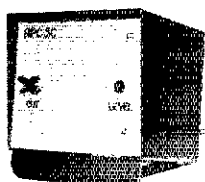


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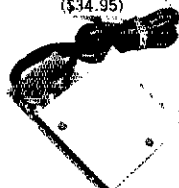
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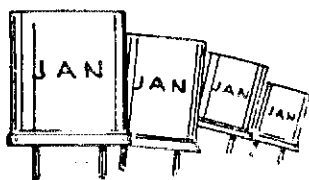
CPN	3965	1800 M-S	31	478	208
		1000 Sh			
VHF 2	145.98	2200 M-S	23	86	59
VHF 6	50.6	2100 M-S	23	124	55

High QNC: CN — WAIGFH, WIKV and KIFIR. CPN — WIDQJ, WIGVT, WIMPW, KISXF and KIYGS. SEC WIIHR has the 10-meter fm net in his area. Please report AREC activity and club effort on EC work to him each month. Director WIOV expects the Tri-City Hamfest to be held during Apr. It's always a very good one so make plans now to attend. Club bulletins contain lots of information and are a credit to the members who get them out. Danbury CARA and Southington SAKA enjoyed their respective Christmas Party Meetings. Murphy's Marauders held their Annual Banquet Meeting — their 4th year of threat to ALL other contest clubs, to join, contact KIVTM. Straight Key Night and the 160-Meter Contest brought memories and activity to many. With regret we add WIBNH to the list of Silent Keys. All clubs are requested to promote activity during the coming Conn. QSO Party sponsored by the Danbury CARA, Apr. 3, 5. Please help in making Conn. QSOs available to other states. Congratulations to: WNIMBE on the CP-20 sticker; KIVTM on making USA - CA 3000; and to WIFNZ on making 346 contacts on 2-meters with a half-watt output! Now is a good time for "preventative maintenance," check your rig! Traffic: (Dec.) WIEJ 433, WIEWF 405, WAIJVV 307, KIFJR 291, WAIGFH 202, KISXF 146, WIMPW 101, WICTT 90, WAIHSN 87, WAIHOL 86, KIEIC 73, WIGVT 72, KIYGS 49, WAIJMO 41, WAIJQC 41, WIOV 28, WIFWL 22, WAIJGA 19, WIDQJ 18, WIIYBH 18, WIDBI 16, WIIHR 14, WIAW 6, WICUII 6, WIIWE 2, WIIYB 2. (Nov.) WIEWF 312, WIIHR 20.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, Jr., WIALP — SEC WIAOG received reports from: WILE, KIS DZG, NEW, ZUP, WAIJDX. WAIHFE worked W4s on the 6-meter opening and also has taken over as PAM for 2-meters. We thank WAIJAD for his good job as PAM. WIAUO is back as OO. Endorsements: WIS ABC, PEX as ORS. WIIHV has moved and will operate mobile or as KICXP in N.H. Sorry to report WIBNZ, WIFUW and WIKON husband of WIMJE as Silent Keys. WILR, KIKBB, WIALP attended a meeting of the Mass. Emergency Communications Commission in Boston. WAINLX has 32 S-1 and 30 L-1 on the air. The T-9 Radio Club met at WIMVQs. VE7AUA is in Calif. The Barnyard Net had 652 QNTs. 27 traffic. KIEPL reports the New England Emerg. Phone Net had 4 sessions, 100 QNTs, 6 traffic, also that the Barnstable RC hold code and theory classes at the Community Bldg. in W. Yarmouth, Thurs., 7 to 9:30 P.M. The South Shore Club had a Christmas Party. WNIYIM is new in Manchester. EM2MN had 24 sessions, 200 QNTs, 286 traffic. WNTNKE has his Advanced Class license and is trying to get Phillips Academy, WISW on the air. The 6-Meter Crossband Net had 20 sessions, 56 QNTs. Somerville ARC, WAIMHN has a new twelve-element DX Colinear for 2 and a six-element beam for 6. WAINVC is now a Tech, K8JLH is a busy man at WIMX and WIAE. WAINVI has a 2-watter on 80-40-20 cw. WIAUQ has a Drake R-4B and an SB-200 linear. WAIJPSI made PSHR. WAIHRY has WAS. Endorsements: WIDOM as OBS, WAIHRY as ORS, WIMNK as EC. WIOJM, WAIYY made BPL. WIFJN is on 6 and has DXCC. WIMX is tooling up for the DX test. WNIMSB is on 15 and in the Novice Net. WAIKZE and WNIWRV are in Murphy's Marauders. WIOB is spending a lot of time in Granite, N.H. since his retirement. KICLM has been endorsed as OPS and WIBB as EC and OO. WAIJDC was NCS for CPN. KIWVW is EC for Hopkinton. WAINXY is KIGLB's brother. WIBW has a new frequency counter. WIKP is in the hospital. KIVJI went to Seattle. Bill Wright spoke at the Middlesex ARC on computers for the medical field. Roger Allen of WRKO and WROR spoke on "Programming the News" at the Quannapowitt RA. These counties make up this section: Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, all others are in the Western Mass. section. Another nice copy of EMMENs. K7OIR has a new 1-kw rig and is looking for the gang back here on 10-15-20. Thanks for the many greeting cards, gang. There was a nice write-up in a Boston paper about WIKI helping a Bolivian boy to come to N.Y. for an emergency eye operation. WIRKP writes he is getting active again and has all of his Dad's equipment (WIOPT) and his boy is also getting interested. Traffic: (Dec.) WIOIM 605, WAIYY 581, WIPX 399, WAIJAD 345, WIABC 176, WAIHFE 143, WIEMG 120, WIATX 96, WAIJYM 96, WIMNK 80, WAIMFG 67, WIRQL 64, WAIKZE 63, KIPRB 61, WIUX 54, WIAOG 49, WIPL 42, WIFIN 33, WIMX 32, WIDOM 31, WNIMSB 13, WAIJDC 12, KILCO 10, WAIJNM 6, WILE 4, WAIJEL 3, WIAYG 2, W2TPV 1/2. (Nov.) WAIJPSI 152, WIMX 34, WAIJNM 24, WAIKZE 9, WAIJMH 5.

MAINE — SCM, Peter E. Sterling, K1TVF — SEC: K1CLE. PAM: WAIJCM. RM: WIBJG. WAIMZA is active on 15-meter cw and is willing to schedule any novices that need Maine. KIRSA still

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is trying to convert his DX-40 to 6-meters. RTTY can be heard most any night of the week on 2-meters. I am very sorry to report the passing of WISDE who ran the Horse Trader's Net and also helped out many hams that needed him. He was active in the Sea Gull Net and on the vhf bands as well. I am also sorry to report the passing of WICZE who was very active in Army MARS. New hams in Maine are WN1NUM, WN1NVX, WN1NVZ. WA1JTT is building a new SB-220 linear and hopes to have it going soon. WA1JVZ now is on 6-meters ssh. New officers for the Portland Amateur Wireless Assn. are WA1JTT, pres.; WA1KVY, vice-pres.; WN1NYD, secy.; W1BTR, treas.; K1GAX, chief op.; K1TEV, asst. op. I still am looking for news for the column. Traffic: (Dec.) WA1FCM 344, W1RJG 332, W1YA 56, K1TEV 17, K4BSS/1 10, W1OTQ 10, WA1JCN 3. (Nov.) W1RJG 275.

RHODE ISLAND - SCM, John E. Johnson, K1AAV - SEC: W1YNE, RM: W1BTV, PAM: W1TXL, VHF PAM: K1TPK, RISP report: 31 sessions, 618 QNT, 86 traffic. Fidelity ARK, K1NOG, reports that members Tod O'Sullivan and Mark Beezer are waiting for their Novice tickets. W1QLD and K1UNW are on the 160-meter Grey Hair Net. WN1MMF finished building his HW-16 and now is on the air. WN1MPU has completed his new shack. The club had a very successful exhibit at the Warwick Mall and handled almost 100 pieces of traffic from the exhibit. The club has several members using Ten-Tec according to WN1MPU, secy. The W1AQ Club of Rumford held their election of officers recently. Elected were WA1IUR, pres.; K1AGG, vice-pres.; WN1MUO, secy.; W1DK, treas. The club will hold several fund raising programs to complete additional renovations this summer. K1CZD and W1DK recently completed the installation of a 40-meter antenna for the club. Traffic: W1TXL 270, K1QFD 35, K1VYC 13, WA1HBW 6, WA1JST 5.

VERMONT - SCM, E. Reginald Murray, K1MPN -

Net	Freq.	Time(Z)Days	QNT	QTC	Net Mgr.
Gr. Mt.	39.32	2230 M-S	375	15	W1JLZ
Vt. Fone	3955	1400 Su	100	4	W1KKM
Carrier	3945	1400 M-S	574	38	W1BLC
VTPO	3909	2300 Su	72	24	K1BQB
VTSH	3909	2230 M-S	469	82	W1HSG
		1300			

Welcome to WN1NUR (St. Albans). We all sincerely thank the crew that has been working on getting the repeater W1KOO back to normal. WA1LQV has a new 2-meter fm rig. Another Green-Up Day in Apr. Your help is needed again. The VTNH Net is still alive but needs Vt. check-ins. Traffic: K1BQB 178, WA1GKS 125, K1MPN 23, K1VGF 12, W1KJG 4.

WESTERN MASSACHUSETTS - SCM, Percy C. Noble, W1BVR - SEC: WA1DNB, CW RM: W1DVW, PAM (75-Meter): WA1MFB, PAM: W1KZS (Berkshire Co. 6-Meters).
Section-Wide nets are:

NTS	WMN (cw ttc.)	3560	7:00 P.M. Dy
NTS	WMFN (phone ttc.)	3915	6:30 P.M. MW
AREC	WMN	3935	9:00 A.M. Su
	Berkshire Cty	50280	6:00 P.M. Su
	HCRA	145 350	9:00 P.M. M
	HCRA Conn. Valley	28700	8:00 P.M. W

If any have been omitted, please advise. SEC WA1DNB has a beautiful AREC setup covering Hampden and Hampshire counties utilizing 80-cw, 75-, 10-, and 2-meter Ph. RM W1DVW reports that WMN had 183 QNTs during Dec. and handled 192 messages. Top five in order of attendance: W1BVR, WA1LNF, W1ZPB, WA1LPJ, K1SSH. PAM WA1MFB reports for the first nine sessions of the newly-formed WMFN: 47 QNTs and 31 messages handled. Attendance: WA1IZS, W1CSF (7 sessions), WA1MFB, K1GVN, WA1GXN, WA1LPJ (4), WA1LNF, WA1LPJ, K1NWE (3). Controls: WA1MFB, WA1IZS, WA1LPJ, WA1LNF. Incidentally, WA1MFB now has his Advanced Class license. W1ZPB is really pumping out the ARRL Official Bulletins - 40 transmissions during Dec. W1EOB has a new SB-200, WA1BXQ has a new Swan 350 and vertical, W4GS (W1VC in summertime) has a new SB-102 on the air from Pompano Beach, Fla. From the MARC Bulletin: Ex-W1BNO now is W4TTB. W1LTY is at the Keystone Nursing Home. From the HCRA Bulletin: The Dec. speaker was Les Cushman. New members: K1FUG and K1HFF. Note to club editors - for insertion in QST please be sure to use ham calls (not just names). Traffic: K1SSH 457, WA1BXQ/1 283, W1ZPB 187, W1BVR 105, WA1LPJ 102, W1HHI 67, W1DVW 52, WA1LNF 44, WA1MFB 35, W1EOB 9, W1YK 5.

NORTHWESTERN DIVISION

ALASKA - Acting SCM, Kenneth R. Klopff, K1EVO - K1LCAH racked up 426 in traffic. While the Anchorage area wants snow so they can operate their homebrew portable 40-meter

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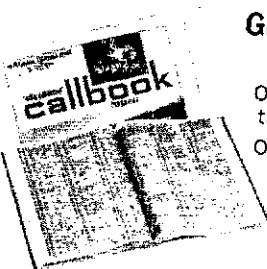
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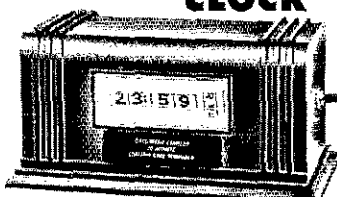
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transistor rigs in the field, the interior is wallowing in a record snow burden and staying close to their home stations through desire or necessity. The Aleutian stations are watching their antennas sway in the balmy breezes. Heard that on the air they use the buddy system when forced to brave the elements. North of Billingham, KL7MD is working the novice portion of 40-meters as well as some ssb. KL7HEE is keeping 160-meters from freezing and after a 20-meter QSO with UK9OAW got a 160-meter SWL confirmation from him. KL7HEE also has a 160-meter schedule going with ZM1AYG who has given some good reports. KL7CL in Talkeetna is another regular on 160. VR6DO in Hongkong has nice 75-meter signals in Alaska and the Cook Inlet crew also have been logging European stations on 75. Of course the low end of 80-meters is great for DX fishing too. KL7FNM and OM, KL7FNL and co-horts have started quite a few novices in Tanana. Novices please check into the net on 3735 and meet each other. The speed adjusts to the slowest station, sometimes because of conditions. A recent check-in is W17HBC in Tanana. Pass news items to SCM via 3915.

IDAHO - SCM, Donald A. Crisp, W7ZNN - SEC: WA7EWV. The FARM Net meets each day on 3935 kHz at 0200 GMT. The Idaho RACES Net meets week days on 3990.5 kHz at 1515 GMT. The PO Net meets Tue., Thurs., Sat. (GMT time) on 3930 kHz at 0130 GMT. W7WLV is installing a "Y" beam at his new QTH at Sage. WA7FFZ now is KL7HEO at Douglas, Alaska. North Idaho hams are using 3930 kHz as a contact and rag chew frequency. New officers of the Lewiston club are: WA7F10, pres.; WA7EWV, vice-pres.; WA7JHZ, secy.-treas.; K7THX, W7AOO, W7VIO, W7YRX and Russell Radke, dir. W7HUI is teaching a Novice course. WB6MA/7 at Orofino has a new SR rig. WA7NBI is building a 160-meter transmitter and converter. FARM Net report: 138 traffic handled, 1269 check-ins, 31 sessions. P.O. Net: 51 traffic handled, 100 check-ins, 12 sessions. Traffic: K7KBX 354, W7GHT 133, WA7BDU 99, W7HY 69, W7ZNN 19, K7CSL 12.

MONTANA - SCM, Harry A. Roylance, W7RZY - Asst. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7IZR, VHI-PAM: W7IAC. Welcome to the following new hams in the section: WN7PYR, WA7PZE, WN7PZS, WN7PZX, WA7QAP, WN7QAS. Radio clubs in Billings, Missoula, Helena and Butte are conducting classes in radio and code. Helena claims to have 25 hams on 2-m. K7LTV is on with a six-element beam. Anaconda Radio Club officers for 1971 are K7OEK, pres.; WA7NAA, vice-pres.; WA7KYQ, secy.; Fred Whaley, treas. WA7MCU built a digital 24-hour clock and not from a kit either. The Butte Radio club held its annual Installation Party Jan. 16. WA7KGR is being transferred to San Diego. WA6MDL and WA6OJU are proud parents of a boy. W7RXL's XYL was selected Montana Teacher of the Year. It is noted that we have about 1100 hams in Montana and only 139 in the ARRL. We can use a lot more ECs and other appointees. Your SCM would like to receive a few more reports from the present appointees. Traffic: WA7JQS 291, W7LBR 117, WA7ZR 29, K7EGJ 26.

OREGON - SCM, Dale T. Justice, K7WWR - SEC: W7HLE. PAM: K7ROZ. Section Nets - WA7GT reports for the ARRL Net, sessions 26, traffic 25, contacts 26, check-ins 404, maximum number of counties 14. WA7KIU reports for the OSN, sessions 22, traffic 45, check-ins 123. New appointment: WA7ADW as EC for Josephine County. He replaces W7DFM, who receives our thanks for all outstanding job through the years. The SAUSDN met in Coos Bay twice during Dec., with good turnouts both times. Oregon made a good showing during the 160-meter test with seven stations on the air. WA7GMP has a new quad and tower, all home brew. WA7LDZ received 58WAS, with all contacts made during 1970. Traffic: K7ROZ 226, K7QIG 355, K7NTS 189, WA7HIS 125, WA7KIU 101, K7OUP 92, WA7KRH 38, K7WVR 35, W7HLE 27, W7BFX 20, K7KPT 17, W7MLJ 11, WA7MOK 10, W7LT 8.

WASHINGTON - SCM, Harry W. Lewis, W7JWJ - WA7HCL now is serving as NSN Mgr. and WA7OCV as NSN recorder. The Lower Columbia Amateur Radio Association, W7NCW meets the 1st and 3rd Thurs. of each month at 8:00 P.M. in the Civil Defense Headquarters. New officers of this group are W7DYZ, pres.; WN7MXE, vice-pres.; WN7OMX, secy.-treas. The new officers of Clallam County Amateur Radio Club are W7AIB, pres.; W7HWU, vice-pres.-treas.; WA7LHT, secy.; W7LG, trustee. Listen for code practice sessions Mon. at 7:30 P.M. on 3735 kHz with WA7IKZ pounding the brass. W7UBA is the new pres. of The Radio Club of Iacoma and W7BJN is vice-pres. W1RVP/7 has been active from the Seattle area where he is stationed with the USCG. He is looking for 15 more QSOs to SWAS. W7PI has now retired. Heard him on one night, check-in to WSN, RN7, PAN, TCC, NTN, WARTS, CBN and NWSSB. W7AXT, who originates more traffic than anyone in Wash., has now added RTTY to his station operation. W7BQ now is working on new digital frequency meter and running the tech net



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each Sun, at 3 P.M. on 3970 kHz. Want to pick up some Extra Class information? Tune in the Tech Net! W7JWJ is teaching Extra Class theory at the North Seattle Community College and active 7 from the same location. Winter AREC activity shows 229 stations full AREC members and 8 local emergency AREC nets active. More active ECs are needed in Wash. Tune in the AREC Net each Sun. morning 10:00 A.M. on 3930 kHz. Several Wash. nets were loaded to capacity handling SET traffic in late Jan. while many net members spent long hours over a hot key attempting to route the traffic through to its destination. Traffic: W7BA 1340, W7PI 537, W7DZX 420, W7AXT 238, W7BQ 238, W7HFKR 235, W7JFY 116, K7CTP 104, W7ZEL 70, W7JWJ 43, WA7EDQ 40, WA7LMO 40, W4UWZ 7 40, W7APS 29, WA7BTB 18, K7KPA 16, W7IEU 15, W7AIB 14, K7SUX 13, W7GYF 76.

PACIFIC DIVISION

EAST BAY — SCM, Paul J. Parker, WB6DHH — RM: WA6DIL. All appointees be sure to send your certificates in for notarization if you did not do it last year. This must be done to keep your appointment up to date. WA6DIL would be more than happy to hear from anyone in the section who is presently engaged in cw traffic-handling. W6AKB is back in town after long vacation in San Diego. W6CBF is recovering from the holidays. WB6UMT is busy with three different net check-ins with a one hour time interval. W6ZF has been faithfully transmitting the Pacific Division bulletin on the 1st and 3rd Mon. at 0400 GMT on 3540 kHz. Transmissions last approximately 1 to 1½ hours in length and make FB code practice. W6IPW made the BPL list with over 500 total traffic count in Dec. He was Santa Claus to a lot of people with this FB message/traffic count. All who are interested in traffic work, please get in touch with me and I will do my best to put you in touch with a net that will suit your interests. This is a very rewarding amateur contribution and I would like to see more members in the section taking part and receiving the benefits from this form of service. If you were wondering where your name was this month and would like to have others know that you are still on the air and enjoying your hobby, please send me a short note describing your activities. Address appears on page 6. Traffic: W6IPW 515, WB6UMT 47, WB6VLEW 27, W6ZF6.

HAWAII — SCM, Lee R. Wical, KH6BZF — Sometime between Apr. 1 and July 1, 1971 WVVH will relocate from Puunene, Maui to Barking Sands, Kauai. At such time it may become necessary to shorten WVVH's transmission schedule from the present 24-hour continuous operation to a 12-hour daylight period. WVVH is conducting a survey of users to determine what the impact such a curtailment would be of their operations. Write your comments to KH6JIK, Sadami, Chief Engineer of WVVH, Box 578, Puunene, HI 96784. KH6JQ, now is signing 76! KH6BJ/6 and family returned for an Isle visit and stopped at KH6BZF's. KH6OR and others for eyeballs. KH6CHL, KH6BWT and W9YFW and XYL dropped by KH6BZF's QTH. K5CIT/KH6 is assigned to the CINCPAC Staff. WB6ZXB/KH6HHH and XYL, KH6HJI, ex-WB6ZXE have opened their new Lafayette Radio Electronic outlet on 1111 McCully Street. KH6GMP was signing /K5G. KH6GKD has a new SB-220 linear. K2HBA/KH6 has been doing a bang-up job as OO and Intruders Watch. PAM KH6GJN has been doing a great job on the Confusion Net. KH6HJ reports that WA7NFW/KH6HDM is on with a new Swan-350. W0BWJ/KH6/AM reports that he also has a new vertical. KH6AK has retired and moved to Fla. where he signs K4QG. He's building a new home around his radio and a four-element tri-band quad. In Nov. W3GRF, chmn. of ARRL Contest Advisory Committee was in town on business with DCA/NAVCOMMSTA HONO and he presented movies of the PYRC gang and their enormous antennas. KH6HCM reports that he passed his Extra Class exam and also has 22 states on 160-meter. During the ARRL 160 test KH6s HCM, CHC, RS and I rallied. The best catch was VP2VI. KH6HDB reports he was married Dec. 18, in Slaton, Tex. VF7AAA and VF7NW vacationed here in the islands. KH6BHJ now is working in Okinawa. Snow and high winds kept KH6GPQ from working atop Mt. Haleakala. K1HNO/KH6 is in the process of buying a new home in Haleiwa. KH6GGX went multi-op in phone ss 70 with KH6GPQ. W6DGH visited with KH6RS and operated same as single operator in the phone portion of the CQWW contest. KH6GRV has been recommended as an EC. Maui. KH6BAS reports that in Nov. he confirmed a two-way SSTV pix with 11LCF. Ed reports that Australia is the newest country to permit SSTV transmissions. KH6RZF reports that "that" storm made his 18AVO look like a fish hook! W0DAD/KH6 was in Guam on business. K2HBA/KH6 reports that winds wiped out his 20-meter section of the quad. WB6ZV/KH6 is the CHOP at KH6BGS. Be sure to send your Form 1 to your SCM the first of each month. Happy ARRL DX Test. Traffic: (Dec.) KH6BZF 24, K1HNO/KH6 18,

W0DAD/KH6 7, K1H6BAS 1, KH6GPQ 1, KH6RS 1. (Nov.) KH6BZF 113, W0DAD/KH6 60, K2HBA/KH6 6, K1HNO/KH6 1, W4UAF/4 1, K5C1T/KH6 1, WB6ZEV/KH6 1, W7U2H/KG6 1, KH6AK/4 1, KH6BAS 1, KH6BI/6 1, KH6EWD/4 1, KH6FON/4 1, KH6GKD 1, KH6GKV/2 1, KH6GPP/6 1.

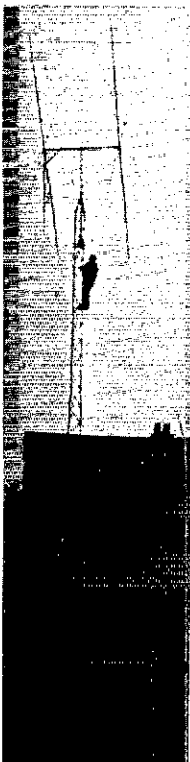
NEVADA - SCM, Leonard M. Norman, W7PBV - SEC: Lewis Mike Hain, WA7BEU, 560 Cherry St., Boulder City, NV. Mobiling in Nev. remember WCARS 7255; WPSS 3955; with 34/94 fm coverage in the populated areas. SNARS held an FB meeting and installation of club officers with a nice dinner and movies on the Mt. Vaca fm repeater. WA7AEL has been busy looking for radio active dust. WA7BAV reports good DX and has several new active novices on the air chasing it. W6RAY/7, CHOP of K7QDB, has retired and retreated to his ranch with a herd of wild mustangs. K7TDQ is back at the drafting board working out plans for improving the WA7OHX repeater. K7KNP is out of the hospital and doing fine.

SACRAMENTO VALLEY - SCM, John F. Minke, W6KYA - We still are looking for FCS for the ARPSC (AREC) program. We have 2 at present, WB6KZN for Sacramento Co. and WA61QJ for Yolo County. Those of you who are interested in promoting this worthwhile program for the best interests in amateur radio and your community, contact W6SMU. Ted's address is in the Dec. QST along with the rest of the SECs. New officers of the Nevada County ARC are: W6BRE, pres.; W6HMK, vice-pres.; WA6QFS, secy.-treas.; WB6CBI, sgt.-at-arms. The 1971 officers for the Radio Amateur Mobile Society. (RAMS), are: WA6IQK, pres.; WB6SBR, vice-pres.; WN6HO, secy.; WA6IVL, treas. Things are slow in Sacramento Valley. Traffic: W6LNZ 27, W6VUZ 1.

SAN FRANCISCO - SCM, Kenneth S. McTaggart, K6SRM - I regret to report the passing of K6JC, an avid UHF'er and experimenter, early in Dec. New officers of the Humboldt Amateur Radio Club are: W6SLX, pres.; W6RNL, vice-pres.; W6BWV, secy.; WA6ASQ, treas.; WB4GBR/6, act. mgr. New pres. and vice-pres. of Valley of the Moon Radio Club are WB6HZZ and WA6CBR. W6KVQ is looking for AREC members in Mendocino County. Drop him a line if you can assist. WA6AUD attended the DX meeting in Fresno in Jan. 8 mobiles and 4 base stations are active on the Sonoma Mountain FM repeater, including WB6JOP, WB6FLT and WB6YEV. WA6JUV is building an RTTY terminal unit. The Northern California Emergency Net meets Sun. at 1800Z on 3920 and covers the Eureka/North Coast area. Contact W6AEY for more information. W6RQ snagged his best phone DX on 75-meters, a 9V11. WB6FZN is active on NCN. W6OER has departed to Ariz. W6CBR now is operating 2-meter ssb from Sonoma Valley. W6EAX continues to be a dependable S.F. outlet for NCN. WA6NQZ and K6SRM have completed modifications on their ARC-5 transmitters to allow QSK operation. Anyone needing an FCC Form 610 for renewal purposes can send me an NASE and I will send one out to you. Traffic: W6KVQ 304, W6EAX 97, W6WLX 44, K6SRM 34, W6OER 28, W6HWV 22, WA6AUD 7, WB6FZN 6, W6PZE 3, W6RQ 2.

SAN JOAQUIN VALLEY - SCM, Ralph Saroyan, W6JPU - W6PPO now is a Silent Key. W6PPO was a very ardent radio amateur and operated on all bands, built most of his equipment before ssb, was a past pres. of the Fresno Amateur Radio Club, Trowel Radio Club and other fraternal groups. Wally will be missed. W6WXP has an SR-500. WB6OSH has been put in charge of FARC equipment. W6PSQ has daily sskeds with KL7BZB on 14292 kHz. W6GRV and W6PSQ attended the FARC in Jan. The Madera Amateur Radio Club held their Christmas party Dec. 29 with 21 in attendance. The FARC held their Christmas party with 22 in attendance. W6GRV is chasing DX on 20. W6HUA is on all bands. K3JWV is on 2-meter fm. K6OZL has four-element mono's for 10-15-20. W6HWC is on 75 ssb. The new officers of the Delta Amateur Radio Club are: WB6OPQ, pres.; WA6HIN, vice-pres.; WA6ICH, secy.; WA6HAC, treas. W6MUV is on 160. W6YKM assisted by W6IEX, WA6JUD and W6YKS put up a tower and antenna for 50 MHz. Don't forget the FARC Hamfest, May 8, 9, 1971 at the Tropicana Lodge.

SANTA CLARA VALLEY - SCM, Albert F. Gaetano, W6VZT - RM: WA6LFA, W6ASH with some help now has the Ft Camino Hospital on the air for the local cd net with the antenna on the roof of the hospital. W6AUC spent the Christmas holidays handling phone patch Christmas traffic overseas, all with a doublet since he hasn't had time to put his beam up at his new QTH. W6BPT reports that the MARS traffic out of RN6 for Dec. was very heavy. W6DEF was busy handling communications for the children's Christmas parade. K6DYX gave a talk to the Santa Cruz Radio Club on slow-scan TV. WA6LFA is getting some RTTY equipment together to use for traffic and liaison between NCN and RN6 via 2-meters. WA6NHD is having TVI problems. The SCARA Club presented a plaque to W6NX for his long service, over 30 years, to the club. The



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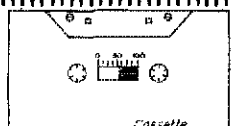
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presentation was made by W6ZRJ, Pacific Division Director. Now that the heavy traffic season is over, I would like to take this opportunity to thank all the fine operators who helped and were very patient during poor and trying conditions. You all have done a fine job and were a credit to amateur radio. Traffic: W6RSY 726, W6NW 423, W6YBV 375, W6LFA 371, W6BYB 352, K6DYX 216, W6DFB 114, W6VZT 81, W6AUC 80, W6BPT 35, W6ADK 23, W6OH 8, W6ASH 4, K4BYD/6 2, W6NHID 2.

ROANOKE DIVISION

NORTH CAROLINA - SCM, Calvin M. Dempsey, WA4UQC - SEC: W4EVN. PAM: W4AJF, VHF PAM: W4HJZ. RM: W4WXZ. WB4NIV has a new linear, phone patch and a tri-band beam on a 55 ft. tower. He also has 1.5 kw power unit. WA4KWC is the acting participation officer on the MARS Tone Net. K4CAX received the 50 wpm Code Proficiency certificate from the Conn. Wireless Assn. He also enjoyed the Indiana QSO Party, 160-Meter Contest and Straight Key Night. WA4TRO is back at Wallops Island, Va. and will be heard portable from there. WA4UQC has raised his 20-meter quad and reports the DX is rolling in. WB4QJA is enjoying his new 5-watt qrp rig. K4JBH and WB4NIV got together and sent 42 messages to servicemen overseas for the people of the Albermarle, N.C. area.

Net	Freq.	Time(Z)/Days	QTC	Mgr.
CN(E)	3573	2:44 Jy	140	WB4GHH
CN(L)	3573	0:00 Dy	104	WB4ETE
NCSSB	3938	2:30 Dy	28	WB4ADF
CHEN	3923	00:00 Dy	75	WA4UQC

Traffic: (Dec.) K4MC 177, W4FVN 171, W4WXZ 130, W4HR 99, W4MTG 75, W4NPNY 44, W4VNY 43, WB4NIV 37, W4BHH/4 29, K4TTN 25, W4BGR 20, WA4UQC 20, W4HGS 18, W4HGT 15, K4VBG 13, W4PWZ 10, W4QJP 5, W4BHX 3, K4CAX 3, WA4KWC 3, WB4HDS 1. (Nov.) WB4MTG 27.

SOUTH CAROLINA - SCM, Mrs. Elizabeth Y. Miller, WA4EFP - SEC: WA4ELU. Asst. SEC: W4WOM. PAM: WA4GAW. RM: K4LND. W4BQF, former S.C. SCM, after a sojourn in Atlanta, now has retired and is living in Clover. W4MC, long time EC in Charleston, has been promoted to special assignment EC duties in that area. W4JA will administer the ARRL as new EC for Charleston County and WB4RFJ will do likewise for Chesterfield County. Other EC representation by counties is as follows: W4MTE Aiken, W4FVY Anderson, K4NGU Barnwell, WA4GAW Beaufort, W4TWW Berkeley, K4MID Chester, W4ELW Clarendon, WA4LDM Florence, W4CPX Greenville, K4JYV Greenwood, WA4AMM Hampton, K4OMK Horry, W4DX Kershaw, K4WJU Laurens, K4BML Lee, WB4CBJ Lexington, K4KCO Newberry, W4OVQ Orangeburg, K4OVS Richland, W4MZS Saluda, W4MCI Spartanburg, K4LNI Union, WA4HNA Williamsburg, W4UMW York. Some of these have filled their posts ably and well for many years and deserve your full support and cooperation. Others are recent appointees just learning their duties and need all the help you can give them. Traffic: K4LND 141, K4OCU 131, WA4FP 58, W4OA 57, W4JSD 12, W4WQM 14, W4JA 10, WB4MCI 6, WB4BZA 3.

VIRGINIA - SCM, Robert J. Slagle, K4GR - Asst. SCM: A.E. Martin, Jr., W4THV. SEC: W44PRG. Asst. SEC: WB4CVY. PAMs: W4OKN, WA4YXK. RMs: WA4LUL, WB4NNO, W4SHJ. Note the new VSN RM. WB4NNO: our many thanks to K4MLC for his years of service to the VSN. WB4NNO made the BPL in Dec. SEVWA is establishing incentives for "Operator of the Month"; they are contacting all newly-licensed hams in the Tidewater area. W4TTG is working on his General. WB4OMF is working on the SB-102. W4HU cited over 20 stations for out-of-band second harmonics in Dec. WA4HQW reports quite a month NC Sing on VSN. WB4DRB mobilized on 6 meters and reports the W and M ARC is K4EFL. WB4DRB went to Jamaica for Christmas. WB4OQJ 2nd opping at WB4ODN. WB4FUT sent welcome wagons to K4EFL, WB4PWP and WB4RNI. K4EFL is back and active after ten years in Morocco (CN81 W). Venezuela and Laos (XW8CR). WA4WQG leads W4JUI 2179 to 2000 counties! The PYRC Christmas Dinner was well attended. OBS W4OP was asked to transmit bulletins on the MARS Nets. WB4GMC has grandkids residing in his antenna farm. K4LEL, an Advanced Class licensee, got a new first harmonic Dec. 16. W4ZM hit the 160-QSO Party and Straight Key Night. W4DM keeps a regular schedule with dad, W9YPP, also W4JUI schedules W4LK and W8JO weekly. I deeply appreciate the many condolences on the passing of my XYL Dec. 22. VSN 3935 at 6 and 10 P.M.; VSN at 6:30 and VN at 7:00 P.M. on 3680; VFN at 7:30 on 3947. Traffic: (Dec.) WB4NNO 805, W4NQQ 364, W4UQ 258, K4KNP 278, W4NLC 216, WB4GIS 176, WB4FEZ 158, WA4JJE 115, WB4HRA 88, WA4HO 72, W4TE 68, W4OKN 55, K4CRK 53, WB4DRB 52, WB4KIT 49, WB4KBJ 48, WA4PHG 42, WB4EDT 38, K4EFS 33.

WB4DRC 30, K4VCY 29, WB4JMD 23, K4GR 22, WA4NJG 22, W4ZYT 20, K4E2L 18, WB4ODN 18, K4AWV 17, W4THV 17, K4CPQ 16, WA4WOG 16, W4YZC 11, W4K1C 10, W4SHJ 10, K4TSJ 10, K4JYM 9, W4MK 9, WB4GCM 8, W4KAO 7, WB4LOV 5, W4OP 5, WB4GMC 4, W4KX 4, K4POL 2. (Nov.) K4CRK 22, WB4GMC 7, WB4GCM 4.

WEST VIRGINIA - SCM, Donald R. Morris, WKJM - SEC: WA8NDY. RM: WB8BBG. PAMS: W8DUW, K8CHW, W8IYD. Phone Net Mgr.: WA8LFW. CW Net on 3570 at 0000Z and 0300Z. RACES CD Net, Sun. on 3996.5 at 1300Z and 1800Z. State Convention W8WVA certificates are available from WA8NDY. Advise him of time and date of contact. MARA officers are WA8NPA, pres.; WB8CPU, vice-pres.; WB8AAT, secy.; WA8EQH, treas.; WA8BMV, act. Congratulations to W8WVM on his recent marriage. SEC WA8NDY uses LSB and USB on RACES nets for speedy traffic handling. W8HZA had 79 contacts and 37 sections in the 160-Contest. K8HUH improved the signal with a new 75-meter antenna. WB8KJG is a new General Class licensee in Martinsburg. WB8BBG and WA8LFW made PSHR. WB8CRU completed the new HW-12A for fixed and mobile operation. If you can assist at the State Radio Convention, Jackson's Mill, July 3 and 4, please contact W8IYD. DL4VA/WA4WMC, ex-W.Va. ham would like to meet any W.Va. groups touring Germany this summer. Contact me for details. WVN Phone Net handled 171 messages with 575 stations and CW Net with 56 sections and 300 stations handled 217 messages. The LO meeting will be held in Greensboro, Apr. 9, 10, W8DUV, chmn. Traffic: WB8BBG 208, WA8NDY 121, WB8AKQ 113, WB8JWX 91, WB8CYB 75, WB8DXF 50, W8HZA 44, WA8POS 30, W8JM 25, WA8WCK 23, WA8LFW 22, WA8ZNH 19, W8DUV 13, WA8EC 11, W8GWR 8, K8QEW 8, WB8AQE 4, W8WEJ 4, WB8CPU 3, W8ETE 3, W8CCR 2, WA8JW/R 2, WA8THX 2, K8ZDY 2, WB8AFI 1, WA8AYB 1, W8CKX 1, WB8DOX 1, W8EQH 1, W8KBM 1, W8KWL 1, WA8OKG 1, WA8TWR 1, WA8UNP 1, WA8MX 1.

ROCKY MOUNTAIN DIVISION

COLORADO - SCM, Clyde Penney, WA8HLO - This end of the year report has been prepared by W8SIN and my congratulations and best wishes to the incoming SCM and my sincere hope that all of you fine ARRL members will cooperate with Clyde to the fullest for the well being of all section amateurs. My warmest thanks for all the excellent help received from the members the last two years and more especially to those who have helped with the organizing of the nets, keeping the flow of traffic going, for work with the AREC and other emergencies. W4UDS/0 lost his quad in the wind, K8ECR had the transmitter modified for 160 and the Silver State Net is doing very well. WA8YNP has been NCS on CCN and W8LLA is getting new Hallicrafters gear. District 5 and 9 are the only ones without local ECs at present. All others have been filled. With SSN having liaison to TWN as well as CCN, traffic has picked up and with RTTY being used on 2-meters, prospects are better yet. The Denver Amateur Radio Teletype Society has been formed and with the talk of tone control, etc. a new interest is being shown there. The Silver State Net reports QNI 212, QTC 110, informals 41,853 mins. The Columbine Net QNI 1133, QTC 78, informals 250, time 1354, CCN 26 sessions, QNI 144, QTC 83,620 mins. Hi-Noon QNI 1032, QTC 136, time 1026 for 29 sessions. Traffic: (Dec.) K8ZSQ 1192, W8WYX 263, K8JSP 139, W8LQ 129, W8LRW 94, W8LLA 62, W8MQH 50, W8SIN 49, WA8YNP 42, W8YCD 32, K8ECR 13, K8LGA 8, W8LCE 5. (Nov.) K8ZSQ 567.

NEW MEXICO - SCM, James R. Peine, W5NUI - W5PNY resigned as SEC, which was effective Dec. 31, 1970. Many inquiries for a replacement have produced no results, therefore the office will remain unstaffed until a replacement can be found. Members who have sent in ARJC forms will have to wait awhile for some action. The New Year's severe weather, much snow and sub-zero temperature was sure a good test for emergency capability ty. How did your equipment stand the strain? Traffic: W5RE 242, K5MAT 120, K5DAB 82, W8AVX/5 52, W5IUY 46, W5DMG 24, W5PDY 20, W5DAD 19, W5MYM 18, W5ASNO 17, W5AJNC 14, W5ADSH 13, W5AMLY 8, W5AHL 7, W5NTG 7.

UTAH - SCM, Carroll E. Soper, K7SOT - SEC: W7WKE. RM: W7OCX. W7PIB reports that a notice net is being organized on 21.15 MHz each Sat. at 1930 MST. Anyone interested please check in. K7ZJS issued 70 cooperative notices for Dec. and will be in New York City for the next 3 months. PSHR totals: K7HLR 55, W7OCX 52. W7OCX made RPI on both originations and deliveries. BUN QNI 859, QTC 106, average time 2039. WA7DDH has received Beehive Utah Net Certificate No. 82. The Utah VHF Society operates two open repeaters in the Salt Lake area, one with an input of 146.340 MHz and an output of 146.940 MHz, the other with an

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WYOMING — SCM, Wayne M. Moore, W7CQL — SEC: K7NOX. RM: K7KSA. PAM: W7TZK, K7SLM, OBS: K7SLM, K7NOX, W7SDA, WA7HFA. Nets: Pony Express, Sun, at 0800 on 3920; YO daily at 1830 on 3608; Jackalope Mon. through Sat. at 1215 on 7260; Wx Net Mon. through Sat. at 0630 on 3920; PO Net 1900 Mon. through Fri. on 3950. K7NOX and W7VTB are on 2-meter fm. K7VWA is making plans for going mobile. Ex-W7VJI now is W5SNY in Metairie, La. Don't forget to set aside the 3rd week end in July for the Wyoming Hamfest to be held in Casper this year. Send your nominations for the 1970 PICCON award now so the choice can be made and the award presented at the convention in Colorado Springs June 19, 20. The Casper club now has a tower up and are looking for a beam and rotator to top it off. Start getting prepared now for another good Wyoming Field Day. Traffic: WA7EUX 168, W7SDA 70, W7HLA 63, K7VWA 59, W7TZK 55, W7BHI 9, WA7AUD 2, K7BTF 2, K7WNF 2.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Donald W. Bonner, W4WLG — SEC: W4DGH. RM: W4HFU. The BARES (Birmingham Amateur Radio Emergency Service) organization recently participated in an American Red Cross drill, consisting of a simulated tornado "touchdown". A total of 22 BARES participated and used 10-meter mobile units, 10-meter handi-talkies and 6-meter handi-talkies, plus the Red Cross "Com-van". We are in need of a liaison station from an NTS net to check into AFNR on 50.52 which meets Tue. and Thurs. at 1915 CDT. W4QAU is NM. K4AEB has his Advanced Class and WN4POD has his General Class license. New ORS is WB4OJD and new OBS is WB4KIM for AFNO. DL7VA/WA4WME says that if you are planning a trip to Europe get in touch with him and he will show you around. K4FCI is new to the SSTV ranks. Traffic: WB4KDI 232, W4HFU 227, WB4OJD 215, WB4JMH 145, WB4EJ 132, WB4LAL 123, WB4OKT 110, WA4VFK 105, WB4KSL 84, WB4OVR 65, K4AOZ 50, W4DGH 12, WB4NJG 12, WN4RIX 10, WN4SBD 9, W4WLG 5, K4BSK 4, WB4MLV 2, WB4NLC 2, WN4POD 1.

EASTERN FLORIDA — SCM, John F. Porter, W4KGJ — Asst. SCM: Albert Hamel, K4SJJ. SEC: W4IYT. Asst. SEC: W4SMK. RMs: W4LLE, K4EHY. PAMs: W4OGX 75 and W4SDR 40. K4HEX, WB4OMG and K4FAC made PSHR for Dec. W4LLE RM for this section now is on his fifth year as editor and publisher of OFN. Regis and all the contributing net managers are to be congratulated. W4ROA has tied the knot with a nice yankee gal named Ruth. Good luck to both. OO reports were received from K4FMA and W4FRL. What about the rest of the OOs. The Indian River ARC new officers are WA4KGV, pres.; WB4FBH, secy.; W4EWB, vice-pres. and treas. The Gulf Stream Society fm repeater now is on 145.500 input and 146.880 output. Their new antenna is up 300 feet and they run 200-watts. Special station WC4SHF was set up by the Society at the South Fla. Fair. Note special call. The FMN picked up WB4QKR, WB4OUH and W4SGW as new members. The West Palm Beach ARC, with over 40 members, now has a new club house. W4ICP from League Hq. was a visitor at one of their meetings. The Fla. Country Cousins WA4ONZ, WB4DRM are working on a new project at the Harry Anna Cripple Children Hospital. They plan a cude and theory course for those interested. Winter Park CD is adding a RACES plan to their already well established office, EOC and shelter system. W4YSO is the RO. The Central Fla. Ground Wave Society's new officers are WB4GIO, pres.; W4CLJ, vice-pres.; W4YSO, secy. W3CUL/4 had three rigs blow up on her. WB4OMG, WB4AIW, W3CUL/4 and W3VR/4 made BPL in Dec. Next hamfest for Fla. after the Tropical Hamboree will be at Orlando. Lets plan ahead. Traffic: (Dec.) W3CUL/4 3650, WB4AIW 720, W3VR/4 701, WB4OMG 564, WA9QVT/4 431, WA4LH 392, W4EPC 366, W4DVO 263, K4FAC 235, WB4SMA 229, W4SDR 154, W4IZZ 124, K4JWM 124, W4LLE 121, W4BNE 100, WB4LAA 99, R1Y/W4 91, WB4HJW 78, WB4IER 76, W4EHW 75, K4GJ 73, WA4HFD 73, K4HS 71, K4HEX 67, W4IA 59, WB4EJY 56, WA4ABY 54, K4DAX 53, W4NGR 53, W4KRC 52, WB4MIQ 50, W4BCGW 47, WB4GHD 47, W4BM 45, W4YPX 44, W4AKB 40, WA4HDH 37, WA4EJA 34, W4OGX 30, W4DEU 28, W4SMK 28, WB4HNL 27, W4KGJ 27, W4JTM 22, W4ADI 18, K4LPS 18, K4BLM 11, W4CUJ 11, K4ERE 7, W4LK 6. (Nov.) WB4HKP 213, K4FAC 76, WB4HIW 67, (Oct.) K4FAC 23.

GEORGIA — SCM, A.J. Garrison, WA4WQU — Asst. SCM: John T. Laney, III, K4RAI. SEC: WA4VWV. RMs: K4BAI, WB4JXO. PAMs: K4HOI, W4LRR.

Net	Freq.	Time(Z)Days	QNI	QTC	Mgr.
GSN	3595	0000/0300 Dy	705	352	K4BAI
G CN	3718	2300 Dy	180	80	WB4IXO
GRN (Phone)	3975	0100 Dy			WA4VWV
Ga. Cracker	3995	1300 Su	121	8	WA4JQU

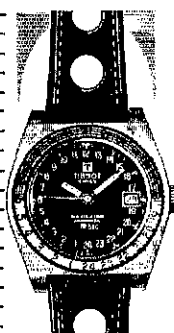
Congratulations to WA4RAV for a month of outstanding traffic handling. Recent appointees: WB4JSH as EC Long and Liberty Counties. K4EDU as EC Greater Augusta area. W4AGI/W5KL and NYL WB4BUH/WA5WAR have QSY'd from Atlanta to Jasper, Ark., in the Ozarks. Leland has served as ORS continuously for more than 33 years and also served as Asst. Director for the Southeastern Division. Our loss is Arkansas' gain. SEC WA4VWV and EC W4KRE for the Greater Atlanta area, reports some very successful AREC meetings on 10-meters. Traffic: WA4RAV 530, K4BAI 171, W4EHP 167, W4AMB 100, W4PIM 98, WA4WQU 87, W4CZN 83, W4RNL 67, W4FDN 52, K4NM 41, K4FLR 33, W4DDY 17, W4UYP 16, WB4DMO 14, WB4FED 11, K4GVG 7, WA4ZHC 7.

WESTERN FLORIDA - SCM, Frank M. Butler, Jr., W4RKH - SEC: W4IKB, RM: K4LAN. RTTY: W4WEB, PAM: W4NOG, VHF: W4UUF. FM enthusiasts are forming an association to operate a repeater. For details contact WB4DVM, WB4JCV or WB4DHL. WA4IZM, WB4CVR, W4FOX (Panama City) and WA4JRT (Sneads) are active in the Reddy Kilowatt Net which meets on 3945 kHz at 2330Z. W4NOG, a PAM appointee, has mailed a net roster and NCS guideline to all members of W4PN. W4JLW has two complete kw rigs—one for cw and one for phone. WN4SBD is a new call stationed at Corry Field. K4NMZ now is teaching at Penn. State in W3-Land. Fort Walton: Transmitter hunts have started again on 146.94 fm. For details contact W4UNV. About a dozen 10-meter enthusiasts can be found on 29,560 kHz evenings; K8RQO/4 is on from Crestview. Marianna: WA4SIB, K4UNT and W4KCA are helping to set up an EOC in the Jackson County courthouse. 2-meter fm equipment also has been bought for CD use in Blountstown; K4NML will operate it. Port St. Joe: A new ham is WB4LJO. Tallahassee: The Dec. dinner meeting of TARC was well attended. WA4EOQ had to miss it because of heart trouble. WB4GTY and WB4GOO joined the 2-meter fm gang. Traffic: 8R1Y/W4 91. W4NOG 22, W4FDJ 15, WB4DVM 14, W4RKH 13, WA4SSB 10, WA4EOU 9, W4IKB 7, W4UUF 7, K4CFS 4.

SOUTHWESTERN DIVISION

ARIZONA - SCM, Gary M. Hamman, W7CAF - The Amateur Radio Council of Arizona elected the following officers for 1971: K7GHS, chmn.; K7JWB, vice-chmn.; W7OKL, secy.; VE3FCE/W7, treas. The Cochise Amateur Radio EM Assn. is operating WA7KYT as a remote base with either 146.76 or .94 output frequencies but will have a repeater operational in the near future. New officers are W7ELQ, pres.; W7AKU, vice-pres.; W7GJN, secy.-treas.; W7AKU, tech. dir. The Arizona ARC elected the following officers: K7UXG, pres.; K7JJT, vice-pres.; W7OQB, secy.; K7MLE, treas.; W7LXX, act. mgr. Congratulations to all the new officers. The larger clubs all had enjoyable Christmas parties with over 70 in attendance in each one. Numerous Arizonans were in attendance at SAROC. It was a pleasure having W6PAN, Dakota Division Director, in Phoenix while he was auditing the records of a local firm for a couple of months. Our Director, W6KW, has retired and now is living in San Luis Obispo, see p. 8 for address. WA7KYT has a new XYL. W7DRR finally has his SB-220 operating. WA7NXI also just completed an SB-220. K7RDH graduated from A.S.U. in Jan. Congratulations to K7NHL on earning the BPL award. Public Service Honor Roll (PSHR): K7NHL 54, W7CAF 46. Traffic: K7NHL 579, K7NDT 295, W7CAF 83, W7UXZ 73, K7UYW 56, W7IO 36, K7RDH 32, W7DQS 24, K7EMM 21, W7OUE 20, K7ZMA 15, WA7MCK 6.

LOS ANGELES - SCM, Harvey D.D. Heland, WA6KZI - Asst. SCM: Dick Norton, W6DGH. SEC: Vacant. Code and theory classes are being offered for all ages by the Artesia HS Tue. and Thur. both day and night plus another class on Sat. Contact the school for details. WB6WFI was provided a tour of the communications facility at Edwards AFB by WB6WCS. WB6WDS took in the Strait Key Night, but reports that having used a keyer has taken its toll. K6VGH now is an Advanced Class licensee. WB6ASR took in the Jan. VHF SS with his points going to the So. VHF RC club score. W6NJU took in the League's first 160 cw contest working 23 states and VP2VL The UCLA RC, W6YRA, managed 170 QSOs in the 160 test and other reports indicate it was very well received in its first outing. The San Fernando Valley DX club hosted a joint meeting with the So. Cal. DX Club and heard W6EJJ on the recent HB9DL operation and W6DGH on the recent KH6RS operation in the CQ WW phone test. New officers of the San Fernando Valley DX Club are K6UKX, pres.; K6BTI, vice-pres.-treas.; WB6DXU, secy. W6USY reports that his Kenwood is working well and that net operations are back up to par again. Pasadena RC members K6OMU,



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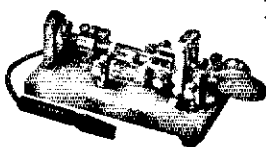
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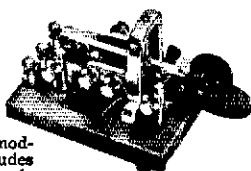
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WB6UWA, K6RKN, K6OWF, WA6EST, K6BEM, W6JBX, K6CPB and K6GPJ provided communications for the Christmas Tree Lane in Altadena. WB6VZI was elected pres. of the UCLA and West Valley RC's. WN6AFL passed his General Class exam. WB6SKY is quite active on 75-meters. WB6WC is working on a pair of 4-400s. WN6HMI is working 2-meter cw with WB6MCW and working toward his General by attending code classes at Inglewood HS. W6YRA has big plans for a new antenna farm. WB6MCW added a Yaesu FT-200. W6DOX played host for HSNARD in addition to building more shelf space for his electric radios. W6LYC has been doing some DXing on 21 MHz. WB6JZL reports that many teenaged or college aged amateurs are gathering at 7:00 P.M. on 28.683 MHz with breakers welcome. K6AUI reports a fine fm turnout for SAROC. The Edgewood AR Soc. has prepared a proposal to ARRL suggesting that considerable service could be rendered to amateurs (esp. traveling amateurs) if SCMs would be requested to include inband repeater information in their monthly column. To be listed the repeater owners would have to provide the SCM with the information and monthly activity reports. Interested readers may express their comments to the Repeater Advisory Committee (via ARRL Hq.) and to Director Griggs. I will list such information if provided with the details. The same applies to traffic nets. Net report for Dec.:

Net	KHz	Time	QNT	QTC	Mgr.
SCN	3600	6:30 P.M.	642	852	W6LYY

Traffic: (BPL/PSHR): K6AEH 0/11, WN6AFL 0/7, W6AM 2/0, W6BHG 214/3, K6UDW 81/24, K6CL 6/0, W6DGH 8/0, W6DOX 8/0, K6EA 19/0, W6FD 21/0, W6WC 0/8, W6GAO 10/10, W6GCHH 1/3, W6JNH 541/37, W6IVC 72/13, W6JBX 0/4, W6KKG 13/17, W6LPI 0/20, W6LSB 0/10, W6LYY 103/21, W6MMW 0/5, W6OEO 58/10, W6PAV 1/18, W6QAE 122/27, W6QIR 0/15, K6OPH 2/0, W6SXY 421/45, W6USY 38/0, W6WFI 0/6, W6ZTI 0/10, W6ZVC 37/26.

ORANGE - SCM, Jerry L. VerDuft, W6MNY - New club officers: Anaheim ABA - W6KRP, pres.; K6JBG, vice-pres.; W6CCG, sec. sec.; W6FMT, corr. sec.; W6GWC, treas.; K6USX, W6VKL, W6RD, W6GZNM, dir. Fullerton RC - K6GSC, pres.; W6LTS, vice-pres.; W6NLMC, sec.; K6ATK, treas. Victor Valley ARC - W6GAN, pres.; WHJF, vice-pres.; W6JPK, sec.-treas.; W6HGI, act.; W6CFF, sgt.-at-arms; W6TTR, trustee; WN6ARI, novice coordinator; W6GFD, chief ed op; W6ATC, MARS coordinator; W6LWF, cb coordinator. Congrats to Director W6KW who was reelected for another term. John's new address is 1273 13th St., Baywood Park 93401. W6ZOK is a new ORS. W6VOZ has reinstated his OO appointment now that he is retired and has lots of time to tune the bands. OVS K6YNB provided net control for the Harrow to Vegas motorcycle races operating from a mountaintop using a 6-meter kw and no TVI. EC WA6TAG reports the Palm Springs Desert RATS were in charge of 2-meter communications for the 200-mile Dune Buggy races. Fixed relay stations were W6ADH, W6AOC, W6FB, K6FA; mobiles were W6AJW, W6DRQ, K6LWE, W6QAH, W6TAG, W6VZU, W6VGA and K6ZVS. W6YXA and W6WVW in Hemet control code classes up to 20 wpm. W6ZBJS is a Silent key. OO W6ONU made antenna repairs, installed a new Ham-M-Rotor, built a control box, and is ready for the DX Contest. Santa Claus blessed OVS W6BUK with a new Heath wattmeter. W6BAKR traded the Clegg-22er for a new 75S-3B and promises to be on hf soon. OVS W6RAL is active on the 220 MHz net and suggests we listen for them with a diode and an earphone. PSHR: W6BNX 67, W6MNY 42, W6FOO 38, W6FOQ 38 and W6MNY earned BPL for Dec. traffic. Traffic: W6FOQ 525, W6MNY 241, W6BNX 100, W6WRJ 74, W6LCP 64, W6ZUC 35, K6LUB 34, W6QBD 18, W6ZOK 18, W6VOZ 12, W6FH 8, W6BRJX 8, W6BUK 7, W6YXA 6, W6QNU 5, K6GGS 4, W6YWS 4.

SAN DIEGO - SCM, Richard E. Lettler, WA6COF - Asst. SCM; Art Smith, W6JNL. There has been much work and effort put into the new "Antique Radio Display", housed in the Aero-Space Museum, by the SD Chapter of QCWA. Stop by soon and see it next time you visit Balboa Park. Club activities: IVARA continues to grow in El Centro with 8 new novice licensees in Dec. The club now will sponsor the ARRL ARRL Novice Net on 3725. In Dec. the SD DX Club met at the home of W6RZE. SOBARS had SD cd film report on the fires. El Cajon had a Jan. meeting on youth problems. Clubs must report activity to SCM each month if it is to appear in this column. Station activities: W6RMC went from Novice to Advanced Class. BPLs earned in Dec. were W6VNO, W6LRU, W6LOT, W6JOU. PSHR listed W6VNO, W6LRU, W6BGL. Five SD hams made the DXCC Honor Roll in Dec. (W6PT, W6BZE, K6EC, W6JD, W6CHV). K6BTO got his 2K-41 Klystron to operate above 3.3 GHz. Congrats to W6EWW on his 50th wedding anniversary (Jan.). W6DLN was appointed by W6KW as Asst. Director for Imperial County area. W6MIW now is IC for the same area.

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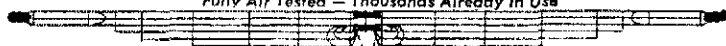
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THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS 3-71

WB6CDB was elected pres. of the El Cajon club while WA6BDW was elected to same office for SOBARS. W6TAL added a phone patch to the station. Reminder: WA6COL (SCM) reads bulletins on 3900 each evening at 1800 M-F, and can be contacted right after bulletins. Traffic: W6VNO 954, W6FOT 788, W6JOU 609, W6LRU 603, W6BGF 308, W6BHM 120, W6YKF 84, K6KDE 72, K6HAY 67, W6INI 21, W6JOL 8, WA6COF 5, W6TAL 2, W6SRN 1.

SANTA BARBARA - SCM, Cecil D. Hinson, WA6OKN - SEC: W6JIA. RM: W6UJ. The Ventura County ARC plans several meetings on the subject of "Ham TV". Good pictures have been received between Santa Barbara and San Diego. Mailing address of the Ventura County ARC is P.O. Box 2092, Oxnard, Ca. The club pres. is WA6JZ and WA6VJP, vice-pres. The Channel Cities 2-Meter Net still is active 5 nights a week. The Santa Barbara section meets on 145.8 at 1800. WA6WYD is net control. The Los Angeles section meets on the same frequency one hour later. The mailing address of the Santa Barbara ARC is 333 Old Mill, No. 238, Santa Barbara, Ca. 93105. Director W6KW has moved into the Santa Barbara section and soon will have antennas up at his new location in Baywood Park, San Luis Obispo. K6SJE and K6FAQ of Santa Barbara will soon have a repeater going on Santa Ynez Peak. WB6WRH passed both his General and Advanced Class exam in one day and has a new TR-4. WA6DEI is working on a large linear using 833s. W7DOL/6 of Simi is active on 160-meters with 100 watts. WA6DEI made BPL for Dec. Traffic: WA6DEI 749, W6JTA 12, W6UJ 5.

WEST GULF DIVISION

NORTHERN TEXAS - SCM, L.E. Gene Harrison, W5LR - Asst. SCM: Gene Pool. W5NEO. SEC: W5JSM. PAM: W5BOO. RM: W5QZG. The Arlington ARC installed new '71 officers: K5LNM, pres.; K5LOU, vice-pres.; W5SRR, secy.; W5VBW, treas.; K5GMY, FC; W5DCH, VHF FC. Congrats men. The KYL, yours truly plus W5IQ and KYL were invited guests. Your SCM expects to attend the Midland Swapfest and wishes to thank all for reports during the past year. The Cooper High School, Abilene, wishes affiliation for club. W5CGP requests ARRL affiliation. The KC Club's Novice and General classes will be in full swing when you read this. W5JSM is an OPS appointee. The Irving ARC annual Christmas party was held at Furr's and new officers are W5RWO, pres.; K5AVT, vice-pres.; W5FFS, secy.-treas. W5AVA reports that W5ARS was sick but is recovering nicely. Ed says many club

members think cw is for the birds but it appears that young groups are behind in their reading as "Incentive License" now paying off. Heard an interesting ARRL Net in W6-Land. W5VEX interested in proper operating procedures and W5QZG has offered some ideas. W5SFR's equipment is up for grabs. Contact Mrs. Carl EMN-2221, Dallas. Many reporting stations are using the Form cards. W5FKB is the district 10 RACES officer. K5ILL is the net IC for Rusk County. W5ZZT is interested in net operation. W5KYD's OO appointment was renewed, also W5JHA as OP. W5KHE has applied for an OO appointment. W5NFO reports the 2-meters are going 1-B in W.Tex. Endorsed: W5HVT as OP. W5INH, CAN mgr., offers good advice to amateurs interested in traffic. W5QWA's OPS appointment will be renewed if he sends present certificate for endorsement. W5RUB accomplished a coveyplary traffic job for the VA Hospital personnel during the holidays. W5GXP is the asst. RACES officer for Dallas County. Don't forget W5EYR's Newington trip in May '71. Tell him your stripes. Traffic: W5QU 253, W5RUF 232, W5VJW 201, W5JSL 128, K5ILL 104, W5HVF 45, W5NFO 42, W5PBN 18, W5JA 3.

OKLAHOMA - SCM, Cecil C. Cash, W5PML - Asst. SCM: W. Smoky Stover, K5OGV. SEC: W5FESN. RM: W5YRO. PAM: W5MEX. W5WHV, K5DIE and W5ZRU, QSL Bureau: W5QOM. Another year passed, a new year dawning. New Year resolutions filed away. Some to be broken, of course, but after all haven't they always. I have heard indirectly of a few pieces of ham gear that Santa brought but you haven't reported to me so I can't quote you. K5OCX reports his SH-220 that Santa brought early is working good. W5JJ reports he is looking forward to retirement. 1971 will be well underway by the time this reaches you but I would like to say a belated Very Happy New Year to all. The Tulsa Amateur Radio Club elected the following officers for 1971: W5EYK, pres.; W5NOO, vice-pres.; W5HUI, secy.; W5ZBI, treas. I took a short vacation over the New Year and went mobile through Tex., L. Miss, and Ark. and am happy to report that I had no trouble working into the nets during the 2000-mile circular trip, both on 4 and 75-meters. Even worked one 40-meter Army MARS cw net.

Traffic: K5TEY 1360, W5FEI 89, W5ZOO 49, W5MEX 3

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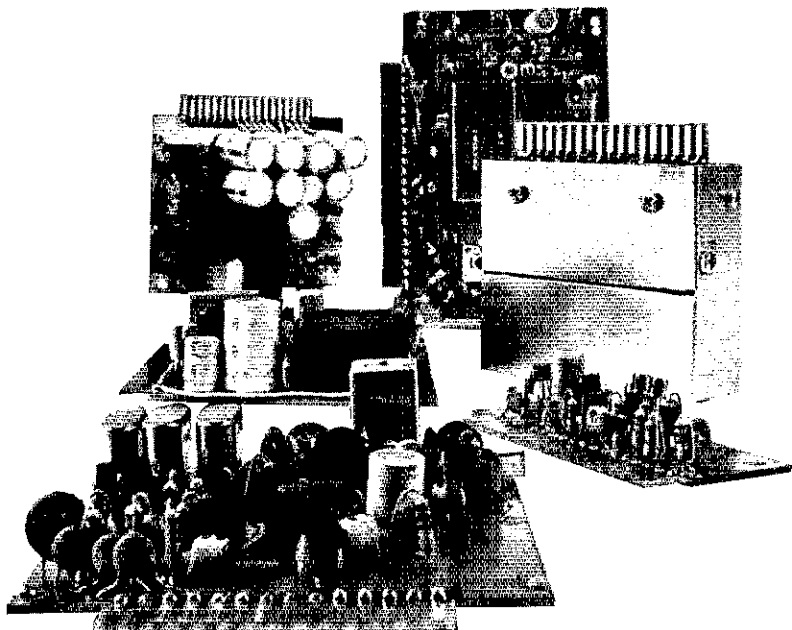
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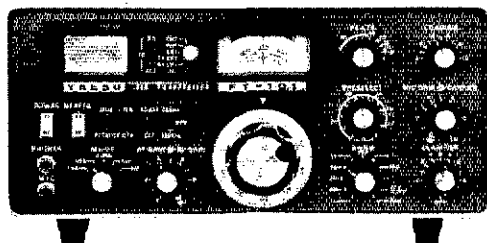


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SOUTHERN TEXAS - SCM, E. Lee Ulrey, K5HZR - SEC: K5HXR. PAM: W5KLV. RM: W5EZY, ORS K5HGB reports he worked 11 new states on 160 during the recent ARRL test. Congratulations to W5QJA on making PSRR for Nov. W5BTO reports excellent DX during the early daylight hours into JA- and ZL-Lands on 10-meters. SEC K5HXR visited Huntsville and group in Walker County and indicates we may have some AREC activity there soon. W5ABQ says he finally paid his San Antonio Radio Club dues. He's a charter member. W5KFL and W5KR presented the film "Hams Wide World" before the Brownsville Rotary Club with over 100 enthusiastic Rotarians attending. Three members of the faculty of Pan American College, including the college's pres., are amateurs. Dec. was the month for club Christmas parties and SARC had a good one with over 110 attending. Renewed appointments: W5NGW as OO, W5MXY as ORS, W5BTO as OBS, W5H as FC. Congratulations to new appointees: W5PRB/5 as OVS, W5LES as OO Class 1, K5TSR as OO Class IV. New club officers of the Texas Southmost ARC are W5HBI, pres.; W5KFL, vice-pres.; W5HKB, treas.; W5KR, secy.; K5FHY, W5MXY and W5HBI, dir. San Antonio Radio Club officers are W5KJU, pres.; W5EJT, vice-pres.; K5LLK, secy.; W5VFM, treas.; W5DUI, sgt. at arms. San Antonio Repeater Organization officers are W5OMU, pres.; W5ETG, vice-pres.; W5VZV, secy.; K5PKX, treas. OBS W5BTO transmits on the following schedule: 50.4 MHz at 0130 GMT Tue./Fri. and 0215 GMT Wed. Traffic: (Dec.) W5MXY 374, W5EZY 214, W5HJN 127, W7WAI/5 90, W5ABQ 38, W5BHO 34, K5HZR 28, W5TFW 19, W5BGE 15, K5HUA 13, W5QMH 11. (Nov.) W5QJA 86, W7WAI/5 16. (Oct.) W5QMH 10.

CANADIAN DIVISION

ALBERTA - SCM, Don Sutherland, VE6FK. SEC: VE6XC. PAM: VE6ADS. FCS: VE6SS, VE6AFQ, VE6AZU, ORS: VE6LZ, VE6ATH, OOS: VE6HM, VE6MJ, VE6TY, OVS: VE6MX, OPS: VE6ATH, VE6AFQ, VE6SS, VE6HN, OBS: VE6OE. This has been a tough season for FCS. VE6AFQ is seriously ill in Lethbridge Hospital. VE6AZU is back on the job after an operation. Also retired SCM VE6TG is recovering from an operation in the Nanaimo General Hospital. This year's SET for Calgary should prove to be very interesting with direct participation by the Calgary EMO and the AREC providing communications for the Calgary flood plan. The BC Centennial Award and the Sask. Homecoming '71 are causing a lot of excitement. VE8OK must have been in the running for the first BC certificate. ORS VE6LZ is the RTTY authority in this area. He and the other Calgary RTTY specialist have formed a group which should advance this mode of communication in Alberta. VE6AWI announces the closing of the Slow Speed CW Net because of lack of interest. VE6AWI has put a lot of effort into the ATN. Traffic: VE6FK 37, VE6CF 11, VE6XC 11, VE6SS 5, VE8OK 5, VE6LZ 4, VE6UD 4, VE6HF 3, VE6AFW 2, VE6JK 1.

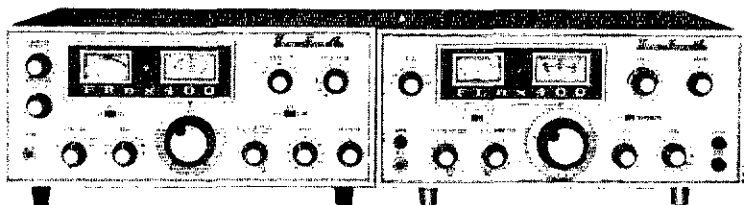
BRITISH COLUMBIA - SCM, H.E. Savage, VE7FR - 1971 is our Centennial Year and the British Columbia Amateur Radio Assn., has a Centennial Certificate. VE7AYI has mailed a letter to all VE7s with the rules, so there is no excuse. Nanaimo district Asst. EC is VE7BXN. VE7CC will be in the hospital for some time. Fort George RAC reports there are many active base and mobile 2-meter stations that you may contact on 147.33 when passing through. Kelowna ARC is working on the 1971 OK Hamfest. The Vancouver ARC Christmas dinner at Fraser Arms was well attended. VE7AMW was in and out of hospital. Thanks to all who wrote us in 1970. Traffic: (Dec.) W7NXO/VE7 134, VE7BLO 109, VE7LL 69, VE7APF 44, VE7AXH 19, VE7QQ 18, VE7GG 6, VE7SE 6. (Nov.) VE7AXH 15.

MANITOBA - SCM, Keith Witney, VE4H - VE4GY was operational during Christmas week at the Garden City Shopping Center Mall. Ex-VE4NN now is VE7BNN. Our RM has made plans for the SET. Many of us will regret the resignation of W0LGG as TUN Mgr. VE4DI and VE4OM are both recipients of MTN certificate. Congratulations to VE4FQ on receiving BPL. There are very few of these out in Manitoba. Traffic: VE4FQ 113, VE4GY/4 61, VE4KE 39, VE4RO 34, VE4DI 33.

MARITIME - SCM, William J. Gillis, VE1NR - Asst. SCM: Clarence Mitchell, VO1AW. SEC: VE1HI. I regret to report the passing of Bill Stoyles, VO1DW. Bill was one of the old timers and an ardent DXer in the early days and more recently active on 10 and 6. Our sincere condolences. New slate for NARA. VO1DF, pres.; VO2AL, vice-pres.; VO1CE, secy.; VO1CK, treas. APN reports QNT 107, QTC 65. Traffic: VE1AMR 128, VE1RO 74, VO1CA 45.

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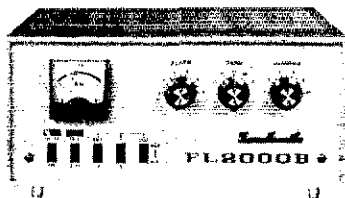
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ONTARIO SCM, Holland H. Shepherd, VE3DV - As expected the traffic listings for Dec. were above those for 1969 and this is due in no small way to the new ORS appointments of VF3FXA and VF3GFN. VE3ERU and VF3DV made BPL for Dec. I am concerned about the vast area of Ontario north of 45 degrees north which still is not represented on the Ontario nets. Every Ontario amateur should be aware that there exists a large, capable traffic oriented network in the ssb and cw modes throughout the province with liaison to other parts of Canada and the U.S.A., that can provide you with nearly guaranteed 24-hour delivery anywhere in North America of third-party formal traffic. Who else can say the same? For details send large SAE to ARRL Hq. enclose 12 cents U.S. and ask for the ARRL Net Directory. Toronto's Skywide Club is running a project at the Queen Elizabeth Hospital for the chronically ill. The project call is VE3QFH and will have a station on the air by the time you read this. Under the guidance of VE3DOR they are teaching patients the code and theory. If you wish to assist with this project please contact VE3DOR. West Side pres., VE3CJL, is worried about the vitriolic language which has been appearing in certain Canadian bulletins regarding the ARRL and Canadian amateur and has taken us to task by writing a fine editorial on the subject in the club bulletin. I wish I had the space to reprint it in this column. It needs repeating. VE3SU, RSO pres., recently spoke to the Ottawa ARC. New officers of OVMRC are VE3GO, pres.; VE3JD, vice-pres.; VE3MH, sec.; VE3BMC, treas. VE3RMC is the FC for Carleton County. Traffic: VE3ERU 510, VE3GL 317, VE3DV 315, VE3DPO 149, VE3FXA 139, VE3JWE 115, VE3FXI 96, VE3GFN 94, VE3CYR 83, VE3BUR 43, VE3HHL 37, VE3DU 33, VE3BPC 27, VE3DBG 23, VE3LK 21, VE3NO 18, VE3EWD 17, VE3CRW 13.

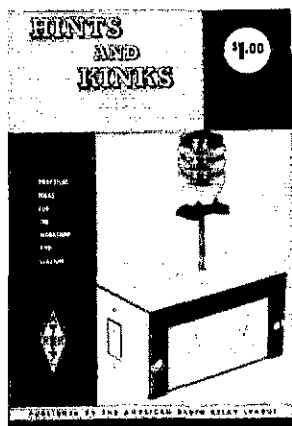
QUEBEC - SCM, Joe Unsworth, VE2ALF - SEC VE2BTZ. VE2BZD was appointed as QVS and RM. VE0MAD now is VE2OW. VE2BJI is an Advanced Class licensee. VE2MO meets at the QTH of VE2TI. VE2FC is active again. VE2APT made 26 points for the PSNR. VE2XO retired two years early. VE2DIC now is 4Z4JS. VE2BG is a great-grandfather. VE2AYA now is VO1GK and VE2AYB is VO1GM. VE2UN made BPL for Dec. SEC Net certificates (VE2RM AREC) went to VE2s JO, BTZ, OI, RMQ, AKM, BHH, NA, ATE, AQL, BOM, AKI, ALE, DEA, BVD, AWO, BGL, BRP, OH and APT. VE2RM VHF 75-Meter Net meets on 3.740 MHz at 0100 GMT. VE2GK reports the flu bug got him.

VE2AEJ is /1 in Fredrickton, NB. VE2KG now is VE3BAZ and active on VE2RM from Vankleek full. VE2BQK had his mobile squashed. Civil protection sent letters to VE2s on standby for crises. DE VE2DLD - Invitations a tous a venir sur reseau VE2OM chaque soir a 1930. Aussi reseau couche-tard chaque soir 2200 3.780 MHz (VE2BBL). Regret deced Pierre VE2SS, Roger VE2AW, et Gerard VE2HD. Participons nombreux au concours VE2 (phonie) le 2 mars de 1000 a 2000. VE2AQZ est de retour sur L'air de son nouveau QTH: Baie St-Paul. Traffic: VE2UN 115, VE2DR 86, VE2ALE 38, VE2FC 9, VE2AP 7, VE2APT 4, VE2BVY 4.

SASKATCHEWAN - Acting SCM, Barry Ogden, VESBO - The airwaves are humming these days with every mode of operation getting a good workout. In addition to the usual Christmas and New Years traffic, we also have many QSOs re our Provinces' big "Home-Coming-71". Nearly half a million former Saskatchewan residents have been invited to revisit VES-Land. In keeping with the spirit of things and to promote activity and good fellowship on the bands, VES-4 and is sponsoring a "Ham-Coming-71 Award" that will be sought after between Jan. 1, 1971 to Jan. 1, 1972. For further information you are invited to contact any VES. The Phone Net meets nightly at 0100Z on 3785; CW Net nightly at 0230Z on 3690. ARRL Net Sun. on 3780 at 1530Z. 10-15-20-meters also is very active. Congratulations to VESOB for achieving his ARRL WAS award for 10-meter phone. Welcome back to our PAM. VESHZ from his 41,000-mile air trip!

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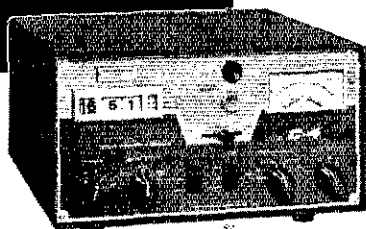
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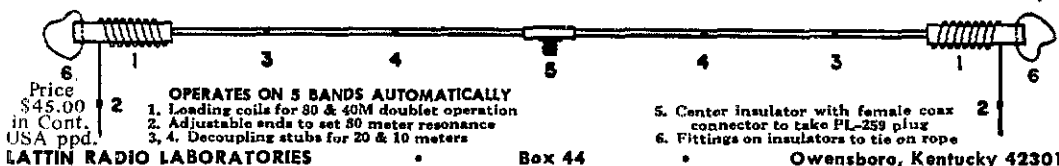
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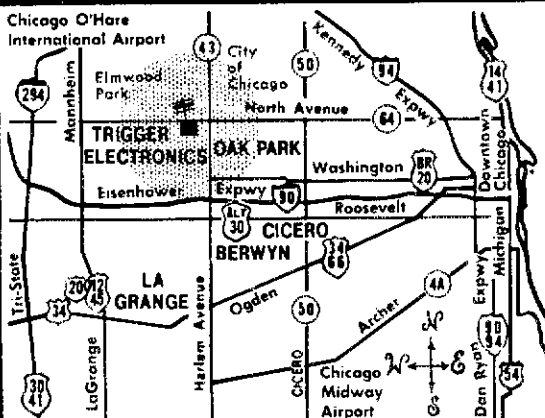
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QCWA Quarter Century Wireless Association is an international non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information, Q.C.W.A. Inc., Box 394, Mamaroneck, NY 10543.

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QSL, SWL, WPE cards. Samples 25c. Log books, file cards, decals. Malgo Press, Box 375 Toledo OH 43601.

QSLs, SWLs, WPE samples 15c. Nicholas & Son Printery, PO Box 11184, Phoenix AZ 85017

100 two color glossy QSLs \$3.25. Yutz Printing W3LXY Pottsville PA 17901.

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QSL service 100/\$1.75 add postage one lb per 100 for second color add on \$1. Cash with order. Ambra Productions 34-14 Linwood Rd Fairlawn NJ 07410

CREATE a QSL with a "Sampler instruction kit" 25c. Samco, manufacturer of (Xtra Class) and regular printed QSLs. Write Samco Box 203 Wyantskill NY 12198

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TWO color QSLs \$1.95 per 100. Send check or M.O. to A. Cohen 2025 B North John Russell Circle, Elkins Park PA 19117

NEW! QSLs professionally designed and printed. Every card original, exclusively for you. Samples 25c (deductible). W1FLX QSL Designs 20 Britton St Pittsfield MA 01201

100 QSLs \$1.60. Samples, dime. Holland R3 Box 649 Duluth MN 55803

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WIRELESS sets, parts, catalogs, bought, traded. Lavery, 118 N. Wycombe, Lansdowne PA 19050.

REPAIR and calibration service. Write before shipping. Pan Tronics, Inc. Box 209 Annandale VA 22003.

TELETYPE parts. Fast service. Machine to M.35. Buy, too. S.a.s.e. Typetronics, Box 8873 Ft. Lauderdale FL 33310.

NOVICE crystals: 40-15M \$1.38, 80M \$2.08. Free flyer. Nat Stinnette Electronics, Umatilla FL 32784.

AMATEUR museum buying old radios, books, magazines, catalogs, parts. Selling QSTs and CQs. Erv Rasmussen 164 Lowell, Redwood City CA 94062.

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WE buy electron tubes, diodes, transistors, integrated circuits, semiconductors and resistors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207. Tel. 201-354-3141.

WANTED Collins mechanical filter 0.2-0.4; 1.8-2.1 KHz. H.
Mshima 787 Curtiss Parkway 119, Miami Springs Fl. 33166

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28, 32, 33! Many more bargains. Last, stamp please. Van W2DLT
302Z Passaic, Stirling NJ 07980

SB 401 with crystal pack \$265, SB 300 all filters \$175. Both excellent condition. Together \$420. R. Frank, 19 Cherry Blossom Ln., Channahon, IL 62816 401-828-6212

YAESU 560 & speaker in cartons \$395. Hy-Gain 3 element beam two months old \$45. Call 203-633-2489 for further details. Scallion, Glastonbury CT 06033

SX-117, mint \$170. Heathkit DX60B xmtr \$70. Other goodies.
Send s.a.s.e. for list. Doug Klingman, Box 10337, Lubbock TX
79401

SELL: Hammarlund HQ100A receiver \$80, Viking Challenger transmitter 80-6 \$60, Both excellent, Irwin Hyman W2DJQ, 166 Syracuse Ave., North Massapequa NY 11758

SWAN 350 (late) with calibrator, 117C ac supply and 412 dc supply, all very good \$300, Johnson 6 and 2 converter, 10 meter output, like new \$20, RME DB23 piezoelect, excellent \$125
Huster 40, 20, 15, 10 resonators and MU-2 foldover mast \$220
Husters Band Adder \$99, Shure 401A mike, as new \$6, Esterline shielded ignition system for Buick 6 cylinder \$18, All items E.O.B. Andrew Byerley WBBH&K, Route 2, Webster City IA

HP13 \$50. GE EP14B dc supply \$35. Sound pwr phones \$10
All A1 R Meyer #505 Yellowstone, Elmhurst NY 11375

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Village Green, Westfield, MA 01089

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CV-591A/URR \$6.60 each, Hundreds more. S. Consuelo, 490
Roanne Dr., Washington DC 20021

FOR SALE: Heathkit SR-101 transceiver with external tuning unit (SB-640) which enables split freq. and P/S \$390. Drake 2-c receiver, excellent condition \$200. WA2EAA Tony J. Podrasky

212 8th St., Hicksville NY 11801. 516-433-1351
DX-60B \$85; HG-10B VFO \$15; HQ-110A RCVR \$105. All
absolutely mint condx with manuals. Gary Hofer WB4OUN
2202 Bayshore Hwy., Fairfax VA 22030 703-260-3328

SEILB: Halicopters HQ-110AC RCVR, fine condx; Tcrat TR-144 2-MTR, PS, GUD. Larry Schoen WA2GUA, 1446 E 52nd st, Brooklyn NY 11234

FOR SALE: Johnson Valiant \$135. BC-312 RCVR with P/S
\$65. John Anderson WABUNP, 1204 Village Dr., So. Charleston
WV 25309

HEATH HW-17A two meter transceiver, factory calibrated, like new \$80. Paul Adler, 100 Manorshire Dr., Fairport NY 14450

WIDE SWAP, HAVE COPIES 1984, WALK, DRINK, TALK, TRAVEL
Stanley Holmquist, 3704 Capri Dr., Santa Barbara CA 93105

516-931-2966
WANTED: Johnson Viking navigator transmitter. WA9WGT
715-623-3107

CLEANING out my shack. HP 430C Sofometer \$70; Dumon 322 dual oscilloscope \$100; Bruno 94E RF power bridge \$78; TS 148 UP spectrum analyser \$65; HP 624C X band test set (best offer) all in good condition. Shipped to: Anchorage

Other miscellaneous equipment available. Write for list
KL7ARY, 6611 Inlanch Way, Anchorage AK 99502

Heathkit SR 300 receiver, mint condition, all filters included

PROPELLER pitch motor, mounted, transformer selsyns with

RG-10B \$30: RCA course No. 26 semiconductor electronic
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ALLIED A-2515 general coverage receiver, amateur bandspread
perfect condition \$65. Must sell. Ron Mendel WN9CGV, 934
Kilbourn, Skokie IL 60076

SALE: Heath HR10B with HRA-10 and HS24; DX60-B with HG10-B and GH12-A, extra tubes and crystals. Cost over \$250. Sale price, \$125. Ivan O'Neil, 312 Crestview Dr., Kalispell, MT 59901

CALIFORNIA: Swan 500C, 117XC, Excellent. \$420. New tower. WA6CFE, 213-378-0110

FOR SALE: Central Electric's 1947 transmitter Serial 241
\$290; 75A4 Serial No. 4622, mint condition with speaker
vernier knob \$395; 2 prop pitch motors \$29 each. W1PST, 3
Martha's Ln., Chestnut Hill MA 02167. 617-566-0427

TRADE Swan 250 with power supply for NCI, 2000. KH6GIJ
Box 421, Honolulu HI 96809

ARGENT: Ameco TX621 transmitter and matching 621 VFO with relay, cables, manuals, W16L, f.c. Firm \$130. W4GNS, #206 Midnight Pass Rd., Sarasota FL 33581

WANTED: used printing press type and cuts that have been used in printing QSL cards. W9RZL, Rt. 1, Iuka IL 62849

CONTACT us for the best deal on new or reconditioned Collins, Kenwood, Tempo-One, Drake, Swan, Galaxy, Hallicrafters, Hy-Gain, Mosley, Henry Linear, towers, antennas, rotators, other equipment. We try to beat any deal and to give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio, Butler MO 64730

HAMMARLUND HQ110, Johnson TR switch, Heathkit DX60A — Heathkit HQ10, all cables and manuals. \$200 for all or will separate. Tom Sigman, 1501 Winding Way, Nashville TN 37216

FOR SALE: Heath HX20 XMTR, HR20 RCVR, HP20 ac supply \$160 firm. Also Hallicrafters HT40 XMTR \$45. Ralph Bowen WB5AAR, 2016 Flatcreek, Richardson TX 75080

DRAKE 2-C rcvr and spkr. #145. Doug Willinger, 4030 Stansbury, Sherman Oaks CA 91403

WANTED: Manual or schematic diagram for OS-62/USM-50 scope. Purchase or borrow. WTKLK, c/o ARRL, 225 Main St., Newington CT 06111

NOVICES: Need help for general ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, Box 6015, Norfolk VA 23508

FOR SALE: DX60B, good conds, manual \$65/best offer. Will ship up to 600 miles. WA1NIO, 57 Jefferson Dr., Ridgefield CT 06877

QSTs Jan 58 thru Dec 69, only 3 issues missing. Make offer. New Skyline Trihand Quad, never assembled \$25. Al Stevens, Granite Falls MN 56241

QST magazines, January 1960 through December 1969 less six issues. Submit offer. F.O.B. Fischer K4AS, 9802 Ashby Rd., Fairfax VA 22030

HEATH 16-52 generator \$60. SX-101 \$150. H4-32 \$150. All e.v. condns. Davis K3KHI, 100 Rosewood Ave., Baltimore MD 21228

COLLINS KWM-2 No. 15,596. PM-2, perfect, original owner \$850. K4CGV, 2316 Limerick Dr., Tallahassee FL 32303. 904-385-4958

FOR SALE: Technical book collection. S.a.s.e. for list. K1APA, 3 Sunny Acres, Brattleboro VT 05301

SELL: NCX-500, AC-500, Excellent \$365. H Taubin W2GCW, 192-15A 69th Ave., Flushing NY 11365. 212-464-2775

FOR SALE: Like new TR4 with noise blander MS4 speaker and AC4 power supply. Hardly used. \$545. K2AC, Wheeler Ave., Fayetteville NY 13066

SELL: NC183D RCVR and Viking navigator with manuals. Package deal \$130 or will swap for Viking KW matchbox. WA4VDN, 120 W. Queen St., Edenton NC 27932

WANTED: W2RUK would like to compile a list of Hams who are interested in model railroading. Card to 7 Charles, Auburn NY 13021

WANTED: Tribander beam (full power), rotor, 20' or more tower. Include price and details. WB9CZS, Paul Sacks, 9200 Greger, Chicago IL 60617

TRIBANDER — Mosely MP-33, 1 yr old w/ bahn \$75. 6-foot rack w/ panels \$25. U pick them up. Neal, WAGENV, 2141 Fallen Leaf Pl., Tustin CA 92680. 714-834-4766

NCX5 Mark II with NCXA power supply. Excellent condition. \$375. W2FAU R. Barnard, 138 Weston Ave., Chatham NJ 07928

4-1000A unused. Parts for 2KW linear-teletype mod 15 & TD. Nick, WB2VAE, 160-42 85 St., Howard Beach NY 11414. 212-835-2082

TELETYPEWRITER machines, parts, bought-sold. S.a.s.e. list. Typetronics, Box 8873, Ft. Lauderdale FL 33310

WANTED: Collins 628-J. Sell: Heath SB-110 with ac power supply, speaker \$180. K3SLJ, Rt. 1, Box 24, Pottsville PA 17901

SELL: 1928 Philco Mod 40, 115V D.C. Works fine. Best offer. Want to buy Wind Charger for 120 V D.C. Describe condition. William Boykin WA3EYG, Rt. 1, Box 115, Lutherville MD 21093

WANTED: Self-supporting crank-up tower. At least 50'. Von D. Stafford K4VUY, 8316 Denise Dr., Louisville KY 40219. 502-969-8414

NEVER used HW-100 w/HP-23 instld in SB-600. New HM-15 SWR meter incld. Pro condn aligned. Complete w/cables/manuals. RE prepd. \$280. H. E. Bartell, 287 Mitchell Ave., East Meadow NY 11554

CAPB Cod Sale: HW12 \$45. 75A4 with three filters and vernier \$275. Low freq receiver \$15. HRO with all coils and power \$35. B&W 5100 \$45. SB200 \$145. Elmac 3/1000 unused \$15. All good condition with books. No shipping except tube. W1DVS, 56 Worcester Court, Falmouth MA 02540

SELL: Collins 75A-3 \$200. Lakeshore Phasemaster III sideband exciter \$50. Mosely TA-33 \$50. Robn No. 6 tower \$25. Alan Fleischer WA6VIX, St. Louis MO. 314-542-3990

FREQUENCY Counter — 200 Mc., all solid state \$695. Somelock, 5070 Bonnie Branch Rd., Ellicott City MD 21043. 301-468-3234

WANTED: 6 meter transverter, HA-2. W2IYR.

HEATH station, HW23 recon'd Heath at Heath. HP23A new. HP-13, mike GH 12, HRA 10-1 new includes manuals, mobile antenna, all fittings, wires. First \$166. I pay shipping. WA2DZV, 201-462-4837

CLEMENS Model SG-83A signal generator, like new \$175. R. D. Smith W0NGS, Box 93, Lanyon IA 50844

SELLING for best offer year-old mint HQ180A speaker, spare tubes. Must pick up. Walter Jandro, 473 Success Ave., Bridgeport CT 06610

SELL: Hammarlund HQ-170A-VHF receiver, 160 thru 2 meters \$190. WB6SLT, John Myers, 1344 Orchid, Santa Barbara CA 93108

WANTED: Viking Navigator with manual. WB2AMI, Russell Rd., Wappingers Falls NY 12590

QST — 1932 to 1971, except 6 issues 1947. Good condn. Plus 3 years CQ \$150. W. V. Chambers W3EYY, West Willow PA 17583. 6 miles south of Lancaster

HAMMARLUND HQ-200, 6 months old, top condition, and Johnson TR switch. \$240 or best offer. John Davis, 120 Oak Valley, Nashville TN 37207

TR-4 with noise blander. Perfect. \$495. AC/DC supplies, accessories. S.a.s.e. for list. K3BNS, Box 192, Ladogone PA 15047

MUST SELL: R4B T4XB AC4 MS4, Excellent. Richard St. John, 1510 Anthony St., Hancock MI 49930

FOR SALE: Drake TR3, AC, MS4, Also Heath HR-20. Want vertical antennas 10-40. Pohorence, 11046 NW 6th Ln., Miami FL 33126

RECEIVERS SX100 \$135; S77 \$40; transmitters DX100 \$100; DX40 \$40. WB6LQG, 22615 Decoro Dr., Saugus CA 91350

DRAKE R4 receiver, mint condition \$150. Am M. Magagna W8RWW, 3922 Mac Alpine Rd., Ellicott City MD 21043

SELL: SX-117, good condition \$155. Also new condition R 390 A \$795. WA4IS, 300 Thornwood, Taylors SC 29687. 803-268-2518

HEATH Warrior Linear, Model HA10, good physical and operating condition. \$100 f.o.b. W4YGX, Box 746, Melbourne Beach FL 32951

SCANALYZER wanted: Heath SB-620, spectrum monitor. State price. Must be in perfect condition. Write W2CVY, 70 Beech Terrace, Wayne NJ 07470

WANTED: Johnson Viking Navigator with manual. State price and condition in first letter. Lew Prescott W1RFQ, 15 Loring Dr., Lincoln RI 02865

HEATH SB-101 and HP-23 plus extras for \$325; Heath SB-200 for \$190. Write or call Barry Groner, 237 Atwood St., Pittsburgh PA 15213

TELETYPE equipment and parts for all models. Write R.T.T.V. Electronics, P.O. Box 655, El Cerrito CA 94530

SWAN 350, 117VAC and mobile DC supplies, w/15M spurious filter, extra finals, in good condition, \$465; Model 14 non-typing reperforator, refurbished, \$20; Budweiser Beer neon sign (unique shack conversation piece), \$14. Local interest preferred. Jim Talens K3MNI, 8361 Langdon St., Philadelphia PA 19152. RA5-2373

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TRADE, sell: used receivers. Available HQ-180C, R-4A, HQ-200, NC-190, GPR-90, S-Line. Steven Kullmer, Evergreen Hatchery, Dysart IA 52224

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WANTED: Teletype machines, parts, Models No. 28, 32, 33, 35, 37. Cash or trade for Drake equipment. Altronics-Howard Co., Box 19, Boston MA 02101. (Tel: day or night 617-742-0048)

CLEANING shack. NC300 with X'tal calibrator \$135. Ameco nuvistor converters 50 and 144 \$25 each. Six foot rack with castors \$30. Other goodies priced right. Send for list. R. Bintliff, K1YDG, RFD, Acton MA 01720

CLEGG-Zeus transmitter — 185 watts input, top 2 & 6 meter transmitter in excellent shape with power-supply modulator with instructions. WA1GBX, 92 Lawlor Terr., Stratford CT 06497. phone: 375-2848

BEST offer — QSTs 1947-1958 in hard binders. Harold H. Starr W1LQG, 108 Columbia St., Brookline MA 02146

SELL: Viking Valiant \$75; DX100 \$85; HQ129X \$55. WA2OLC, 9 Wyndham Way, Port Wash. NY 11050. 516-767-6863

WANTED: Crank-up tower, 70 to 100 feet. WA5FNW, Route 2, Box 220, El Reno OK 73036

WANTED — For personal collection. The Radio Amateur's License Manual, Edition 12. ARRL "Map of Member Stations," 1914. W1CUT, 18 Mohawk Dr., Unionville CT 06085

WE'RE trying to complete our collection of callbooks at Hq. Anyone having extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington CT 06111

DRAKE 2C, 200, xtal cal. mint \$190. 2-meter Heath HW17A factory aligned \$90. W8BGNP Dick Wilber, 5265 University, Santa Barbara CA 93106

WANTED Linear— National or Collins preferred. Must be in good condition or excellent. Call WA2NJR, Danny 914-834-6464 or write Box 43, Larchmont NY 10538

RANGER, good condition, time sequence keying, manual \$49 firm, no ship, will deliver within 50 miles L.A., Phil Smith K1NBN/6, 16263 Midwood, Granada Hills CA 91344, Tel. 213-360-4536

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KNIGHT T-150A transmitter, Heathkit Mohican receiver with AC pack. Ron Garrison, 241 East Holden Hall, Michigan State University, East Lansing MI 48824, Tel. 353-4093

DIODES— 1000V PIV 1.5 A Epoxy 24 cents each ppd, Toroids 8MMHY or 44 MHY 5 for \$1.50 ppd, Wueschenker, Box 383, Irwin PA 16642

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WANTED: KWM-1. Call Jim, 516-692-8817 (516-694-1414, weekdays) or write W2NM.

NEW HW12A and HP23A — hot performer — \$129. Harold Greene, 211 Circuit, Hanover MA 02339

DRAKE R4, T4, MS-4 with a.c. supply. Excellent. \$415. W4TEW, 2783 Evanswoods Dr., Atlanta GA 30340

FOR SALE: Drake K4B receiver ham bands. Excellent, \$385. 2201 Branch Ave., S.E. Washington DC 20020. Tel. 582-2585

CQ-FLORIDA interested in sub-letting home or apt. Long or short term. No children or pets. W2CRW

SELL: SK101A, good condition; Invader 2000, needs work; manuals, connectors, original boxes. Make offer, Pick-up only. W2NKC, 115 Roosevelt St., Garden City NY 11530. Tel. 516-775-8255

DRAKE 1-A excellent condition \$100 money order or certified check. R.O. Crossner, 1241 1/2 Columbia Pl., Orange CA 92668

SEVERAL Progress line tube and transistorized Gen. Electric FM mobile & bases 27 to 54 MC & 150 MC. From \$350 to \$450. W9DSV, Box 87, Webster WI

COLLINS KWS1 \$700, factory serviced, James H. Maloney W7NWE, 143 S.E. Chelsea Ave., Vancouver WA 98664. Tel. 206-695-0135

HW-100 XCVR; HP-23A supply with speaker, cabinet; HD-10 keyer; PTT mike, All excellent condition, \$270 plus shipping. D. Flanigan, 1024 Pammel Ct., Ames IA 50010

NCX 5 with NCX-A (ac) \$325. KW Compac Heath HA-14 with HP 24 supply \$125. SBE 34 \$250. Two new 4-1000 \$50 each. W6JHG, 2089 Cypress Dr., El Centro CA 92243

32V5 a classic black beauty by Collins, with Collins rdk, manual, and spare 4d32. Sell or trade for operating or restorable gear. Also HW 22A, brand new, unused, tests fine, with 100 KHZ cal. HP 23 power, mobile mkr, and manual \$150. W44LIG, 7621 Lankford St., Apt. 2, Norfolk VA 23505

WANTED: Used antenna Matchbox. Jim Reichler, WN2REW, Box 153, Stony Brook NY 11790

EIMAC VC-12 32 Kv fixed vacuum capacitor \$2, Ohmite D-100 73 ohm 100 watt dummy load \$1. KH6JL

SELL: Unique "wire" tuner. Mint condx \$45. WB2IWH, 213 Dayton Ave., Clifton NJ 07011

SELL: Galaxy GT-550, ac P.S., VOX with manuals \$450. Will ship. Siefer, 4295 Waybourn Rd., Columbus OH 43220

SWAN 270 \$375 or best offer. 40 M Husler mobile ant. WA6TQT, 2210 Vaquero, La Habra CA 90631

WANTED: TR4 with AC3, clean, unmodified, MS4 optional. All inquiries answered. Al Bart, 5406 N. Neenah Ave., Chicago IL 60656

75A4, SN4305 \$325. Vibroplex \$15. DR23 preselector \$15. New 4D32 \$20. JT30 mike \$6. UPX003A GE preamp \$7. Do coax relay \$9. Other misc., new tubes. W9WYN. Tel. 312-485-5990

LOOKING for Skeds with YLs. Interested in astronomy, spacecraft vehicles, astronautics, status of technology, computers, railroads, astronauts, electronics, and art. WB9BV Extra Class Nicklaus Leggett, 3339 North Charles St, Baltimore MD 21218

FOR SALE: 2-meter mobile-base station, HW-17A XCVR, MP, SWA-17, 1 FM, xmitting adapter HWA-17-2, Husler MO mobile mast, GMA TG-2 mobile ant., antenna specifications M-19 bumper mount. All mint cond. 6 months old. XCVR factory aligned, all cables and manuals. \$210. Package deal only — cash only. You must arrange shipping. A.B. Pedio III WB4MGA, 430 Wyneff Dr., Richmond VA 23236

CAMPING in Europe this summer? Write now to DL4VA/W44WME, 10 man eyeball QSO. Vandegriff MATCOM-D80, APO NY 09052

CAPACITORS — brand new 275ufd electrolytics at 500wvdc Ten for \$19.50. K4HP, P.O. Box 28951, Atlanta GA 30328

HAMMARLUND HQ-10A, very good condition, with speaker manual \$110. WB4KZX, 114 Berwick, Oak Ridge TN 37830

NEVER got license. Never used T4X R4 ac supply matching speaker \$775. "Hurry" (or used TR3 RV3 and AC4 perfect \$500. Mike Schaff, 7651 Quitman, Denver CO 80030, Tel. 429-2417

HAMMARLUND HQ-150 general coverage receiver and speaker in very good condition with no scratches. \$100 money order. Will pay shipping. H.J. Robison K4YHR, Rt. 3, Box 12, Tallahoma TN 37388

SB301 excellent cond. \$250. WB4NMY, 4803 Russell St, Richmond VA 23222

HQ-140-XA \$75. Gonset G-50 6-meter \$100. Pearce Simpson Marathon 30A, 1.6 to 5 mhz \$75. WA4AYM, 1103 Waverly, Muscle Shoals AL 35660

HEATH DX60A transmitter \$50. HR10 receiver with crystal calibrator and speaker \$60. Also HQ119A receiver \$130. Your price freight. Ralph Frick WA2MIU 172 Holly Dr. RD3, Dover NJ 07801

SELL: Late Swan 350, power, extras \$315. Howie WB2ZDY, Tel. 212-828-0394

EICO 753 transceiver, ac power supply \$150 or best offer. Wipsh, D.A. Rottenberg, 269 Congressional Ln., Rockville MD 20852

SELL: NCX-500 transceiver with AC-500 supply, FB cond \$285. K3TML, 27 Sheldon St., Wilkes-Barre PA 18703. Tel. 717-824-9310

HW 100 SSB transceiver, PTT mike, HP23 power supply, SB60 speaker, excellent condition \$275. J. Reichsteiner WA6QPU, 22 Naomi St., Redlands CA 92373

HALLICRAFTERS SX-100 good condition \$130. Heathkit HW-12 modified for 20, 40, and 80 meters \$200. W47LKN 18019 First N.E., Seattle WA 98155. Tel. 206-363-9581

WANTED: HT-33B linear. Sell: SB-401, Ray Crawford W4VRC P.O. Box 424, Royston GA 30662

COLLINS 32S-1 S/N 86 \$250. 516F-2 ac power supply \$55 75A-4 S/N 1674 \$250. All units o.k. and clean. (Not recommended modifications. Will ship f.o.b. W6DSX, P.O. Box 201, Paradise CA 95969

FOR SALE: Heath Twoer \$25. Gonset G-50 5 mtr Kever \$12. 753 MKII Hy-Gain Tribander \$60. Mint condition. You pay shipping. First certified check. Burt Sammis WA6QBX, P.O. Box 551, Vinton LA 70688

U.S. Callbooks \$6.90. Foreign callbooks \$5.90. Free used equipment. Amateur Radio Headquarters 1916 7th St W, Billings MT 59102

QUALITY stainless, other, threaded, washer, hardware for antennas, towers, equipment, guying, antenna accessories, B4 lists 20 cents! Walt W8BLR, 29716 Briarbank, Southfield MI 48075

NOVICES: Brand new Genor model 400, 25 watt transmitter Assembled and tested with key and manual \$30. 1 ship. Larry J. Tucker WN9CLU, R.F.D. 1, Leland IL 60531

HAM — Counselor, over 18, to instruct at a children's camp the Pocono Mountains of Penna. (Own equipment required. Explain type equipment and further qualifications to Pocono Highland Camps, 6528 Castor Ave., Philadelphia PA 19149

FOR SALE: Late SX-101A with spinner dial. Excellent cond. Asking \$200. Communicator II AM/SSM with Heath pha modulator. Asking \$100. Will deal or trade. KITFA, 727 Ph St., Bristol CT 06010

KIRK quads, heli-coils. New signal-once. Low quotation trade. Don Payne K4ID, Box 525, Springfield TN 37172

WANTED: for personal use, Collins S Line; late 75S3B/C, 32S 312B4, 516F2. E1PN3, 24 Rockwood Dr., Waterford CT 06391

FOR SALE: T-1XB Drake transmitter and AC-4 matching pow supply, new, never used, still in factory sealed boxes. W sacrifice, both for \$475. Also Valiant 1 transmitter \$9 K4IDHM, Lawrenceville PA 16929

ELECTROWRITERS: One transmitter unit and one recvy unit. Manufactured by Vector Corp. Never used. \$500 for 1 pair. Fred Kendall WR1PB, 345 Gull Lake Dr., Richland 1 49083. Tel. 616-629-4354

ST sale, 1953 to present. Mint condition. Highest bid plus shipping cost takes all. W1 WDDP, P. Card, Cal Book QTH

ALLIED A-2515 receiver QST Feb. 1969. Very clean, mint condition. Recently factory aligned and checked. \$70 or best offer. Shipping prepaid. Send bank check or m/o to Rick WALKER, 49 Brookside Rd., E. Brantree MA 02184

HW-16 \$80. HG10B \$25. HT-46 \$190. James Cain, 5713C Port Irving, Indianapolis 46224. Tel. 317-247-8963

73 magazines needed to complete personal collection. Lacking January, February, March, 1961, and December, 1963. Gladly pay any reasonable price plus shipping. Bob Yeager, P. O. Box 1-2, Guadalupe, Jalisco, Mexico

HAMMARLUND HQ-170A, excellent condition, manual included \$180 plus shipping. WA2PUJ, 6 Warren Place, Plainville NY 11803

HEATH SB 200 perfect \$175. Viking Ranger \$75. National (HOTA-) \$100. W2RFT, 16 Upper Loudon Rd., Loudonville NY 12121

WANTED: instructions and/or schematic for Knight T-60 transmitter. D. Sims, 2116 W. Sloan, Burr MI 48417

COLLINS DC power supply 516E-1 never used \$50. f.o.b. C. WOBBL, 10624 E. 87th St., Raytown MO 64138

MEISSNER signal shifter, VFO w/coils 10 to 160 meters, exc cond., best offer. John Tidball, 553 2nd Ave., Long Branch NJ 07740

YOUR offers — QST from 1916 to date. CQ. Radio, Proc. Ire. HQ-180C, BC-453, 454, 455, 457, 458, 459, H-W TBS 50-D, Monitor radio, Mac-Key, single tube TU with loop supply, 805s, 809, 812, 838, 852, 860, many 2.5 and 6.3 volt receiving tubes, all new most sealed cartons. Heath Scope, TV alignment generator, battery eliminator, Wilcox F-3 receiver, Browning deviation monitor, room, Piles right, F.O.B. Augusta Maine, R. Parker, R1, 04330

SELL: Collins 755-3B, 325-3, 30L-1, 312B-4, and 516F-2 ac power supply. All mint condition. Jack Thompson WA2FOX, 435 E. 70th St., New York City 10021

SX-117 and HT-44 with power supply, all manuals and cables. Perfect condition, \$500 value \$425. Mike Dwyer, 6506 South Ave., Middleton WI 53562

UFFO Collins, Sell: RX-50-A, HQ-170-C, BXL-1, T-50, VF-1 VFO, plus 3 el Hy-Gain triband beam on 40 foot unguyed tower. \$725. F.O.B. K8CCV, 5471 Norquest Blvd., Youngstown OH 44515

RUBBER stamps: your call, 1/2-inch letters, \$1. Ellis, 108 East Cook, Anchorage AK 99501

FOR SALE: Pair of Collins 75A3 receivers. Both with product detectors and xtal calibrators. one with 800 Hz accessory filter. Asking \$200. without extra filter, \$215 with. Contact E. Shapiro W2NXT, 49 Paerdegat 2nd St., Brooklyn NY 11236. Tel. AC212-763-7910

FOR SALE: Bound QSTs from Aug. 1920. Both covers and operating dept. included. No shipping. No breaking of set. \$10 per volume. Also complete equipment and extra supplies for ham station. Write Anne Fitz, Box 252, Lanesboro MA 01237

HW-32A with calibrator \$80. HP-13 \$66. Hustler 20M whip \$10. Microphone \$6. Halbach offers HT-18 all band cw/lin VFO exciter \$60. Viking VFO 122 \$25. Beautiful pair 811A all band linear in small cabinet less power supply \$30. Charles Bird K6HTM, 875 Lando Ln., Chico CA 95926

VHF Amateurs: Sell Clegg interceptor receiver with Allbender converter \$250. Hammarlund HQ170A-VHF receiver \$200. National NC 300 receiver with 6-meter converter and speaker \$125. Johnson "6N2" transmitter with VFO and Viking Valiant modulator and P.S. \$150. Heath VHF-1 Seneca \$90. Poly-Comm 2-meter transceiver \$150. Poly-Comm 6-meter transceiver \$130. Gonset Communicators: 2-meter \$140; 6-meter \$120; VFO \$30. Heath "Twoer" \$20. Clegg Venus 6-meter transceiver w/ 416 P.S. \$175. Heathkit SB-110A w/ HP23 P.S. SB600 speaker \$250. Gonset Hawkwind W22GWU, 220 Highland Blvd., Apt. F-12, Brooklyn NY 11207. Tel. AC 212-277-4001 Ret. 5-9 P.M.

SELL: New Heath station, used 5 months. SB-220, SB-401, SB-301, SB-630, SB-600, HDP-21A mic, Telex headphones, Vibro-keyer, TR-44 rotor, Hy-Gain TH3-MK3. No reasonable offer refused. Jack Cegella, 1426 W. Locust St., Scranton PA 16504. Tel. 717-346-0612

WANT to buy or trade for: surplus R-C-L bridge; 455KC panadapter. David Potter, 2844 San Gabriel, Austin TX 78703

FOR SALE: Late SX-101A with spinner dial. Excellent condition. Asking \$200. Communicator II, AM/FM, with Heath phase-modulator. Asking \$100. Will deal or trade. KITFA, 727 Pine St., Bristol CT 06010

SELL: 1948-1970 QSTs, 17 years in binders. Code machine keyer TG34A, Eimac 592/3-200A3, Kimaac 4-125A, 3E29s, 12V dynamotor, BC 221AK w/mod. Make offer and pay shipping. W1QBT B. Gorr, 13 Oakhurst Ave., Ipswich MA 01938

SELL: Galaxy 5MK2 transceiver w/ac supply, VOX, calibrator \$275. Extras available: cw filter \$20; DC supply, dash mount bracket \$65. WIBH

DRAKE 2NT, 2C, 2CQ. Excellent condition \$250. Bob Bruno W2HTH, 1 White Birch, Auburn NY 13021

FOR SALE: Kilowatt using two 413s with power supply. In excellent condition \$80. WA2YYJ Carry Rothschild, 700 West/78 St., New York 10033. Tel. 212-WA-9067

FOR SALE: SB-400 \$225. HQ-170ac \$200. K3-FLV-Jack Peoples, 306 N. Central Blvd., Broomall PA. Tel. 215-686-4849

FOR SALE: Heathkit HW12A and ac power supply \$100 or best offer. Greg Ickes, 516 Central Ave., Westfield NJ 07090

GETTING married. Sell Drake T4X, R4A, MS4, AC4, and SWR bridge \$600. You ship. Stephen Rigby, 6606 Evening St., Worthington OH 43085

HQ-110, Viking Adventurer, Heath VF-1, station control \$135. Make offer for separate sale. Steve WAZLEZ, 309 Pleasant St., Utica NY 13501. Tel. 315-735-2506

DRAKE 2C 2CQ 2NT 8 novice crystals. One owner, used less than 10 hours, all cables, manuals, and original cartons absolutely mint condition \$325. Will ship. WN9BDM. Tel. 516-842-3445

SELL: Collins 51J3/R388 \$300. Measurements 80R Sig. Gen. \$200. Eldico SSB100 trans. 2-30 MC \$200. Eldico SBA-1, SSB adptr. \$50. Ampex T-1V Camera, solid state \$100. R. Haynes, 5896 Mill Rd., Brecksville OH 44141. Tel. 216-526-4454

ESTATE K3YOO, Heath Seneca extra \$100; National Two Seventy receiver \$100; Heath monitor scope \$55; Knight TR-108 trvr w/VFO \$85. Send for list of other items. Mrs. Thelma Gardiner, 610 Arlington Ave., Milmont Park PA 19033

SB-101, cw filter \$345; SB-200 \$195; SR-600 \$14; SB-640 LMO \$74; HP-23A \$34; MicroTQ keyer, paddle, \$25; Tiny Tiger 350 watt generator \$65. All items new 1970. WA9ZMA, Gfnthfs, Quarters 4213A, USAF Academy CO 80840

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SELL: Bird model 43 "Thurline" wattmeter w/3 slugs. \$85. Viking Navigator, mint \$65. Knight K1640 VOM \$35. Each w/manual. W4WKE 17511 NW 47 Av, Opa-Locka FL 33054

FOR SALE: Gonset GSR201 Mark IV linear amplifier, never on the air. Will ship purchasers expense. Make offer. Ameco model P12 amplifier, used \$60 value, \$30. Ico 715 transceiver \$35. Midland SWR meter minus antenna \$5. Mars S-meter \$9. Dennis Heinan WA9WRU St. Cloud MN RR 4 56301

HEATHKIT SB301 receiver factory aligned to 1 microvolt or better on all bands \$275. Bob White 314 Tamerlane, Houston TX 77024

SELL Heathkit SB301 with cw filter \$225. SR200 \$185. Drake TX4B with AC4 and MS4 \$380. All used very little and in excellent condition. Gary Carnuck WA7GFT 4902 E 18th St, Tucson AZ 85711

SX101A perfect, all new tubes \$160. W4ZYT 1115A River Ct, Charlottesville VA 22903

HENRY 2K mint condition, console \$345. K4DRH 2957 Meadowlark Dr., East Point GA 30344

HEATH SB101, HP23A, SB640 vfo, cw filter; 1 1/2 yr old & perfect \$415. K1KKB Redman, 15378 Sand Ridge Rd., Bowling Green OH 43402. 419-354-3143

WANTED 75A4 vernier knob and cw filter. W0AJ 11800 Swadley Dr Denver CO 80215 303-233-3366

SWAN 500 with AC supply, like new \$360 firm. DC supply \$40. Mike Jones WB6ZXM 213-329-5020, 17025 Faysmith Av Torrance CA 90504

MUST sell Drake 2C mint, recent factory alignment \$165. DX60 five xtals, clean \$40. HG10B vfo perfect, new \$35. Try package deal. Smith WA2LLR 37 Rosemont Madison NJ 07940

GERTSCH FM44 freq meter multiplier to 30 GHz \$195. New Video Vision SSTV \$295. H-P signal generators 670HM, 670JM, 670SM \$50 each. 432 4X150/4X250 linear \$75. Swap list VHF/UHF/Vave SASE. WA4PL Box 4095 Arlington VA 22204

SWAN 500: four transceiver supplies ac-dc. Bargains. SASE. W4ZO.

SELL: Heathkit HA1A linear and HP24 power supply with manuals. Good condition \$95. Ray McCormick 7310 Whitehall Dr. Dayton OH 45459

COLLINS crystal pack. Be able to work practically any frequency with over 100 crystals. Best offer over \$200. WA9QLQ 5907 N. Oak KC MO 64118

SW3 wanted in good condition. Don Wilkinson, Curtis NE 69025

WORLD QSL bureau. See ad elsewhere in this issue.

2 KW toroid tank circuit kit #115 — kit contains special toroid core, end spacers, teflon sleeve and wire. Complete instruction for assembly. Update your old amplifier for cleaner more efficient operation. 3-30MHz core dimensions 2" dia x 1" thick. Kit price \$16.95. 30 amp filament choke kit #214 — kit contains core wire & instructions 2.5-55MHz dimension 3 1/2" x 3/4" dia. Kit price \$5.75, assembled \$7.95. Amplifier plate choke #217 — 2.6-55MHz 1.5 amp rating dimensions 4 1/2" x 7/8" dia. Price \$7.95, include 30c to cover postage. Make check payable: Redline Electronics 3438 E. Fulton St., Columbus OH 43227.

HEATHKIT station — SB101 with cw filter and ac supply. SB640 LMO, SB220 linear. Mostly triband quad. \$750. K1IGO 203-669-2458.

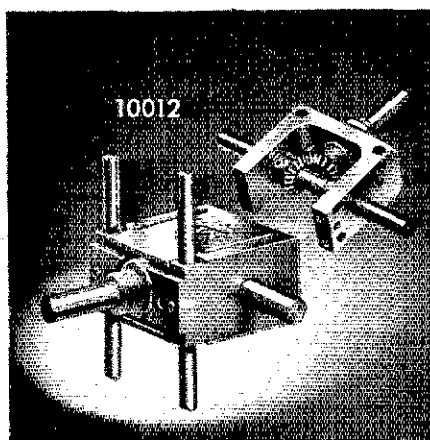
HAM radio counselors, minimum age 19. Boys summer camp in Pennsylvania, June 24 - Aug 22. Write Morgan Levy 1531 S.W. 82nd Court, Miami FL 33144.

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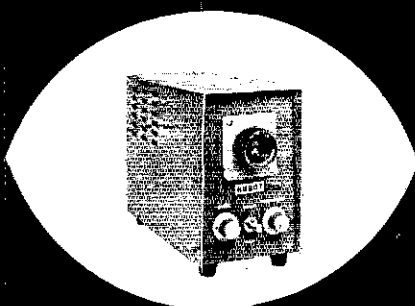
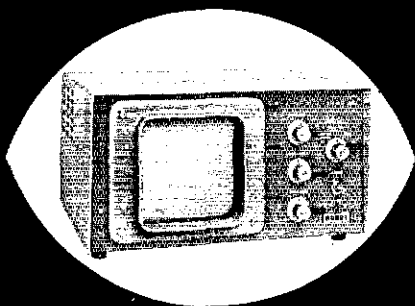
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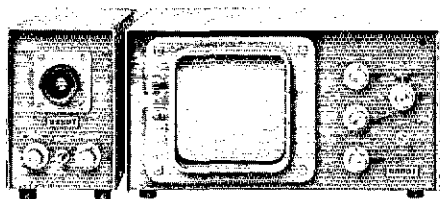
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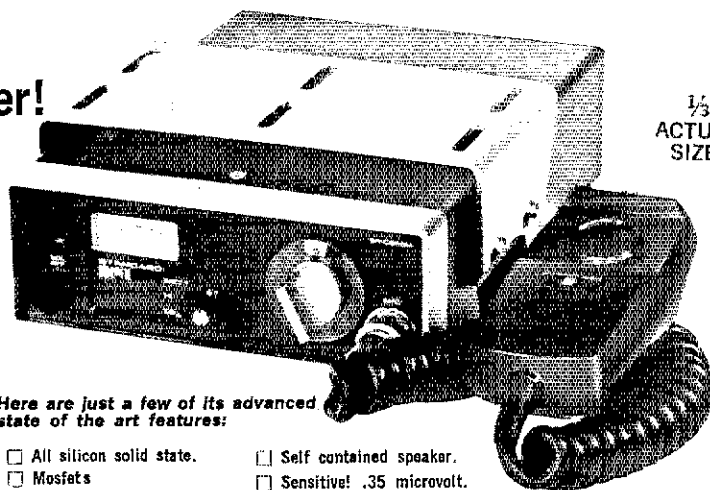
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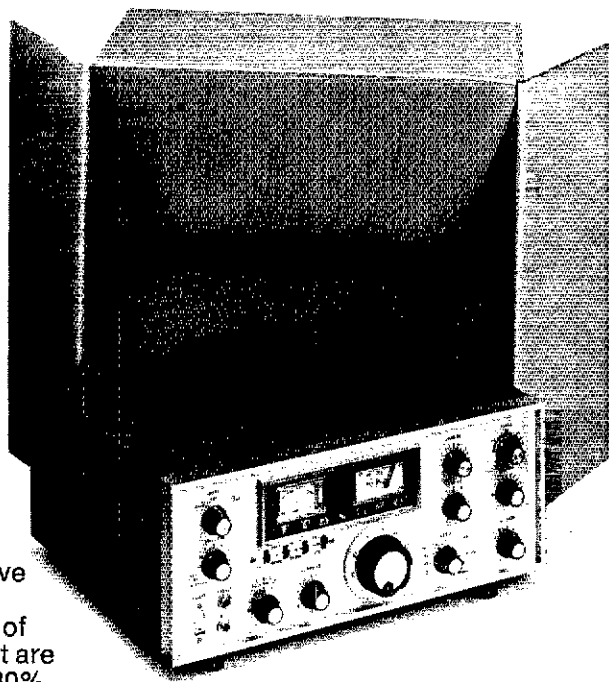
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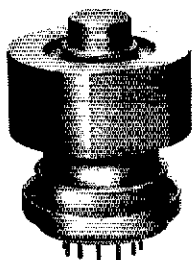
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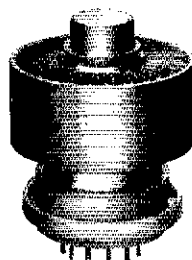
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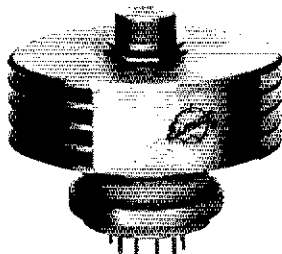
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