

November 1965

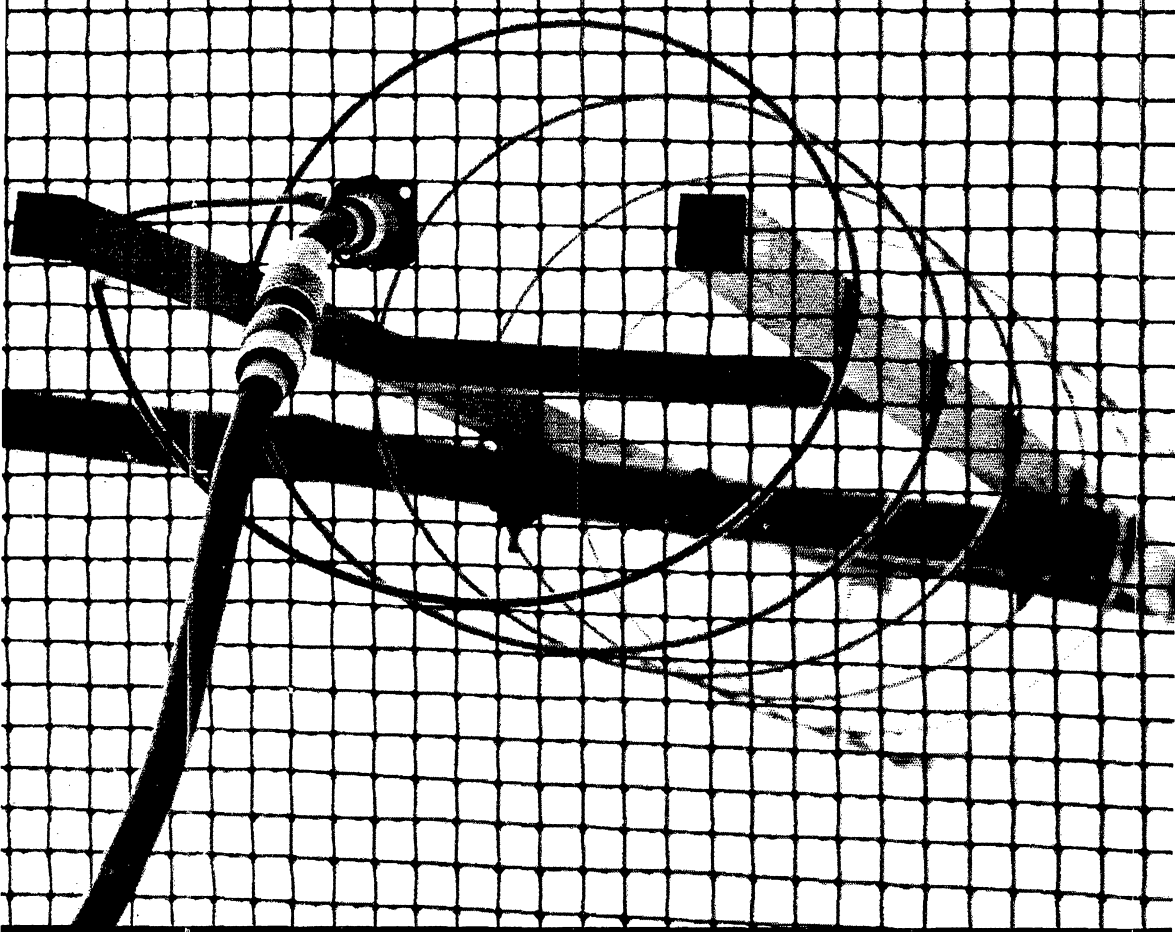
60 Cents

# QST

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# amateur

# radio



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in communications  
are born at...*



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7. *MP-1 Mobile Power Supply*—Transistorized inverter powered from a 12 v dc automobile, aircraft or boat storage battery to the voltages required for operating the KWM-1, KWM-2 or KWM-2A.
8. *PM-2 Portable Power Supply*—Compact, lightweight and supplies all voltages needed for KWM-2. Operates from either 115 v ac or 220 v ac at 50-400 cps to give you a completely portable SSB station. An auxiliary speaker is included.
9. *CC-2 Carrying Case*—Specially designed Samsonite Silhouette case for KWM-2/PM-2 or 30L-1. Molded Royalite interior protects equipment against rough handling. Also available in model CC-3 for accessories.





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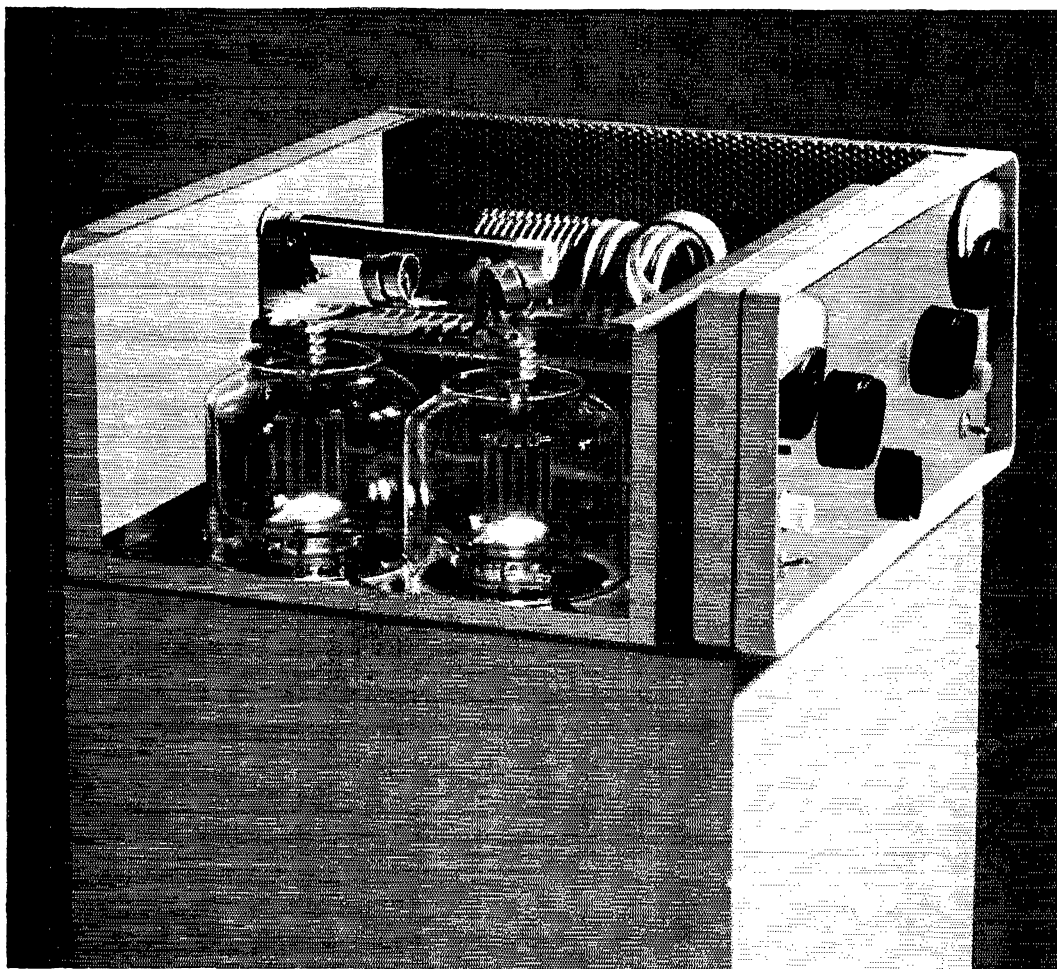
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## 3-400Z triodes power new Henry Radio 2 K linear amplifier

Henry Radio Co.'s new 2 K linear amplifier is sure to become a classic in its field. With an ultimate simplicity of design, it covers the 80, 40, 20, 15 and 10 meter bands for SSB, AM, CW, FM or RTTY. It provides Pi-L plate tank output circuit for maximum attenuation of unwanted harmonic output and resonant cathode input circuit for finest linearity and minimum drive requirement. The best possible performance was demanded of this new linear amplifier. That's why Henry Radio chose two rugged, original design Eimac 3-400Z grounded grid triodes. Designed especially for zero-bias operation, these two Eimac 3-400Z's provide 800 watts of plate dissipation and make possible simplicity of equipment design with no screen or bias power supplies required. For complete information on Eimac zero-bias triodes write Power Grid Manager or contact your local EIMAC distributor. EIMAC—a division of Varian Associates, San Carlos, California.





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## **MULTI-BAND DOUBLET**

*...built better to perform best*

Let's face it. The key to maximum performance from any multi-band trap doublet is in the traps. Sure, it's significant that Hy-Gain multi-band doublets use single strand steel wire elements that defy corrosion...won't stretch...and will withstand hurricane-like winds. It's also important that Hy-Gain's multi-band doublets have rugged, weatherproof center and end insulators that will last a lifetime. But, performance-wise, the real key to the fact Hy-Gain multi-band doublets will take maximum legal power...will operate with SWR of less than 1.5:1 on all bands...and will deliver true 1/2 wavelength performance on each band, is in the superior design of Hy-Gain's "Hy-Q" traps and the fact there's a matched set of "Hy-Q" traps used for each band. "Hy-Q" traps are just what the name implies...they have large diameter coils that are exactly wound and spaced to provide an exceptionally favorable L/C ratio for high Q performance. They employ air-dielectric design to eliminate any significant change in capacitor characteristics due to aging and extreme climatic conditions. But, most important of all, each matched set of "Hy-Q" traps is precision tuned to frequency to insure true 1/2 wavelength performance on each band. This means that with a Hy-Gain multi-band doublet there are no tolerance latitudes built in that will reduce the performance potential of the antenna...Hy-Gain multi-band doublets are built better to perform best. Five models to choose from plus a kit for building a 40 and 80 meter model.



Model 5BDQ for 10 thru 80 meters.....\$39.95 Net



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Model 2TDQ Matched Trap Kit for  
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**BUY  Hy-Gain MULTI-BAND DOUBLET**

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**HY-GAIN ELECTRONICS CORPORATION** 8401 N.E. Highway 6 - Lincoln, Nebraska 68501

## Section Communications Managers of the ARRL Communications Department

**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. ARRL Field Organization station appointments are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed OES, OES, OPS, OO and OBS. Technicians may be appointed OES, OBS or V.H.F. PAM. Novices may be appointed OES. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

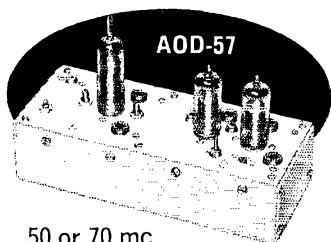
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Trenton	08928		
Buffalo	26		
Conway			
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Michigan City			
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Janesville	56048		
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Clear Lake			
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Covington			
Meridian			
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Schenectady			
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Norfolk	23503		
Fairmont	26554		
Alamosa			
Alamogordo			
Salt Lake City	84110		
Casper	82601		
Athens	35611		
Balboa			
Pompano Beach	33064		
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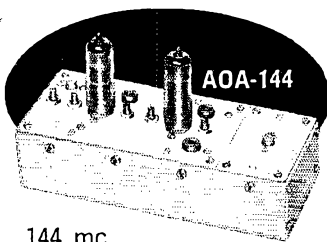
# NEW FROM INTERNATIONAL

## VHF/UHF UNITIZED TRANSMITTERS 50 mc—420 mc

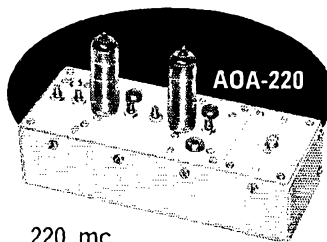
International's new unitized VHF/UHF transmitters make it extremely easy to get on the air in the 50-420 mc range with a solid signal. Start with the basic 50 or 70 mc driver. For higher frequencies add a multiplier-amplifier. All units are completely wired. Plug-in cables are used to interconnect the driver and amplifier.



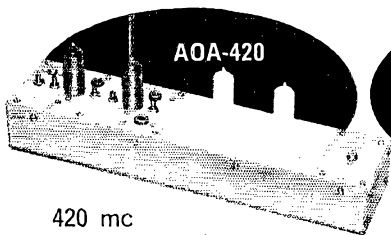
**AOD-57**  
50 or 70 mc  
**DRIVER/TRANSMITTER**  
The AOD-57 completely wired with one 6360 tube, two 12BY7 tubes and crystal (specify frequency). Heater power: 6.3 volts @ 1.2 amps. Plate power: 250 vdc @ 50 ma. AOD-57 complete.....\$69.50



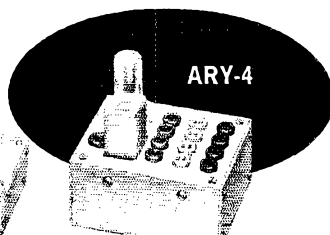
**AOA-144**  
144 mc  
**MULTIPLIER/AMPLIFIER**  
The AOA-144 uses two 6360 tubes providing 6 to 10 watts output. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate power: 250 vdc @ 180 ma. AOA-144 complete.....\$39.50



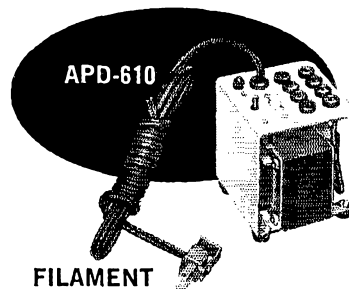
**AOA-220**  
220 mc  
**MULTIPLIER/AMPLIFIER**  
The AOA-220 uses two 6360 tubes providing 6 to 8 watts output on 220 mc. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate: 250 vdc @ 150 ma. AOA-220 complete.....\$39.50



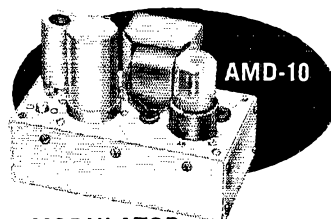
**AOA-420**  
420 mc  
**MULTIPLIER/AMPLIFIER**  
The AOA-420 uses two 6939 tubes providing 4 to 8 watts output on 420 mc. Requires AOA-57 plus AOA-144 for drive. Heater: 6.3 volts @ 1.2 amps. Plate: 220 vdc @ 130 ma. AOA-420 complete.....\$69.50



**ARY-4**  
**RELAY BOX**  
Four circuit double throw. Includes coil rectifier for 6.3 vac operation. ARY-4 Relay Box complete.....\$12.50



**APD-610**  
**FILAMENT SUPPLY**  
The APD-610 provides 6.3 vac @ 10 amperes. APD-610 complete.....\$9.50



**AMD-10**  
**MODULATOR**  
The AMD-10 is designed as a companion unit to the AOA series of transmitters. Uses 6AN8 speech amplifier and driver, 1635 modulator. Output: 10 watts. Input: crystal mic. (High Imped.) Requires 300 vdc 20 ma, no signal, 70 ma peak; 6.3 vac @ 1.05 amps. AMD-10 complete.....\$24.50

### COMPLETE TRANSMITTER

6 METERS	50 mc	AOD-57
2 METERS	144 mc	AOD-57 PLUS AOA-144
	220 mc	AOD-57 PLUS AOA-220
	420 mc	AOD-57 PLUS AOA-144 PLUS AOA-420

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# THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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



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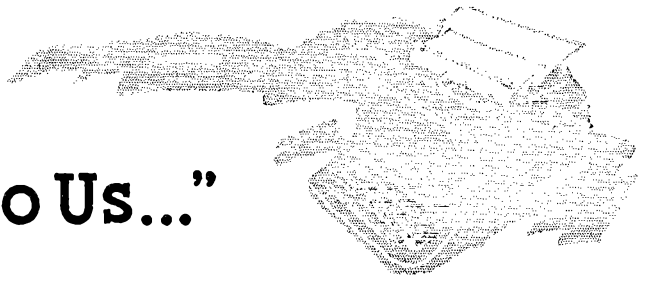
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73159

# "It Seems to Us..."



## YOU GUYS OUT THERE, PART II

In the August issue, the editorial discussed the functioning of the League as a representative democracy. It was pointed out that the policies of the League are determined by the Board of Directors and that you, the members, determine who speaks in your name at Board meetings. The editorial reminded members in eight divisions that elections were to be held and that nominations were open.

Apparently a good-sized segment of the membership understood the principles involved, for headquarters received 62 petitions bearing the signatures of 834 members all told, naming 36 candidates for the 16 offices. Overall, this is an excellent response. Even so, some offices were not contested, some candidates were not eligible and some petitions did not have the required signatures of ten Full Members. Needless to say, the rules for election in an organization as large and as widespread as ours have to be carefully spelled out in the Articles of Association, in By-laws and in election notices, and must then be followed to the letter.

The eligibility of the various candidates having now been determined, a report appears in "Happenings," page 35. Here we'll simply summarize by saying that ballots have now been mailed to Full Members in the Atlantic, Delta, Great Lakes, Midwest and Pacific Divisions. The eligibility of members to receive ballots depended upon whether they were members of the League on September 20, 1965. Should there be any members of these five divisions who have not received ballots by November 1, they are requested to write the headquarters at that time.

Each member of the divisions in which voting is taking place is urged to study the election material carefully, and then cast a ballot for the candidate of his choice. The ballot should be sealed in the inner envelope, and it, in turn, in the outer. The outer envelope, which must have the member's name and address to permit cross-checking with membership records, is removed on ballot-counting day before any inner envelopes for that election are opened to guarantee complete secrecy of the vote. The whole operation takes place under the watchful eye of a certified public accountant, and accuracy is verified by a paper-counting machine sensitive enough

to be used in banks for paper currency. (See "Happenings" January, 1965 *QST* for photos of the ballot counting.)

It is important to note that the ballot must arrive at headquarters before noon of November 20 to be valid.

A strong League depends on full participation in its affairs by the membership, and the most important of these affairs is the choosing of its governing body. It's now up to "you guys out there."

## 1965 SWEEPSTAKES CONTEST

For most amateurs active on the h.f. bands, "Sweepstakes" is a familiar term. We are reminded of a cacophony of c.w. or phone stations, all calling "CQ SS" or busily swapping contest exchanges. Those preferring peaceful ragchews may recall frustration when greeted by the unexpected clamor, but for participants who had planned, practiced and waited for the event all year, all of this meant an enjoyable period of operating activity.

The first "All Section Sweepstakes Contest," held in January, 1930, lasted a full two weeks! Some rabid testers might wish a return to this sort of endurance test, but most of us would find it burdensome or impossible because of work, school, church or social obligations. Over the years, the contest has been progressively shortened, and the 1964 Sweepstakes consisted of but two 24-hour periods, one each for phone and c.w., thus permitting those who wish to enter under both modes to do so.

The 1965 SS, to be held November 13-15 and 20-22, will again be divided into separate operating periods for phone and c.w.; contestants will be allowed a maximum of 24 hours operating time in each 30-hour portion.

It may offer encouragement to some to point out that comparatively few enter the Sweepstakes with the hope of winning. For the majority, this is an opportunity to sharpen up c.w. fists and phone procedures, to snare a needed state for WAS, to check station and operator efficiency, or perhaps simply for the "thrill of the chase." No matter what the goal, Sweepstakes is a long-time favorite. If you're already making preparations, see page 42 of this issue for the rules. If you've never entered before, why not give it a whirl? **QST**

## COMING A.R.R.L. CONVENTIONS

- January 22-23 — Southeastern Division,  
Miami, Florida  
March 19-20 — Michigan State, Saginaw  
April 22-24 — ARRL National, Boston,  
Massachusetts  
May 23-29 — Roanoke Division, Natural  
Bridge, Virginia  
May 27-29 — Southwestern Division,  
Anaheim, California  
June 3-5 — West Gulf Division, Arlington,  
Texas

## Strays

### Stolen Equipment

The following equipment was stolen from my home and includes some Air Force MARS gear: Northern Radio Co. variable master oscillator type 115 Model 1 (Serial 2430), Northern Radio Co. dual frequency shift tone keyer type 153 Model 2, Hammarlund SP-600 type JX 17 (Serial 18148), Berkeley frequency meter FR 67/U (Serial 1180), BC-221 frequency meter type AJ (modified and with a.c. power supply), type 1-177A tube tester and adapter, and Heath SB-10. Some tubes and hand tools were also taken in the theft. Anyone with information please contact Wallace R. Cramond, K7AUI, 3919 Hynds Blvd., Cheyenne, Wyo. 82002.

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### FEEDBACK

Probably most of those who have examined the circuit diagram of the decade divider of W9ZQT's secondary frequency standard in the July issue have recognized the error of an omission of capacitor  $C_{12}$  in the third stage of the divider. A 0.22- $\mu$ f. capacitor should be inserted between CRs and the positive battery line, as shown in the other divider stages.

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The story "Crisis in the Caribbean — I" that appeared in *QST*, September 1965, stated that the operator of K4WCC was K5JEH. Actually, it was W5JEH. In addition to helping out as operator of K4WCC, W5JEH operated from his personal station, W5JEH/4, and put in many hours of his own time during the Dominican operation.

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The reference in W2QYW's article in August *QST* ("Perfect Code at Your Fingertips") to Infinetics cores brought us a letter from the company from which we quote the following: ". . . A small quantity of these parts are in stock. Your readers may order any quantity at \$1.04 each. Their money orders should allow \$1.00 for shipping costs; the excess will be refunded. After depletion of stock, small quantity remakes will raise the price 20 per cent and delivery will run 4 weeks. We suggest one caution be mentioned: Commercial houses do not ordinarily stock No. 42 wire; it is considered an industrial size. If a supply cannot be obtained from some source, we can help as long as the demand does not become excessive."

The cores are type S 125C31-HA-1577-F and the address of the company is Infinetics, Inc., 1601 Jessup St., Wilmington 2, Del.

## A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system 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 4¼ by 9½ 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. Changes are shown in heavy type.

- W1, K1, WA1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass. 01247.  
W2, K2, WA2, WB2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J. 07720.  
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.  
W4, K4, WA4 — F.A.R.C. — W4AM, P.O. Box 13, Chattanooga, Tennessee 37401.  
W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.  
W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, Calif. 92106.  
W7, K7, WA7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.  
W8, K8, WA8 — Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.  
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60128.  
W0, K0, WA0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn. 55921.  
VE1 — L. J. Fader, VE1FQ, P.O. Box 563, Halifax, N. S.  
VE2 — John Ravenscroft, VE2NV, 135 Thorncrest Ave., Dorval, Quebec.  
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.  
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.  
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.  
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.  
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria B. C.  
VE8 — George T. Kondo, VE8RX, W Dept. of Transport, P.O. Box 339, Fort Smith, N. W. T.  
VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.  
VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.  
KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, Puerto Rico 00902  
KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701  
KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska 99502  
KV4 — Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, Virgin Islands 00820  
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.  
SWL — Leroy Waite, 39 Hanum St., Ballston Spa, N. Y. 12020



### OUR COVER

A u.h.f.-man's view through the screen reflector of a 432-Mc. helical-beam antenna. See story on page 20.





## AMATEUR RECEPTION OF WEATHER SATELLITE PICTURE TRANSMISSIONS

Tevised picture of the Nile Delta received at Fairbanks, Alaska, during the NIMBUS I flight using the Advanced Vidicon Camera System (AVCS). The Automatic Picture Transmission (APT) system described in the text gives approximately the same resolution but transmits the picture by slow scan. (Photo courtesy of Goddard Space Flight Center.)

WENDELL G. ANDERSON\* K2RNF

THE NIMBUS and TIROS series of weather satellites provide an excellent opportunity for further amateur participation in space programs through the reception of slow-scan television pictures of the earth. These pictures are primarily intended to show cloud formations for meteorological use, but their high definition gives remarkable detail on terrain features as well.

Fig. 1 shows one of the pictures received from the NIMBUS I Automatic Picture Taking (APT) transmitter, using the relatively simple and inexpensive receiving equipment to be described. While current estimates run \$32,000 for ready-made stations and \$6,000 for the "do-it-yourself" type, the cost of this amateur station was cut to well under \$200 by using equipment of the kind found available in most ham shacks. Modest darkroom facilities and a tape recorder are also required. For this approach, a simple home-brew picture recorder costing under \$50 was used, instead of the commercial facsimile units which cost from \$5,000 to \$35,000.

\* Staff Engineer, Radio Corporation of America, Defense Electronic Products, Camden, N. J.

The simplicity of this ground station equipment is made possible by the slow-scan APT camera system (see box on page 16) and the high-power (5-watt) transmitter in the satellite. This combination gives enough signal-to-noise ratio for effective operation without the giant parabolic dish antennas usually associated with satellite signal reception.

With APT, the satellite camera shutter is opened briefly, storing the picture in the vidicon camera tube. The picture is then transmitted by slow-scan television, completing the frame in 200 seconds. After 8 seconds for recycling, the operation is repeated. Pictures can be received as long as the satellite is within line of sight to the ground station. Usually, three pictures can be received on each pass.

While the presently operating weather satellites are not using this mode, both TIROS VIII and NIMBUS I transmitted the APT signals. By early 1966, APT systems are expected to be in constant operation, providing high-quality pictures of the earth from altitudes of 500 to 750 miles.

When NIMBUS I was launched in the fall of last year, the simple receiving and display sys-

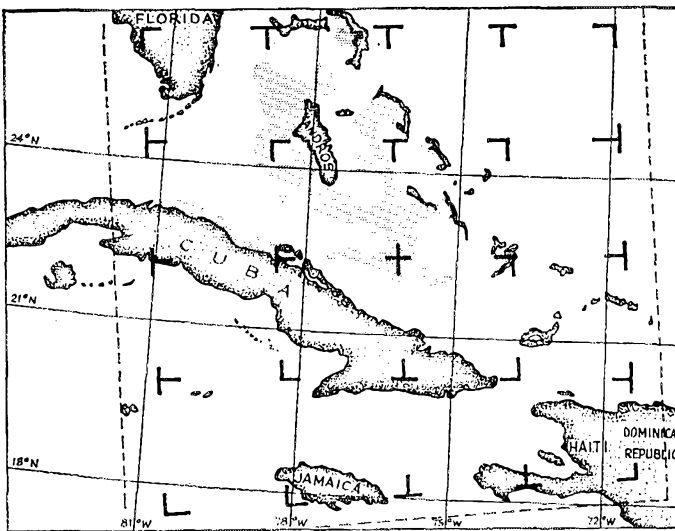
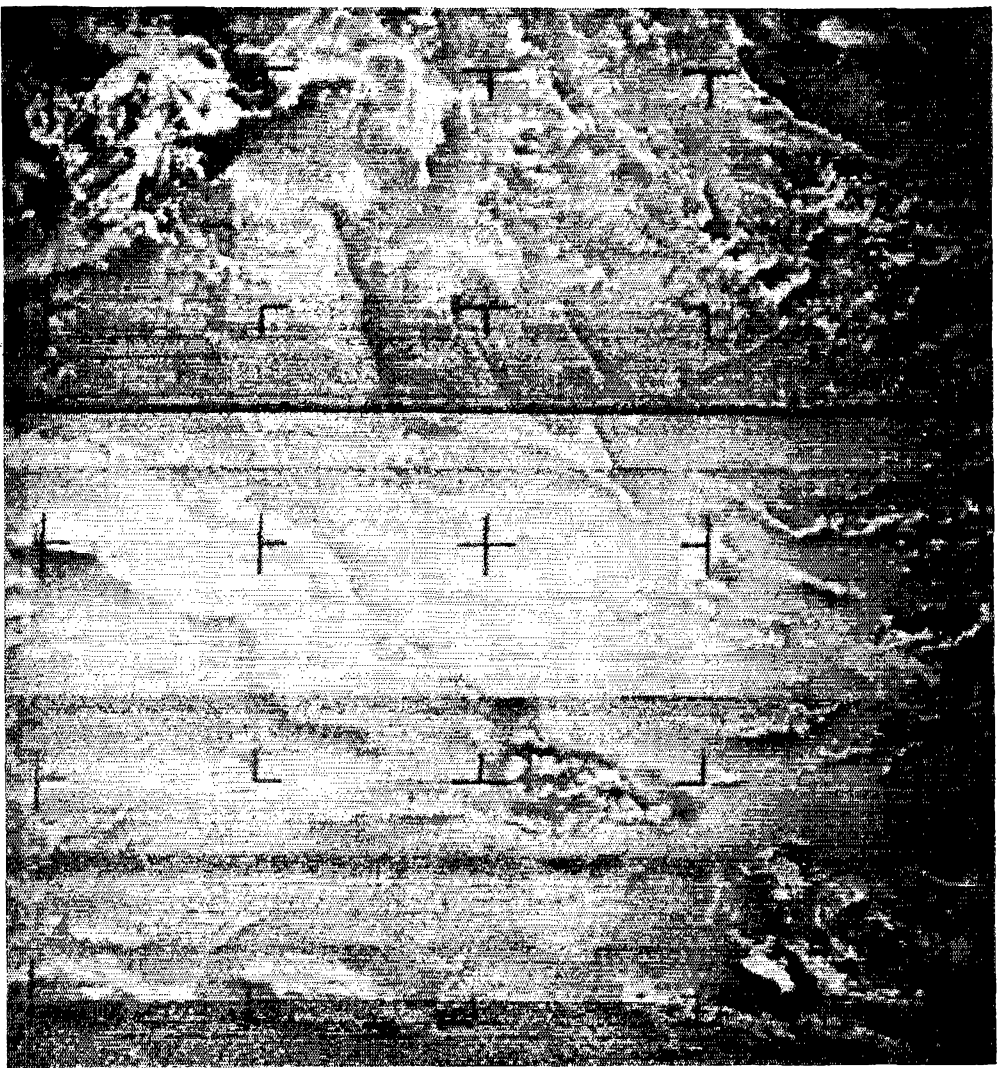


Fig. 1—Photograph of the Caribbean area, transmitted from a Nimbus satellite, made with the equipment shown in block form in Fig. 2. Outline map of the area is shown below. Light crosshatching indicates shallow water.

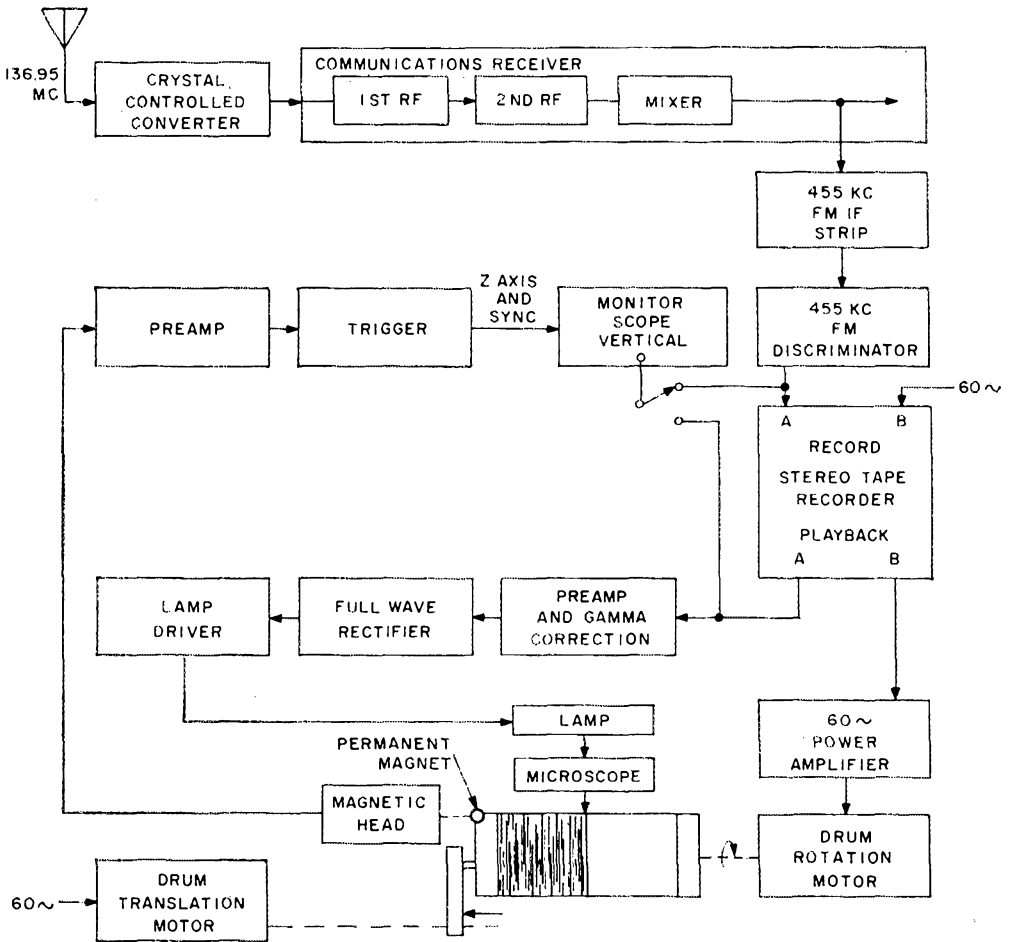


Fig. 2—Block diagram of the recording and photo-reproducing system used in making the picture shown in Fig. 1. A modified version which uses the 2400-cycle audio carrier and frequency dividers to obtain the 60-cycle power for operating the drum-rotation motor is described in the text. The special circuits for the modified arrangement, which requires only a monaural tape recorder, are given in Figs. 6 to 9, inclusive.

tem shown in Fig. 2 was assembled from readily available components, most of them from the junkbox. The crystal-controlled converter for 136.95 Mc. was built along the lines of a regular two-meter converter. An outboard i.f. for the station receiver was built to increase the bandwidth to 20 kc. and to add an f.m. discriminator.

With this arrangement, the signals were strong enough to be received with a folded dipole antenna laid out on the roof, but there were some obvious nulls from local reflections as the satellite passed over. More work is definitely required here. A dipole in the clear would probably overcome much of the difficulty. The next series of weather satellites will transmit the APT pictures from a horizontal whip, which might seem to be an ideal match to a horizontally-polarized rotary beam. However, as the satellite passes a line directly to the East and West of the station, the whip is seen from below one end and the received signal is vertically polarized. Some of the com-

mercial stations get around this problem by using a circularly polarized antenna; others use separate receivers for the horizontal and vertical polarizations with diversity combining at the receiver outputs. The circular polarization appears to be less complex, but has a 3-db. loss compared to matched polarization. A fixed dipole facing north-south avoids this problem since it always has the proper polarization. The extent of the improvement needed will depend on the picture quality desired, of course. Fig. 1 shows both "snow" (the TV type, not the cold, white stuff) and the effects of the nulls in the folded dipole pattern.

#### Receiver System

The r.f. section of the receiver is quite conventional. A low-noise 2-meter converter, tuned to 136.95 Mc., provides a simple front end. (Provision should also be made for future APT satellites, which will operate near 137.5 Mc.)

The 20-ke. bandwidth of the f.m. signal is wider than the usual amateur receiver bandwidth. An auxiliary i.f. amplifier and an f.m. detector were built to give the proper characteristics at 455 ke. The signal is taken from the mixer output of the receiver. Three stages of i.f. amplification are used to provide sufficient limiting and to make up for the loss in gain resulting from the use of 47K swamping resistors on the primary and secondary of each i.f. transformer.

The f.m. discriminator uses a J. W. Miller 12-C45 transformer and a 6AL5. This combination does not require modification for the 20-ke. bandwidth. The d.c. output of the discriminator is monitored during signal reception as a tuning indicator. With the i.f. bandwidth matched to the signal, it is necessary to compensate for about  $\pm 5$  kc. of Doppler shift during a pass.

With the APT signals, the f.m. discriminator output is an amplitude-modulated 2400-c.p.s. audio tone. This signal was recorded on a stereo tape recorder, with 60 cycles from the a.c. line

and secured by double-sided Scotch tape, is exposed to a signal-modulated argon lamp through a reversed 50X microscope. The microscope, working backwards, focuses a highly-demagnified image of the bulb on the film.

### Recorder Drum

The drum rotates once for each line of the picture, giving the equivalent of the horizontal scan of a TV picture. A motor-driven lead screw slowly moves the drum and its mount in traverse to give the "vertical" scan.

Only readily available materials and hand tools were used to construct this recorder. After a number of unsuccessful tries, it was apparent that the design would have to accommodate considerable shaft misalignment and relatively poor bearings. The somewhat unconventional mechanical arrangement shown in Fig. 3 has been quite satisfactory, maintaining synchronization, steady traverse, and good focus without the need for delicate adjustment.

The drum itself is a kitchen rolling pin. The original unit had nylon bearings running on a steel shaft. The left bearing is one of the originals, running on a section of the shaft material. The other is aluminum. All the bearings were made quite thin and slightly oversize to prevent binding due to misalignment of the holes. In the drum shaft coupling to the drive motor, shown in Fig. 4, a rubber band is used to absorb the minor bearing roughness which had previously caused the motor to slip sync occasionally. Direct coupling between the motor and rolling pin can not be used since the motor shaft bearings are quite precise and do not permit enough coupling misalignment.

The drum assembly traverses in a wooden track, driven by a 3/16"-24 threaded rod in a tapped plate. The track must be smooth to prevent irregular movement, which results in line-pairing or worse. Talcum powder is sparingly used as a lubricant. The bearing for the traverse drive was made from a 3/16-inch lead anchor. It was threaded and locked onto the lead screw; it turns in a 1/4-inch panel bushing. The motor mount is adjustable to remove residual misalignments, which cause a bar pattern in the picture at a five-line pitch (the drum makes five revolutions for each turn of the lead screw).

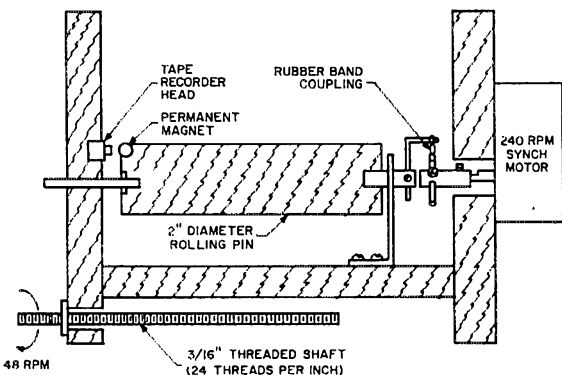


Fig. 3—The drum and carriage assembly, showing the synchronizing system using a tape-recorder head and permanent magnet. The carriage is moved along a track by the lead screw for line-by-line scanning.

used on the second channel for synchronization on playback. Although use of the tape recorder was not absolutely necessary, it provided a means for testing the picture-recording equipment when the satellite was not overhead (which was most of the time, of course).

### Picture Recorder

The picture recorder evolved over a fairly long period of experimentation. The first efforts were with a modified Heathkit oscilloscope and a camera. The slow-scan sweeps worked reasonably well, but the resolution was considerably less than the 800-line capability of the signal, and the 60-cycle hum bars were never satisfactorily removed. The present recorder is built along the lines of a facsimile recorder, but it is operated in a darkroom instead of having a light-tight case. An 8 X 10 sheet of Royal-X Pan photographic film, wrapped on a rotating drum

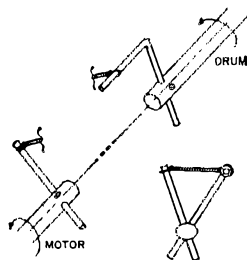


Fig. 4—Detail of the rubber-band drive.

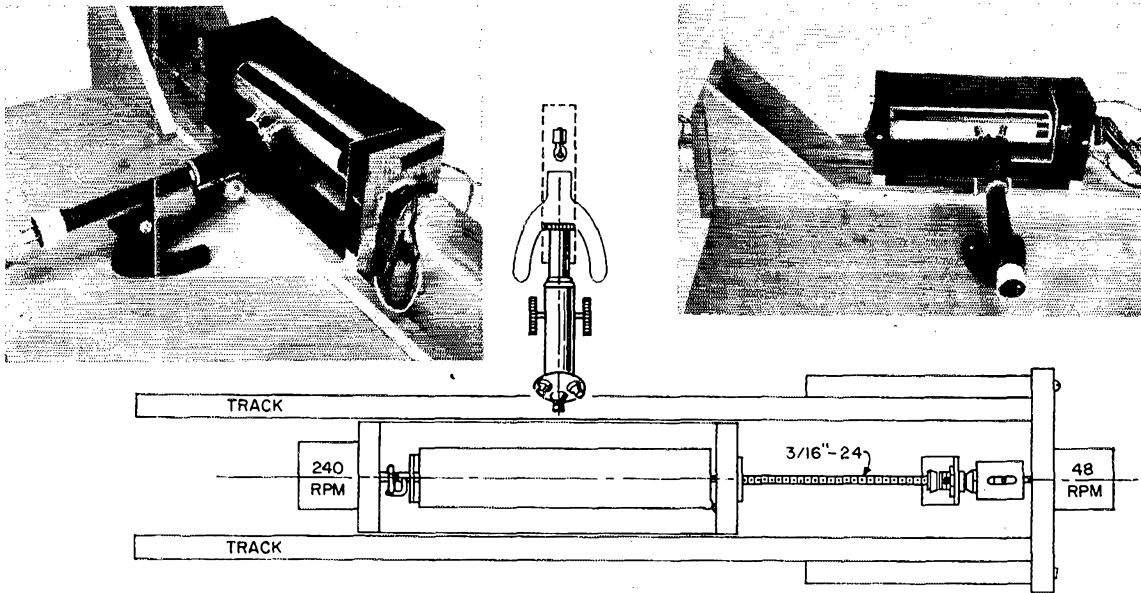


Fig. 5—Top-view drawing of the photo-reproduction assembly. Photographs show the equipment from two different angles.

#### Motors and Lamp Driver

The motors are 5-watt. Hurst synchronous, Type CA. These inexpensive motors have limited torque, but are adequate with proper care of the bearings. A 240-r.p.m. model is used for drum rotation and a 48-r.p.m. model is used for the traverse lead-screw drive. The layout of the unit is shown in Fig. 5.

The circuit used for driving the AR-3 argon bulb is shown in Fig. 6. Several more complex arrangements were tried, but this one worked quite well. At the beginning, provision was made for assurance that the bulb would fire at low signal levels. However, this is apparently not a problem, since no threshold is observed down to currents less than 1% of full drive. The space between the AR-3 electrodes should be made vertical to avoid line-pairing when the position of the glow discharge shifts.

#### Film Exposure and Development

The over-all linearity of the signal driver circuit was adjusted by the 1N1763 networks to give a fairly good gray scale match between the APT signal and the Royal-X Pan film. The APT signal characteristic provides equal signal level steps for each gray step. By setting the sync pulses to 7.5 volts peak-to-peak at test point A in Fig. 6, the networks correct the gamma to provide equal density steps on the film for equal signal amplitude steps. The film was developed as recommended by Kodak to achieve a gamma of 1.0 (10 minutes in HC-110 diluted 1:15).

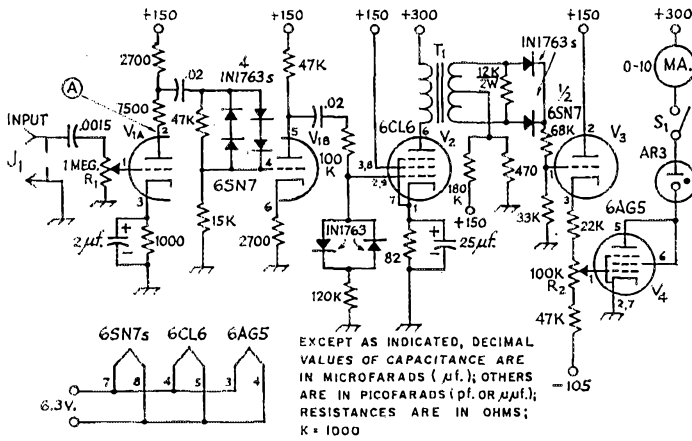
#### Synchronization Techniques

In setting up the recorder at the beginning of a picture, it is necessary to synchronize the drum

and the tape recorder. The drum motor is driven by a 60-cycle signal derived from the timing track, but the start of the picture must be synchronized with the edge of the film — otherwise, the negative will have to be cut to get the proper picture. To monitor the position of the drum (and the edge of the film) with respect to the incoming sync pulse, a tape recorder head (spare part for a portable transistorized tape recorder) and a permanent magnet are used. The magnet is fastened on the drum in such a position that it passes the recorder head, fixed on the frame, at the place where the film edge passes the modulated light source. The pulse from the recorder head is amplified and shaped with the circuit shown in Fig. 7, then used to Z-axis modulate the monitor scope. This signal can also be used for scope sync. In operation, the drum motor drive is interrupted momentarily to allow the drum to slip back into sync, as indicated on the scope.

Maintaining synchronism for the drum drive depends on the exact 15:1 relationship between the 60-cycle line and the horizontal line rate generated in the satellite. For the pass from which the picture shown in Fig. 1 was received, the sync was close enough to get a relatively good image without using a special device. This was only a fortunate coincidence, apparently, and cannot be expected in the future.

A stable 60-cycle oscillator with vernier frequency control could be used to maintain the required sync, but adjustment would be difficult, although certainly not impossible. The 2400-cycle per second subcarrier frequency provides an alternate approach. This frequency is exactly 600 times the horizontal scan frequency, related



- J<sub>1</sub>—Phono jack.
- R<sub>1</sub>—Audio-taper control.
- R<sub>2</sub>—Linear-taper control.
- S<sub>1</sub>—S.p.s.t. toggle.
- T<sub>1</sub>—Driver transformer, 3:1 pri. to 1/2 sec., 30-ma. primary (Stancor A-4723).

Fig. 6—Lamp driver and preamplifier. Fixed resistors are 1/2 watt; fixed capacitors may be ceramic or paper except those with polarity indicated (electrolytic).

### APT SIGNAL DESCRIPTION

Carrier:	136.950 Mc.
Modulation:	f.m.
Deviation:	$\pm 10$ kc.
Subcarrier:	2400 c.p.s.
Modulation:	a.m.
Polarity:	Max. amplitude sync. 80% amplitude max. white
Video:	0-1600 cps
Line Rate:	4 per second
Frame Time:	208 seconds
Gamma:	Equal voltage increments per gray step
Orbit Parameters:	
Duration of	approximately 10 min-
Overhead Pass:	utes, or about 3 frames
Sun synchronous,	80° retrograde.

### Conclusion

The choice of components was primarily determined by the availability of parts in the junkbox and the most inexpensive components obtainable. The microscope is the \$15.00 model from Edmund Scientific Co. but almost any low-power microscope should work as long as the image of the light source is about the same size as the line-to-line spacing on the film.

The photographic film negative size was determined by the circumference of the rolling pin. The traverse motor speed and lead screw threads per inch are set to give a picture that is approximately square. If a photographic enlarger is available, a smaller diameter drum and slower traverse might be used to get all three pictures for one pass on a single strip of film. The microscope would have to be higher power to accommodate the smaller line-to-line spacing, and

by a count-down chain in the satellite.

A 40:1 frequency divider is used on the ground to derive the 60-cycle drum motor drive. Since the signal is often noisy, a phase-locked oscillator is used to provide a clean signal to the count-down chain. These circuits are shown in Figs. 8 and 9. The p.l.o. circuit has given excellent results, holding synchronism during fades of several seconds. To achieve this holding ability, the oscillator was adjusted to free-run at the proper frequency with zero signal-to-noise ratio by observing the drift in synchronization after a signal fade. These fades are automatically available at the beginning and end of a pass. This adjustment is relatively simple with tape-recorded signals, since the tape can be replayed several times if necessary.

This approach has the further advantage of being operable with a single tape-recorder channel (monaural instead of stereo).

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS ( $\mu$ f.); OTHERS ARE IN PICOFARADS (pf. OR  $\mu$ pf.); RESISTANCES ARE IN OHMS; K = 1000

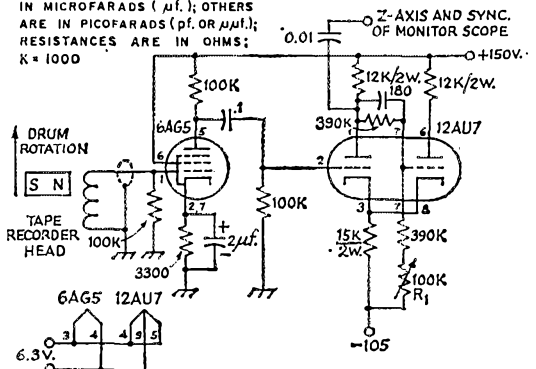


Fig. 7—Synchronizing-indicator circuit. Capacitor with polarity indicated is electrolytic; others may be paper or ceramic. Fixed resistors are 1/2 watt.

R<sub>1</sub>—Linear-taper control.

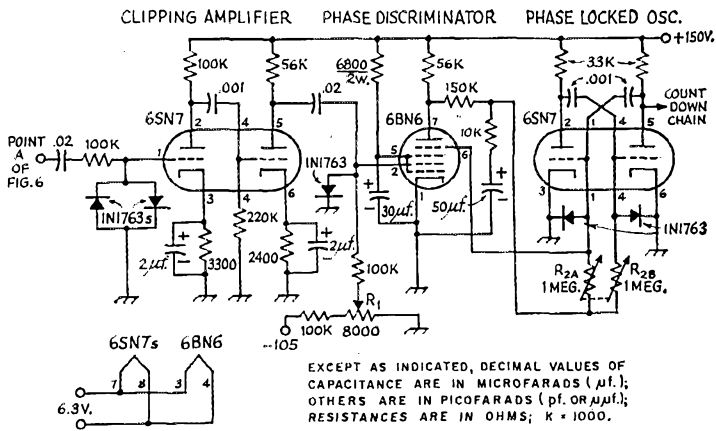


Fig. 8—Phase-locked oscillator circuit. Capacitors with polarity indicated are electrolytic; others may be paper or ceramic. Fixed resistors are 1/2 watt. R<sub>1</sub>—Linear-taper control. R<sub>2</sub>—Dual control, linear taper.

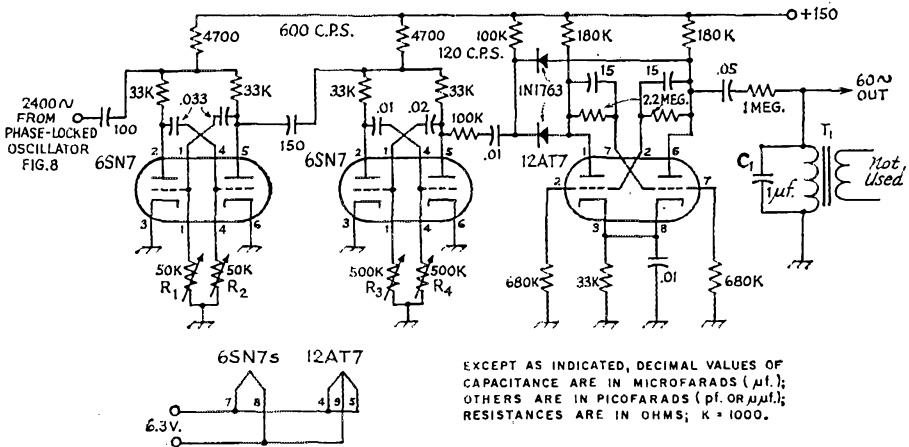


Fig. 9—Frequency divider, 2400 to 60 c.p.s. Capacitors are paper or ceramic; fixed resistors are 1/2 watt.

R<sub>1</sub>, R<sub>2</sub>—Dual control, linear taper.

R<sub>3</sub>, R<sub>4</sub>—Dual control, linear taper.

T<sub>1</sub>—Small output transformer, primary tuned by C<sub>1</sub>

to 60 c.p.s. Capacitance of C<sub>1</sub> may need to be varied to obtain resonance; value given (1  $\mu$ f.) is based on an inductance of about 7 henrys.

somewhat more care in the mechanical construction would be required.

The electronics used for driving the AR-3 and in the synchronizing circuits are not particularly critical since they operate at mid-audio frequencies. The tube types already on hand deter-

mine the design in most cases; many of the tubes used were 20-year-old surplus. The liberal use of 1N1763's was primarily due to their 41é price tag. Their 500-ma. 400-volt rating reduced the amount of calculation required to be sure of safe operation.

**QST**

## Straits

Old-timers and amateurs for whom the Dayton Hamvention has become a pleasant habit will note with great regret the listing in Silent Keys this month of Daniel C. McCoy, W8DG, ex-W8CBI, a founder of and active worker for the Hamvention for many years. Dan had retired from full-time service with Frigidaire but as a consultant, had just finished a history of the firm. Active in amateur radio right to the end, Dan died suddenly on August 30, at age 70. He'll be deeply missed in Dayton amateur circles.

The Amateur Radio News Service, a group of amateurs involved in publication of club bulletins and in getting amateur news before the public, has announced election of the following officers: president, W6MLZ, San Gabriel, California; vice president, publications, W0IKQ, Cedar Rapids, Iowa; vice president, public relations, W4DKJ, Ft. Myers, Florida; treasurer, W1EFW, Southington, Connecticut and secretary, Mrs. Helen "Mother Rat" Brick, 821 West Lindley Avenue, Philadelphia, Pennsylvania-19141 (this address for more info.)

# The

## Monifilter

BY DON R. TYRRELL,\* W7AZG/W9JTN  
AND ALEX K. TINKER, JR.,\*\* K7UXG

### Combination Selective Audio Filter and C.W. Keying Monitor

WHILE s.s.b. transceivers are superb in the mode for which they were designed, many leave something to be desired for convenient c.w. operation. For example, a fixed bandwidth of 2 or 3 kc. is often too wide for satisfactory c.w. reception amid QRM, and usually there is no provision for monitoring one's keying. The circuit described here is offered to solve these and several other problems which c.w. enthusiasts may encounter.

The handy thing about this device is that one simple circuit offers all the following functions and features:

1) *Selective audio filter*: The circuit has a passband of only a few hundred cycles, greatly reducing interfering heterodynes.

2) *Keying monitor*: The unit provides a stable, clean tone which is heard over the same set of headphones used for the received c.w. signal.

3) *Code-practice oscillator*: Since the entire circuit is battery-powered, it is usable at any time as a portable oscillator.

4) *Features of convenience*: The unit and the transceiver are keyed simultaneously, without the need for a keying relay. The only connection to the transceiver is by means of the normal headphone jack, so that no internal modifications or wiring are necessary.

#### Circuit

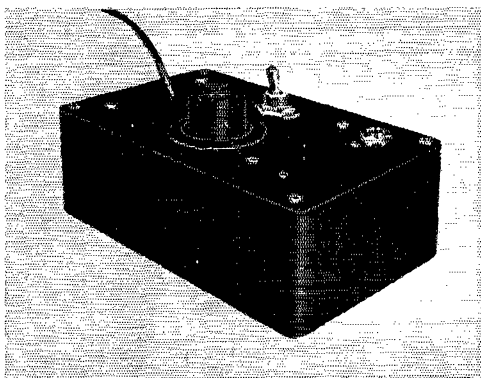
The circuit, shown in Fig. 1, is a transistor bridged-T audio oscillator through which the received c.w. signal is applied. This configuration

operates on the principle of providing maximum selectivity just before the point of oscillation (regeneration). The filter bandwidth at the nose of the characteristic is less than 100 cycles, but because of the wide shape factor, the bandwidth, for all practical purposes, appears to be several hundred cycles. In spite of this, the circuit offers a vast improvement over any fixed transceiver bandwidth.

With the values specified in the bridged-T network, the center of the audio passband will be at approximately 800 cycles, which provides a pleasing c.w. note for most ears. If another frequency is desired, the values need merely be changed. For example, increasing the values of  $C_1$  and  $C_2$  to 0.02  $\mu$ f. and  $R_1$  and  $R_2$  to 15K will result in a center frequency of approximately 600 cycles; values of 0.01  $\mu$ f. and 10K will increase the center frequency to approximately 1 kc. Several of these combinations were tried and no problems were encountered. As shown, the input circuit is satisfactory for use with the low-impedance output of the Drake TR-3. However, it has been found by Charlie, W7EAX, that a high-impedance receiver output, or an output of considerably more audio voltage, might require a voltage-divider arrangement, as shown in the inset in Fig. 1. The resistance values should not be critical.

#### Operation

The use of the device as a keying monitor is simple. As the transceiver is being keyed, the key contacts provide a ground path to short out  $R_4$ . With  $R_4$  shorted out, the only resistance left from the junction of capacitors  $C_1$  and  $C_2$  to ground is that of  $R_3$ . This loss of resistance causes the circuit to break into oscillation. Diode  $CR_1$  is used to isolate the transceiver negative grid-blocking voltage from the filter/monitor circuit. The sole purpose of battery  $BT_2$  is to provide enough voltage across  $CR_1$  to cause it to conduct to ground when the key is closed. The diode will not conduct in either direction with the key up, since there is too much resistance to ground through the trans-



This model of the Monifilter is built into a small molded instrument case.

\* 2521 North 68th St., Scottsdale, Arizona.

\*\* 8330 East Sells Drive, Scottsdale, Arizona.



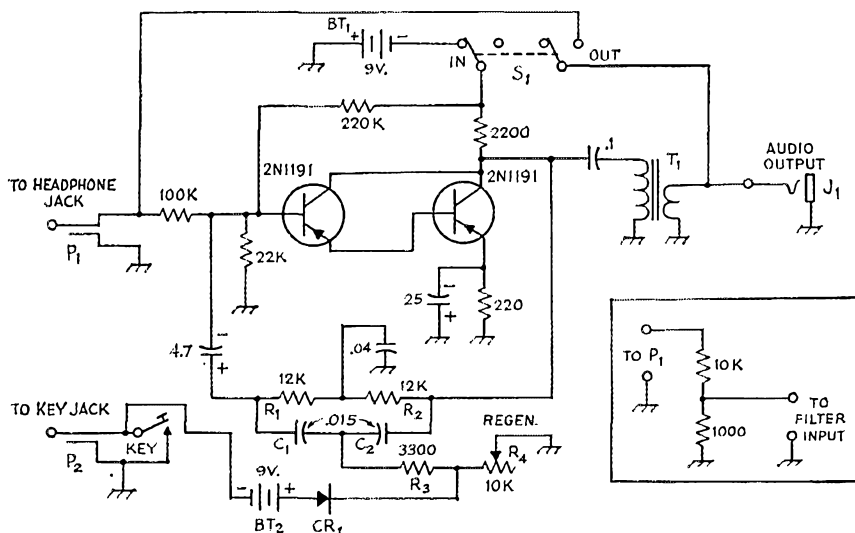


Fig. 1—Circuit of the Monifilter. Capacitances are in  $\mu\text{f.}$ ; resistances are in ohms ( $K = 1000$ ). Capacitors are paper, except where polarity marking indicates electrolytic. Fixed resistors are  $\frac{1}{2}$ -watt. Diagram component indicators not found below are for text-reference purposes. Inset shows circuit of optional input attenuator.

BT<sub>1</sub>, BT<sub>2</sub>—9-volt dry battery.

CR<sub>1</sub>—Silicon diode, p.i.v. about 50 per cent greater than transmitter negative blocking voltage, 10 ma. or more.

J<sub>1</sub>—Open-circuit headphone jack.

P<sub>1</sub>, P<sub>2</sub>—Plugs to fit transceiver key and headphone jacks, or other appropriate connectors.

R<sub>4</sub>—Linear-taper control.

S<sub>1</sub>—D.p.d.t. toggle switch.

T<sub>1</sub>—Output transformer, 8000 ohms to 3.2 ohms.

ceiver. The current drain from BT<sub>2</sub> in the key-down condition, with normal adjustment of R<sub>4</sub>, is only about 3 ma.

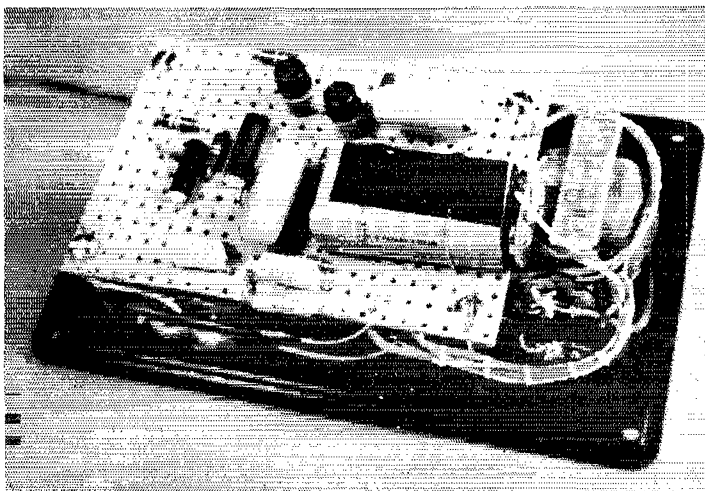
The point of maximum selectivity is found by adjusting R<sub>4</sub> (with key open) until the circuit breaks into oscillation, then backing off until oscillation just ceases. With the filter in use, the transceiver should be tuned until the signal peaks at the filter frequency. After a little practice in making this adjustment, the use of the in/out switch will demonstrate the merit of the filter. It will be found that many nearby signals will disappear completely with the filter in use. S<sub>1</sub> not only serves as an in/out switch, but also turns the unit off in the out position. Make sure that the filter circuit is connected to the key exactly as shown; that is, the battery lead connected to the hot, or ungrounded, side of the

key. If connections are reversed, the monitor signal will be on at all times.

We wish to acknowledge the help of Larry Fort, K7ZZK, in suggesting and testing the basic filter circuit, and I (W7AZG) wish to thank Gus, W10GU, for convincing me, many years ago, that building is more than half the fun of ham radio.

QST

Most of the components of the Monifilter are mounted on a perforated board spaced from the panel to clear panel controls. T<sub>1</sub>, to the right, is mounted directly on the panel.

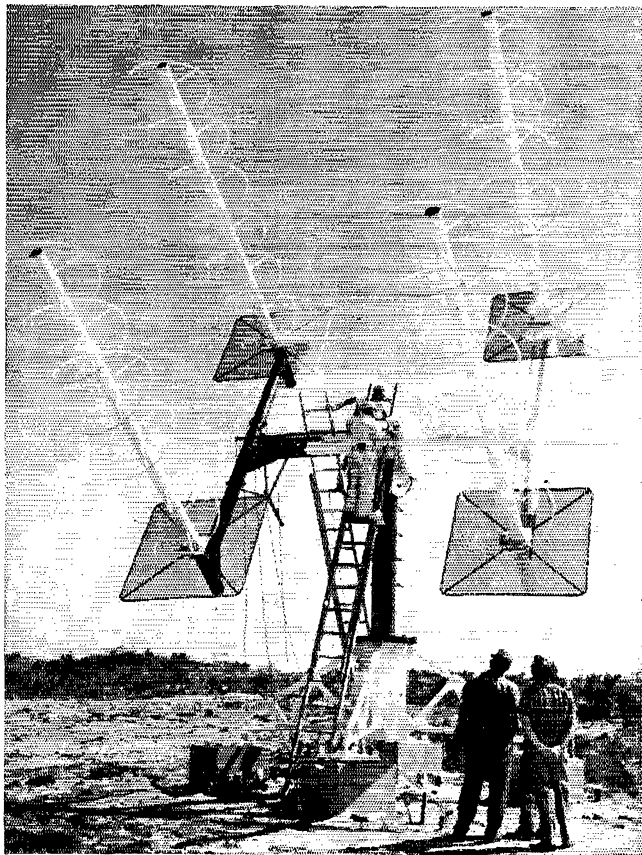


In this clever gadget, a single simple circuit provides audio selectivity when receiving and serves as a side-tone monitor when transmitting. It is designed primarily as an accessory for s.s.b. transceivers often lacking in c.w. selectivity. All connections to the transceiver are made through the headphone and key jacks. No monitoring speaker is required.

An example of a quad-helix arrangement used by the USAF (Photo courtesy of United States Air Force.)

## The Basic Helical Beam

*Slide Rule Absentis*



BY DOUG DeMAW,\* WICER

**D**URING its passage through the ionosphere, a radio signal is subject to a continuous shift in polarization which, when the wave arrives at a receiving antenna of fixed linear polarization, causes periodic fading, especially apparent in v.h.f. and u.h.f. satellite work. For example, a horizontally-polarized antenna will give maximum signal output when the arriving wave happens to be passing through horizontal polarization, but will have essentially zero output at those times when the arriving wave is vertically polarized. This continuous shift in polarization, known as "Faraday rotation," is a complex phenomenon and no attempt will be made here to explain the mechanism.<sup>1</sup> In practice, the fading can be minimized by using antennas that transmit and receive circularly-polarized waves.

In moonbounce communication, there is another complication, in that the "sense" of the circular polarization is reversed on reflection from the lunar surface — that is, whether the polarization rotation is "right-handed" or "left-handed."

\* Assistant Technical Editor, *QST*.

<sup>1</sup> Kelso, *Radio Ray Propagation in the Ionosphere*, McGraw-Hill, p. 45, 137.

Thus it becomes necessary to utilize a system that will permit the antenna's sense to be changed when switching from transmitting to receiving. A commercial version of such an antenna is being marketed and contains a set of interlaced Yagi elements, with one set vertically oriented on the boom while the other set is mounted horizontally on the same boom one-quarter wavelength away from the vertical members. A coaxial harness is used with the system to permit the sense to be switched from right- to left-hand circularity. It is believed that antennas of this type are good performers, but they are subject to matching problems and an attendant standing-wave ratio (s.w.r.) problem that is sometimes difficult to resolve.

Parabolic reflectors, used in combination with a variety of driven-element types, enjoy considerable popularity among amateurs who are active in space communications. Although antennas of this type are quite effective, they are not always easy to procure. The fabrication of home-built parabolic antennas is an exacting process and does not represent a practical starting point for the beginner. This system is also subject to the problems of proper matching. Feed-line

Many a would-be satellite or moonbounce enthusiast has shied away from this interesting pursuit, simply because the antenna system required for this phase of amateur-radio operation seemed to be too complex to tackle. Although a certain amount of antenna knowledge is necessary if effective results are to be had, the helical antennas discussed in this text will enable the beginner to get started in the growing field of space communication with a minimum of difficulty and expense.

radiation with this type of antenna can disturb the sense of the system, making the project additionally difficult.

Perhaps the simplest circularly-polarized antenna, and one that represents a practical starting point for the beginner in space communications, is the Kraus helical-beam antenna. The opportunity for mechanical error, causing poor performance, is minimized by the antenna's rather broad frequency response—approximately 2 to 1. Furthermore, the cost of materials used in the construction of a helical beam is modest, adding even greater appeal to the project.

This article deals with a working model of a pair of helical-beam antennas, of opposite sense, for use on 432 Mc. Other combinations of helical antennas, producing different radiation modes, are also described.

### The Axial-Mode Helix

The term *helix* implies "anything having a spiral form." This is indeed an apt description of a helical beam. However, the diameter of the spirals and the spacing between them has a marked effect on the performance of the system. In this respect the circumference of the helix, in terms of wavelengths, determines whether the antennas will radiate in the "normal" or "axial" mode (Fig. 1). The axial mode of radiation produces a circularly-polarized (or nearly so) field that is maximum in the direction of the helix axis, and is the most useful mode for our purposes. (The normal mode of radiation can be compared to that of a dipole antenna where the field is maximum at right angles to the plane of the radiator.) A turn circumference of one wavelength at the operating frequency will produce the desired axial-mode pattern of radiation.

With helical beams either right- or left-hand circular polarization is possible depending on how the helix is wound. When viewing the antenna from the feed-point end, a clockwise wind will result in right-hand circular polarity while a counterclockwise wind will result in left-hand circular polarity. A screen reflector is centered behind the antenna element and the transmission line is connected between the reflector and the start of the helix at the point where it is adjacent to the center of the reflector.

### Electrical Properties

Helical-beam antennas having as few as one or two turns will produce circularly-polarized waves,

but do not deliver sufficient gain to be of interest to the average user. Generally, between 6 and 10 turns are used in the helix so that greater gain and directivity can be realized. The greater the axial length of the antenna (more turns) the more desirable the system becomes for space communications. A narrower beamwidth (Fig. 2) results as more turns are added. A 10-turn helical beam, adjusted for optimum performance, should be capable of producing between 15 and 18 decibels of forward gain when referenced against an isotropic antenna. If helical beam antennas are used for point-to-point communication in the same circuit, they must be of the same right- or left-hand thread in order to avoid the high-order signal loss resulting from cross-polarity of the two senses.

The feed-point impedance of a multiturn helical beam with a circumference on the order of 1 wavelength is normally between 100 and 200 ohms. This impedance is nearly constant with frequency and is nearly a pure resistance. The empirical relation,  $R = 140 C/\lambda$  ohms, where  $C$  represents turn circumference in wavelengths, seems to hold true on a  $\pm 20$  per cent basis for the antenna system described later. Detailed information concerning helical antennas has been presented by the antenna's designer, J. K. Kraus.<sup>2</sup>

The conductor material used in the helix element should be of sufficient diameter to permit reasonable surface area. Where power levels in excess of 100 watts are contemplated, the larger conductor sizes are to be preferred. A conductor diameter of 0.02 wavelength represents an ideal dimension in this application; at 432 Mc., this turns out to be 0.516 inch. However, a diameter ranging between 0.006 and 0.05 wavelength seems to suffice, making little difference in the properties of the helix in the frequency range of the beam-axial mode. The smaller dimension (0.006

<sup>2</sup> Kraus, *Antennas*. McGraw-Hill, Chapter 7.

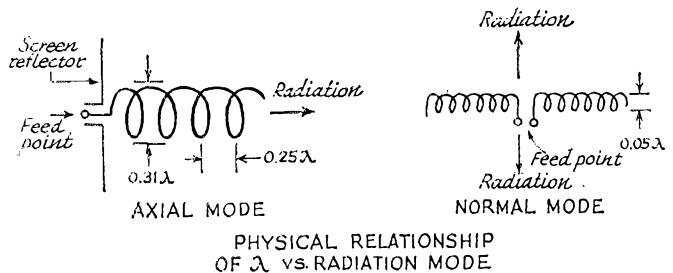


Fig. 1—A comparison of radiation modes. The helical dipole at the right has a turn spacing of approximately  $0.1\lambda$ .

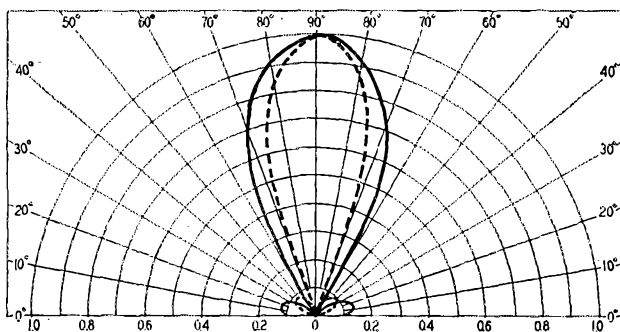


Fig. 2—A polar plot showing the relationship, in terms of beamwidth, between helical antennas with differential axial lengths and turn circumferences. The dotted line is the relative beamwidth of a 10-turn helix with a turn circumference of 1.2 wavelength. The solid line shows a relative representation of the beamwidth of an 8-turn helical antenna whose turn circumference is 1 wavelength.

wavelength) represents an element diameter of 0.154 inch, falling between Nos. 6 and 7 in wire gauge. Although No. 8 aluminum wire is slightly below the specified minimum wire size, it has been used effectively with 125 watts of 432-Mc. r.f. applied to the antenna. Since this type of wire is readily available at reasonable prices, its use can no doubt be justified. Aluminum wire was used in the models described in this article, but if a slightly heavier antenna is not objectionable, No. 6 copper wire could be substituted in its place. If cost and added weight are not important considerations to the builder, the use of 1/4-inch copper tubing might be an even better choice.

The feed-point impedance of a helix having a turn circumference of 1 wavelength will be on the order of 140 ohms. The diameter of a 1-wave-length turn will be approximately 0.31 wave-length. Because of the feed-point impedance that results with this dimension a matching transformer is necessary between the antenna terminals and the transmission line. Two types of coaxial matching transformers, for converting from 140 ohms to 50-ohm transmission line, are illustrated in Fig. 6.

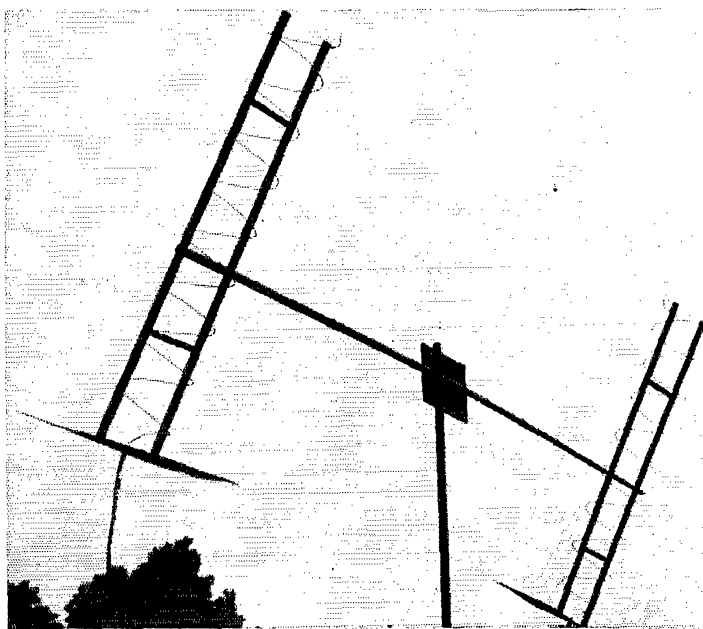
The reflector used in conjunction with the helical driven element should be at least 0.5 wavelength in diameter. A reflector with a diameter of 0.75 wavelength, or greater, is more commonly used and will provide a better front-to-back ratio without noticeable effect on the antenna's impedance. A 1-wavelength square reflector was used with the antennas shown in Fig. 3.

#### Building a Helical Beam

The completed antenna system shown in Fig. 3 contains two helical beams, each having an 8-turn driven element. Both have 25 × 25-inch reflectors that were fashioned from standard mesh-type hardware cloth. Examination of Fig. 4 will reveal the basic simplicity of the system. The reflector elements do not have sufficient rigidity to withstand long-term use and should be constructed as shown in Fig. 5 if the rigors of severe weather are not to shorten the life span of the array.

The longerons which support the helical elements are each 60 inches long and are made from 1 × 1-inch lumber. The helices are stapled

Fig. 3—The 8-turn helical beam on the right is wound for right-hand circular polarization. The antenna in the left foreground is wound for the left-hand circular mode. The quarter-wave matching section (coax and fittings) projects down from the screen reflector and is visible at the left. The individual bays are bolted to the bamboo cross member at the balance point of each bay.



to the longerons at each turn to preserve symmetry and to reinforce the driven elements. A better system would have been to use a standoff insulator at each point where the helices came in contact with the longerons, to reduce r.f. losses. An alternate method for reducing losses during damp weather would be to coat the wooden support members with exterior spar varnish or epoxy-resin paint prior to stapling the turns of the helices to them. After this is done, a few drops of epoxy glue could be placed over each stapled area to add further to the structural soundness of the system.

It is not particularly difficult to wind the helix coils but care should be taken to insure that a full wavelength-per-turn actually exists. It is easy to end up with an egg-shaped turn circumference if each spiral of the helix is not carefully placed on the longerons. The effect of such a mechanical error would be a turn circumference that was greater, or less than, the desired 1-wavelength dimension. Such an error would alter the beam width of the antenna and would result in a different feed-point impedance. The construction of the driven element can be simplified by precutting the aluminum wire to length prior to winding it on the longerons. A length of 207 inches will be correct for the 8-turn helix. To aid in the final tuneup of the antennas, an extra 6 inches of wire should be added to make a total dimension of 213 inches. This subject is discussed later.

The two antennas are identical with the exception that one of them is wound clockwise while the other is wound counterclockwise. This enables the user to select right- or left-hand polarization when engaging in moonbounce work.<sup>3</sup>

After the two antennas are assembled, they can be mounted on the 6-foot long horizontal boom. This cross member, visible in Fig. 3, is a 2-inch-diameter bamboo pole and is attached at its center, with two U bolts, to a 10-inch-square section of 3/8-inch plywood. A 6-foot length of 2 X 2-inch lumber would serve as a more rigid cross member and is recommended. A slight tendency toward "skewing" was experienced while using the bamboo stock, causing each bay of the antenna to have a different elevation angle during periods when a strong breeze prevailed.

A type N connector (chassis-mount variety) is installed at the center of each screen reflector. The flange of each connector is soldered to the hardware cloth to insure against poor electrical contact. The center terminal of the coax fitting is soldered to the feed-point end of the helix as shown in Fig. 4.

Although some controversy seems to exist with regard to the correct spacing between the first turn of the helix and the reflector, it was learned during experimentation with the antenna mod-

<sup>3</sup> Because the antenna system at KP4BPZ is designed to transmit in a right-hand circular sense, and receive in a left-hand circular sense, it is important that stations at the opposite end of the circuit be equipped with antennas capable of matching both the left- and right-hand senses when communicating with KP4BPZ. (Stations at this end of the circuit should transmit in the right-hand circular sense and receive in the left-hand circular mode.)

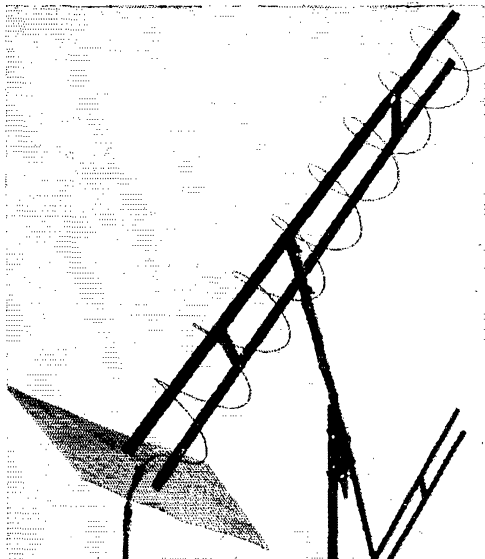


Fig. 4—A close-up view of the 8-turn helical beam. The coaxial cable and matching transformer are connected to the coax fitting at the center of the screen reflector. The helix element is attached to the wooden longerons with staples.

els described here that no significant change in feed-point impedance occurred when this dimension was varied. The first turn was started 1/8 wavelength away from the screen reflector, as some textbooks recommend, and impedance measurements were made. Then the first turn was made to start directly at the coaxial terminal on the reflector (Fig. 4) and the feed-point impedance remained the same. Intermediate spacings, between these two extremes, resulted in but minor changes in the feed-point resistance, so the first turn of the helix was started at the coax fitting in the manner illustrated in the photographs of Figs. 3 and 4.

If aluminum wire is used for the helices, a special soldering flux will be necessary.<sup>4</sup> If copper wire is used for the driven elements, no special flux will be required because copper will accept solder without difficulty.

#### Impedance Matching

A low standing-wave ratio is of paramount importance at 432 Mc. To make the system as efficient as possible in this regard, a matching transformer, Fig. 6, is installed between the antenna feed point and the 50-ohm transmission line to the equipment. In this instance, a match must be effected between the "ball park" figure of 140 ohms at the antenna terminals, and the 50-ohm transmission line impedance.

The formula for determining the correct impedance value for a coaxial quarter-wave matching transformer is

$$Z_0 = \sqrt{Z_1 Z_2}, \text{ ohms} \quad (1)$$

<sup>4</sup> Sal-Met Soldering Flux (available from Burstein-Applebee Co., 1012 McGee St., Kansas City 6, Missouri).

where  $Z_o$  = Desired transformer impedance  
 $Z_n$  = Transmission-line impedance  
 $Z_r$  = Antenna impedance

The required impedance for matching the 140-ohm terminal resistance of the helix antennas to 50-ohm transmission line is 83.7 ohms. Unfortunately, this is not a standard ohmic value for manufactured cables, so a compromise must be accepted if one does not wish to build a matching section of the ideal value. A  $\frac{1}{4}$ -wavelength section of RG-11/U cable (75 ohms) was used with the antennas shown in Fig. 3 and the resultant s.w.r. was 1.8:1. A closer match can be obtained by using the 81-ohm transformer described in Fig. 6. By substituting a length of 5/32-inch diameter brass or copper stock for the No. 6 copper wire shown, the impedance will increase to 83 ohms — a value that closely matches the desired 84-ohm figure. No. 6 wire is shown because it is more readily available than the 5/32-inch diameter stock. Other combinations of inner- and outer-diameter conductor dimensions can be used to secure the same impedance.

It is a simple matter to calculate the sizes of the inner and outer conductors that are required for various impedances in matching sections of this type. The dimensions can be found from

$$Z_o = 138 \log \frac{b}{a} \quad (2)$$

where  $Z_o$  = Desired transformer impedance  
 $a$  = Outside diameter of the inner conductor (inches)  
 $b$  = Inside diameter of outer conductor (inches)

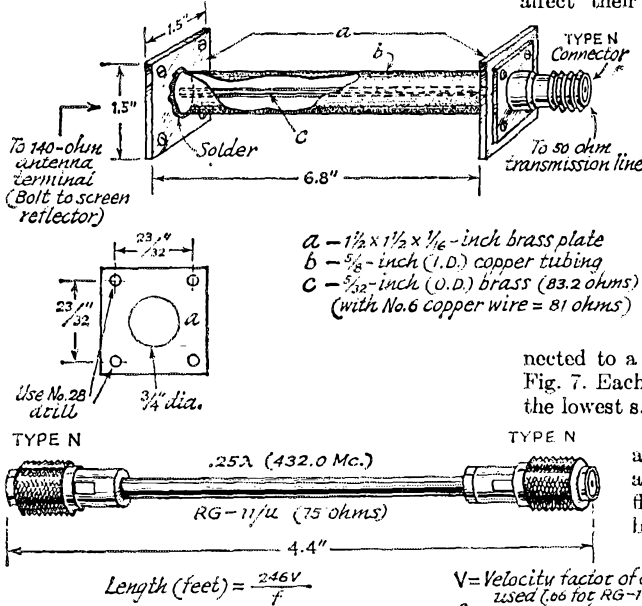


Fig. 6—Details of a matching transformer (top) which can be made from copper tubing. A compromise matching section made from RG-11/U cable (bottom).

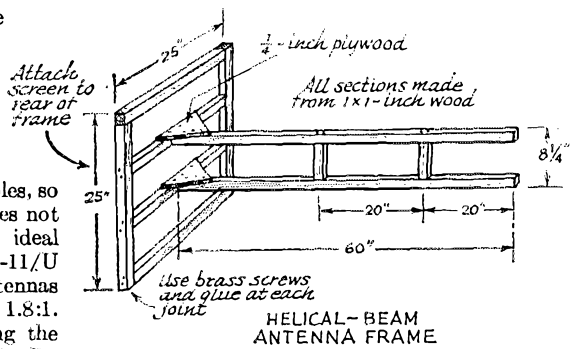


Fig. 5—A wooden framework of this type, treated with spar varnish or epoxy-resin paint, will be sufficiently strong to withstand severe weather.

By employing a double-stub tuner near the feed point of the antenna, a precise match between the transmission line and the helix can be obtained. Since a device of this type must contain two tunable quarter-wave coaxial sections, the mechanical requirements may be somewhat beyond the capabilities of the average ham-radio workshop. Detailed information connected with the design and fabrication of such an assembly has been published.<sup>5</sup>

### Antenna Adjustment

After the antennas have been attached to their supporting framework, they can be mounted to the mast and set in place on the tower. (A 5-foot triangular TV tower was used with the models in Fig. 3.) Although the antennas are but a few feet above ground, proximity effect will not affect their performance if they are pointed toward the sky during the adjustment period. A wooden stepladder will be helpful during the tuneup process and may be left in the field of the antennas without undesirable effects being introduced into the system. The antennas should, however, be kept several wavelengths away from trees, buildings and fences while they are being adjusted.

After installing the matching transformers at the feed point of each antenna, they should be connected to a test setup of the kind illustrated in Fig. 7. Each bay is tuned individually, and for the lowest s.w.r. obtainable.

In tuning for minimum s.w.r., apply a few watts of 432-Mc. energy to the antenna under test. The initial reflected power readings on the s.w.r. bridge will be quite high because of the added length of the driven element, mentioned earlier in the text. Place the transmitter in standby

$$V = \text{Velocity factor of cable used (see for RG-11/U)} \\ f = \text{Frequency of operation in Mc.}$$

<sup>5</sup> Johnson, *Transmission Lines and Networks*, McGraw-Hill, Chapter 7.  
 RSGB, *The Amateur Radio Handbook*, Chapter 14.

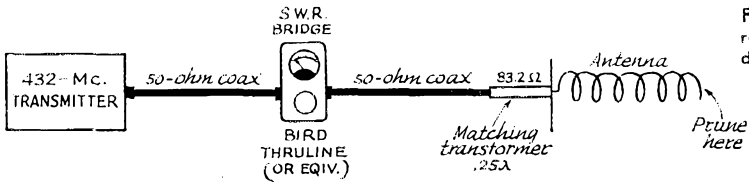


Fig. 7—A block diagram of the recommended test setup for use during antenna adjustments. A u.h.f.-type s.w.r. bridge is needed to assure reasonable accuracy during the tests.

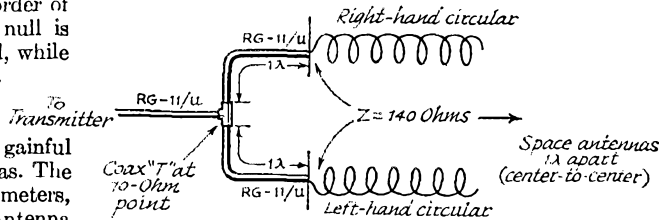
and snip off about  $\frac{1}{8}$  inch of stock from the far end of the helix. Turn the transmitter on and once again observe the s.w.r. reading. Repeat this procedure until a drop in reflected power is noted. When this stage is reached, limit the amount of each snip to approximately  $\frac{1}{16}$  inch to prevent passing beyond the dimension that provides the lowest s.w.r. reading. When no further reduction in reflected power is possible, cease pruning. The s.w.r. will be on the order of 1.5:1, or slightly higher, once the best null is reached. Repeat the process just described, while tuning the remaining helical-antenna bay.

### Using the Antennas

A number of possibilities exist for the gainful application of circularly-polarized antennas. The Oscar work, previously carried out on 2 meters, is expected to continue. A helical beam antenna built to 144-Mc. dimensions would respond better than other types to the ever-changing signal polarity from Oscar. Since satellites are continuously tumbling as they orbit, their transmitted signals tend to arrive on earth in kaleidoscope fashion. A circularly-polarized antenna is capable of responding to whatever signal polarity may arrive at a given instant. A marked reduction in signal fading will result from the use of a circularly-polarized antenna, making the helical array quite desirable for satellite work. Similarly, the fading that is experienced

over rough terrain when operating on 432 Mc. should be lessened because of the antenna's ability to respond to signals affected by polarity shift.

In moonbounce communications, a left-hand circular-sense antenna and a right-hand circular-sense antenna can be used without the need for antenna switching because you will normally be transmitting in the right-hand circular mode and receiving in the left-hand mode. In addition,



### LINEAR RADIATION SYSTEM

Fig. 8—A right- and a left-hand circularly-polarized helical antenna can be combined to produce a linear radiation pattern. This result is possible by feeding the two bays in phase, as shown.

approximately 30 decibels of circuit isolation results from the two antennas being of opposite sense, reducing the complexity of receiver front-end isolation.

A more effective moonbounce antenna would result from arranging each bay so that it contained four helical beams. The added gain, increase capture area (aperture) and improved directivity would be well worth the added effort. An example of such an array is shown in the photograph on page 20. Four helices per bay should be capable of yielding as much as 20 decibels of gain, or more, if carefully constructed and matched. A unique matching system for use with quad-helical beams is described in *The Radio Amateur's Handbook*, and should be adaptable to 432-Mc. use.<sup>6</sup>

When using the helical-beam array (Fig. 3) for moonbounce work, the elevation will have to be changed by loosening the U-bolts on the horizontal cross member, changing the elevation angle of the antennas, then tightening the U-bolts again. A similar procedure is required when changing the azimuth angle of the system. Since this represents a very crude form of Az-EI control, the user of such an antenna system may prefer to mount antenna rotators at the appropriate points in the structure for more rapid positioning

(Continued on page 170)

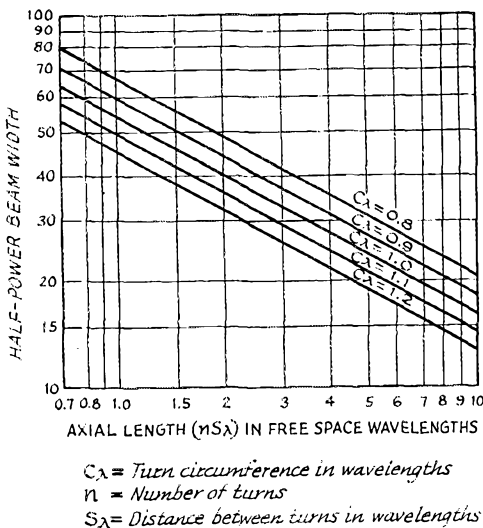


Fig. 9—A chart for determining the half-power beam width of helical antennas using different turn circumferences (in wavelengths) and different axial lengths.

$$\text{BEAM WIDTH} = \frac{115}{C_{\lambda} \sqrt{n S_{\lambda}}} \text{ DEGREES}$$

$C_{\lambda}$  = Turn circumference in wavelengths  
 $n$  = Number of turns  
 $S_{\lambda}$  = Distance between turns in wavelengths

<sup>6</sup> ARRL, *The Radio Amateur's Handbook*, 42nd ed., p. 463.

# The Dipper

**I**F you are one of those hams who likes to build or trouble-shoot your own gear, one of the most useful tools in a ham shack is a grid-dip meter. A grid-dip meter is simply a vacuum-tube oscillator equipped with a milliammeter, or microammeter, the oscillator being capable of covering a wide range of frequencies, usually from about 2 Mc. up through the v.h.f. region.

When a grid-dip meter is coupled to a tuned circuit and the grid-dip oscillator frequency is tuned through that of the tuned circuit, the meter will show a "dip." The reason it shows a dip is that when the two circuits are coupled together the external circuit will absorb some power from the grid-dip oscillator; this causes a decrease in grid current which in turn shows up as a decrease in meter reading or a dip.

The unit described in this article really cannot be called a grid-dip meter because a transistor is used instead of a vacuum tube, and a transistor doesn't have a grid. So we'll call it a "dipper." One real advantage in using a transistor is that we can make the dipper quite compact, even enclosing the power supply (a nine-volt battery). As you will find, there are many, many uses for a dipper and we'll discuss some of these a little later.

## Circuit Description

Fig. 1 is the circuit diagram of the transistor dipper. The frequency-determining element of the circuit consists of  $L_1$  and  $C_1$ . A series of plug-in coils for  $L_1$  provides a frequency range of 1.5 Mc. to approximately 60 Mc. When  $L_1$  is coupled to a tuned circuit the dipper doesn't oscillate quite as strongly because some of the energy from the oscillator is coupled to the circuit being checked. This in turn means that less voltage appears across the metering circuit, the combination of  $CR_1$ ,  $RFC_1$ , and  $M_1$ . With less voltage, the meter will show a very pronounced dip.  $R_4$  is a sensitivity control for setting the meter reading to a desirable range — half-scale, for example.

## Construction Information

The complete dipper is built into an aluminum Minibox measuring  $2\frac{1}{8} \times 3 \times 5\frac{1}{2}$  inches. The only critical construction item is the mounting of  $C_1$  adjacent to the five-pin miniature coil socket. If you look at the bottom-view photograph you'll note that the capacitor is mounted so that the socket pin leads are kept close to the stator and rotor connections of the capacitor. The idea is to keep these leads as short as possible, to reduce any stray inductance so that the dipper will operate in the v.h.f. range, up to 60 Mc.

## A Simple Dipper

### for the Newcomer

BY LEWIS G. McCOY,\* WHICP

The rotor must be insulated from the case, so insulated washers are used when mounting  $C_1$ .

Arrangement of the remaining components is not critical, except when mounting the meter be sure to allow enough clearance between the meter case and  $S_1$  and  $R_4$  so you'll have room to mount the two components. Also, be sure you allow enough clearance around the box so that when the cover is installed, none of the parts are shorted out.

## Calibrating the Dipper

A  $1\frac{1}{4} \times 2\frac{1}{2}$ -inch piece of white card, or any material that is fairly stiff, is mounted under the holding nut of  $C_1$ . As you can see from the coil table, there are five ranges for the dipper, so five calibration lines are needed on the card. Calibrating the dipper takes a little time but it is quite easy to do an accurate job. The simplest way to calibrate the unit is with your receiver. Keep in mind that the dipper is really a small transmitter and it generates a signal.

Turn on the b.f.o. and tune the receiver to 1.7 Mc. in the 160-meter band. Then place the dipper near the receiver antenna terminal. Using the lowest coil range, tune the dipper to the point where you hear the signal in the receiver. Make a mark on the card, or put down the frequency indicated by your receiver. You'll need a sharp point on a pencil, or a pen that makes a fine line, because a considerable number of frequency calibration points will be required on the card.

\* Beginner and Novice Editor.

*Test and trouble-shooting gear are pieces of equipment that every amateur should be interested in. Here is a simple and easy-to-build dipper that should prove as useful as a third hand.*



Then tune to 2.0 Mc., set the dipper to that point, and make another mark. You can then block out the region between the two marks, indicating that as the 160-meter band. Another trick is to use colored pencils for blocking out each amateur band, using a different color for each band. You can also color-code the plug-in coils so that a glance will show you which coil you are using.

Proceed to the next higher amateur band and continue your calibration. It should go without saying that you can make calibration marks *between* the amateur bands if you have a general coverage receiver or can borrow one. Once the unit is calibrated it is ready for use.

### Some Uses For The Dipper

First, and most important, in using the dipper you must couple the end of  $L_1$  to the circuit being checked. Once you find a dip, you can reduce the coupling by moving the coil away from the tuned circuit. The farther away, while still getting a dip, the more selective the dipper will be, thus providing a more accurate check of the tuned-circuit frequency. However, it should be pointed out that the dipper is not an accurate device for checking the exact frequency of a circuit. It quickly tells you what *band* a circuit is tuned to, but not the exact frequency. However, you can improve the accuracy by using the dipper in conjunction with your receiver. First check the tuned circuit with dipper, using as loose coupling as possible, and then, without changing the setting of the dipper, check the frequency of the dipper in your receiver. This provides a fairly accurate measurement.

Many times you'll come across a fixed or variable capacitor that has no value marked on it.

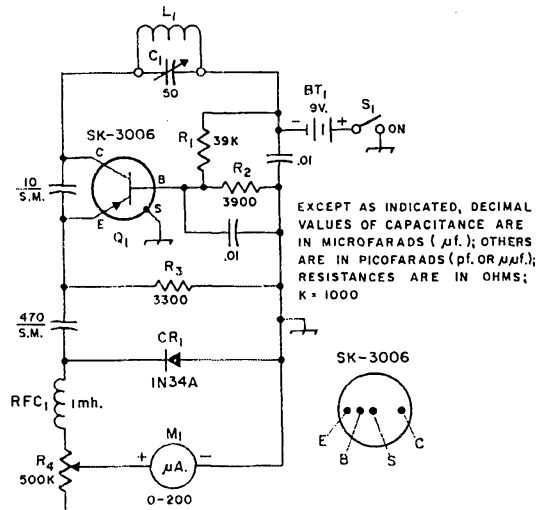
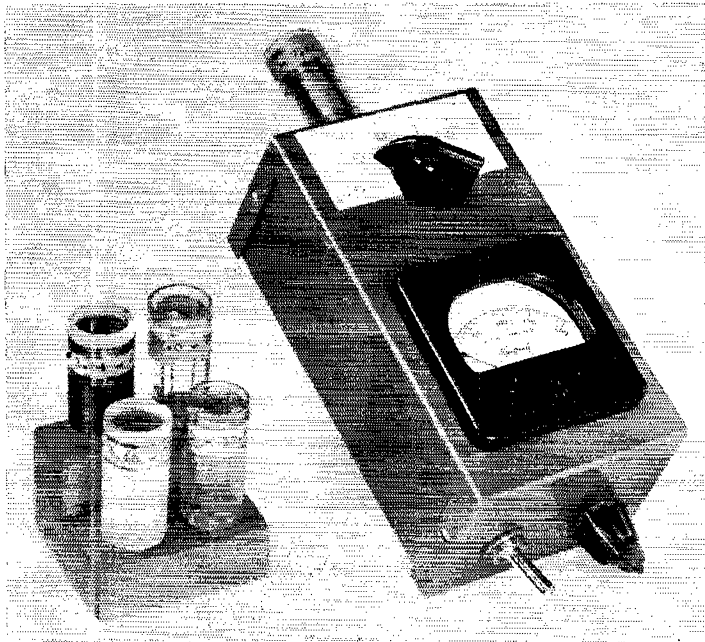


Fig. 1—Circuit diagram of the transistor dipper. All resistances are in ohms; fixed resistors are 1/2 watt; 0.01- $\mu$ f. capacitors are disk ceramic; s.m. = silver mica.

- BT<sub>1</sub>—9-volt transistor type battery.
- C<sub>1</sub>—50-pf. midget variable (Hammarlund HF-50).
- CR<sub>1</sub>—1N34A germanium diode.
- L<sub>1</sub>—See Table I.
- M<sub>1</sub>—200- $\mu$ a. meter, or more sensitive type can be substituted.
- Q<sub>1</sub>—SK-3006.
- R<sub>1</sub>—39,000 ohms, 1/2-watt.
- R<sub>2</sub>—3900 ohms, 1/2-watt.
- R<sub>3</sub>—3300 ohms, 1/2 watt.
- R<sub>4</sub>—0.5-megohm control, linear taper.
- RFC<sub>1</sub>—R.f. choke, 1 mh.
- S<sub>1</sub>—Single-pole, single-throw toggle.



This is the completed unit with the set of five coils. At the lower right on the dipper is the sensitivity control and the power switch is at the left.

In the case of the variable, you may wish to find the minimum and maximum values. All you need are few different values of inductances, say one of 2  $\mu$ h., another of 10  $\mu$ h. and another of 25  $\mu$ h. plus an ARRL Lightning Calculator, Type A. You can do the job with formulas, but using a calculator makes the job simple. For example, connect your unknown variable across the 10- $\mu$ h. coil and set the capacitor at maximum capacitance (plates fully meshed). Next, use the dipper to find out what frequency the circuit is tuned to. Let's suppose it dips at 5 Mc. With the Lightning Calculator hairline set at 10  $\mu$ h., swing the inner ring on the Calculator to put 5 Mc. under the F or frequency mark. Directly under the

(Continued on page 166)

TABLE I

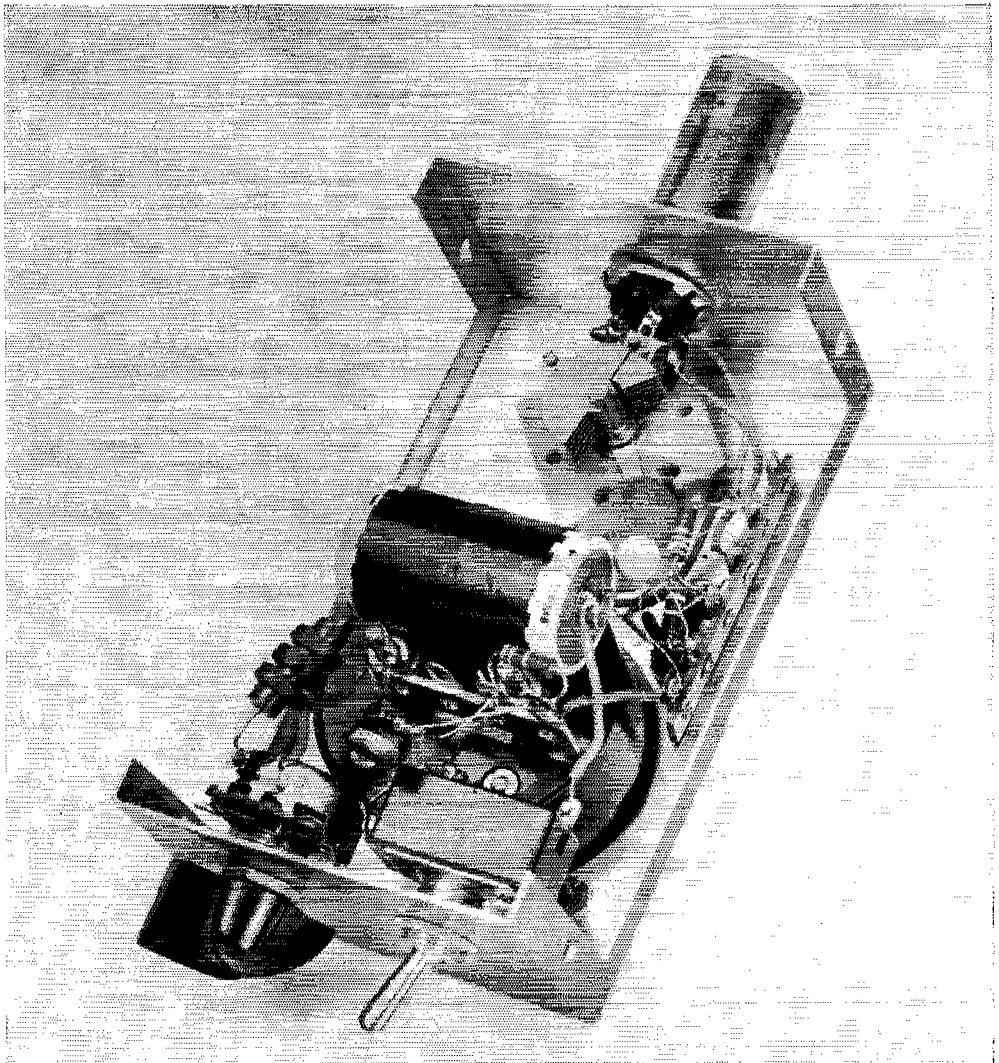
Coil data for L<sub>1</sub>

Freq. Range	Turns	Wire Size	Turns per Inch
1.5- 3.2 Mc.	140	32 Enamel	Close-wound
3.2- 7.3 Mc.	40	32 Enamel	Close-wound
7.0-14.5 Mc.	40	24 Tinned	32 <sup>1</sup>
14.0-40.0 Mc.	15	20 Tinned	16 <sup>2</sup>
37.0-60.0 Mc.	4	20 Tinned	16 <sup>2</sup>

All coils are wound on or mounted in Allied Radio 46 H 693 coil forms, 3/4-inch diam., (page 283 in the 1966 catalogue.) Coil socket is amphenol 7855.

<sup>1</sup> B & W Miniductor, type 3004.

<sup>2</sup> B & W Miniductor, type 3003.



Note particularly how the tuning capacitor is mounted adjacent to the coil socket. Also, when mounting the terminal strip at the right hand side in this view, be sure to allow clearance space for the cover. The battery is held in place by the leads, which are soldered directly to the battery terminals.

A

Compact

Stable

5-Mc.

V.F.O.

## Nuvistor Unit for S.S.B. Exciters

BY JESSE L. MEREDITH, JR.\* K6KWX/7

**B**EING a home-brew addict in the amateur ranks has its advantages and disadvantages. An accumulation of over 30 years of experience in this field helps one sometimes to come up with a useful piece of gear. It also helps to develop a sort of sixth sense to ferret out little unexplained reactions that just "ain't supposed to be."

Some time ago, it was decided to join the ranks of the s.s.b. group, and a small exciter was designed and built. The v.f.o. included in this unit was dreamed up to fit several qualifications. It had to be small because of space limitations. The tuning had to be fairly linear, and the unit had to be extremely stable and rugged for s.s.b. use. The enclosure should be "airtight" to prevent spurious leakage. It was decided to stick to the usual tuning range of 5.0 to 5.5 Mc. The circuit, a high-*C* Colpitts, is shown in Fig. 1.

### Components and Assembly

In a past issue of *QST*, there appeared a product description of a die-cast aluminum box with a fitted lid.<sup>1</sup> This box gives a rigidity and rugged-

\* 180 East 21st St., Idaho Falls, Idaho.

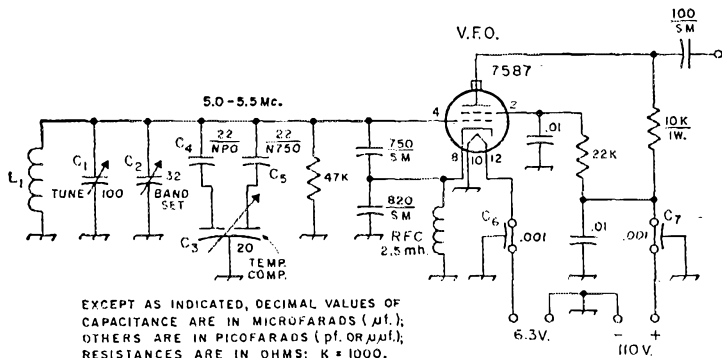
<sup>1</sup> "New Apparatus," *QST*, June, 1962. This is a British import manufactured by Stratton, Ltd., (Eddystone). It is distributed in the U.S.A. by British Radio Electronics, Ltd., 1712 Wisconsin Ave., N.W., Washington, D. C. The box is designated Model 650, and measures approximately 4½ × 3½ × 2½ inches. The price is about \$2.20.

ness not attainable with conventional sheet-metal boxes.

The next problem was to select a tube. First thoughts were toward mounting a miniature tube, such as a 6CB6, on the lid of the box. However, some experiments with Nuvistors yielded the final answer. A 7587 Nuvistor is mounted inside the box in a horizontal position. It was necessary to construct a small bracket to hold the socket (Cinch-Jones 5NS-1). The bracket was bent from a small piece of aluminum. Connection to the plate cap of the 7587 posed a slight problem which was solved by the discovery of an old-time tube-cap clip at the very bottom of the junk box.

The Bud tuning capacitor, *C*<sub>1</sub>, which has very rugged construction, was mounted next on the front wall of the box. For most convenient wiring, the differential capacitor *C*<sub>3</sub> was mounted above trimmer *C*<sub>2</sub> on the right-hand wall, with the two shafts projecting for adjustment. *L*<sub>1</sub> was placed to the rear of *C*<sub>1</sub>, and mounted by its leads, keeping the leads as short as possible to minimize vibration effects.

A small terminal strip was fastened in the bottom of the box to provide a mounting and tie points for some of the smaller components. The two feedthrough capacitors, *C*<sub>6</sub> and *C*<sub>7</sub>, were set in the rear right-hand corner of the bottom. These serve as terminals for bringing in the 6.3-



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS ( $\mu$ f.); OTHERS ARE IN PICOFARADS (pf. OR  $\mu$ mf.); RESISTANCES ARE IN OHMS; K = 1000.

Fig. 1—Circuit of the 5-Mc. Nuvistor v.f.o. Fixed capacitors: SM indicates silver mica; others, unless listed below, are disk ceramic. Resistors: ½-watt composition, unless indicated otherwise.

*C*<sub>1</sub>—100-pf. midget variable (Bud CE-2004).

*C*<sub>2</sub>—32-pf. air trimmer (Johnson 160-140).

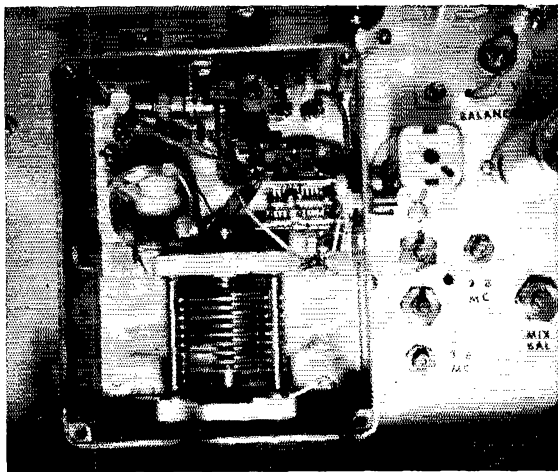
*C*<sub>3</sub>—20-pf. differential capacitor (Johnson 160-311).

*C*<sub>4</sub>—22-pf. NPO ceramic.

*C*<sub>5</sub>—22-pf., N750 neg. temp. coefficient ceramic.

*C*<sub>6</sub>, *C*<sub>7</sub>—0.001- $\mu$ f. feedthrough capacitor (Erie 357-102).

*L*<sub>1</sub>—8¼ turns No. 18, 1-inch diam., 10 turns per inch.



Top view of the Nuvistor v.f.o. with cover removed. The large capacitor mounted on the front wall of the box is the tuning element. Band-set and temperature-compensating capacitors are mounted one above the other on the right-hand wall. The coil is self-supporting to the left. The Nuvistor tube is mounted on a bracket fastened to the rear wall.

volt a.c. and +110-volt d.c. connections from the under side of the main chassis. Ground connections are made to the case of the box.

A small standoff insulator in the left rear corner is used as a tie point for the junction between the output coupling capacitor and the coax cable carrying the signal out. I used a piece of RG-174/U for this purpose. This cable is only 3/32 inch in diameter, and is consequently very flexible and easy to handle. A hole was drilled in the bottom of the box, just large enough to permit the RG-174/U, minus its outer insulating covering, to be slipped through. The fit between the cable shield and the hole was considered tight enough to give good closure, but the shield was soldered to one of the terminal-strip grounding lugs for security.

A Millen type 10035 dial provides good band-spread readability on all frequencies. The calibration turns out to be fairly linear.

### Adjustment

Trimmer capacitor  $C_2$  is used to set the frequency range covered by  $C_1$ . The differential

capacitor  $C_3$ , the zero-temperature-coefficient capacitor  $C_4$ , and the negative-temperature-coefficient capacitor  $C_5$  form an easily adjusted temperature-compensating network. I must admit to a bit of plagiarism in regard to this network, as I believe that it was used originally by Hallicrafters.  $C_3$  is merely adjusted until the oscillator frequency stops drifting. This adjustment must be made, of course, over a period of hours. Any change in frequency caused by adjustment of  $C_3$  may be compensated for by readjustment of  $C_2$ . The best procedure is to turn on the v.f.o., tune the signal in on a receiver, and beat it against the crystal calibrator at one of the 100-kc. points. If the receiver doesn't cover the 5-Mc. range, you may be able to pick up the 6th harmonic at 30 Mc.

### Frequency Drift

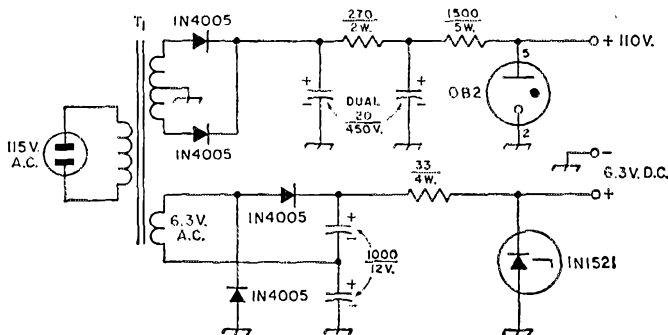
With the v.f.o. entirely enclosed within the heavy die-cast box, the question arises, "What about heat dissipation?" Less than 110 volts is applied to the plate and screen of the 7587, and little heat should be generated. The box itself acts as a large heat sink and, after hours of operation, it was not possible to detect any heat by placing a hand on the box. As an additional precaution toward maintaining stability, it was deemed desirable to regulate the plate- and screen-voltage source, and to use an arrangement that would permit the v.f.o. to run continuously, whether the rest of the exciter was turned off or not. This called for a separate small power supply for the v.f.o., and one was built for the purpose.

In spite of these precautions, I became frustrated no end upon placing the oscillator in operation. Listening on a stable receiver revealed the horrendous fact that the frequency was drifting — all over the place. Impossible! Several nights of tinkering and appealing to various deities finally yielded the answer. The frequency drift was definitely tied to line-voltage variation. The fact that the drift lagged considerably behind the change in line voltage led to the suspicion that the 7587 dark heater was the culprit. A voltmeter across the heater disclosed a variation of over one volt — enough to cause the characteristics of the tube to change radically.

This problem was solved by connecting a small voltage-doubler rectifier and zener regulator across the 6.3-volt winding of the v.f.o. power

Fig. 2—Circuit of the separate v.f.o. power supply. Resistances are in ohms, and capacitances are in  $\mu\text{f}$ .

$T_1$ —Power transformer: 250 volts, r.m.s., c.t. 25 ma.; 6.3 volts, 1 amp. (Stancor PS-8416).



V.f.o. dial mounted on the panel of the author's s.s.b. exciter.



transformer. A check on the receiver while watching line-voltage variations of as much as 15 volts gave a feeling of sheer ecstasy. On-the-air report consensus was, "What drift?"

### Power Supply

The final version of the v.f.o. power-supply circuit is shown in Fig. 2. Type 1N4005 diodes were used in both plate and heater supplies, since they are small, cheap, and I had some in my hot little hand. For the heater supply, any small diodes that have a p.r.v. of 50 volts or more, and a current rating of 400 to 500 ma., can be used safely. The 1N4005 will handle 600 volts p.r.v. at 1 ampere. It is recommended that capacitors of not less than the specified 1000  $\mu$ f. be used in this section of the supply, otherwise the output voltage may not be sufficient for proper operation of the zener. The 1N1521 zener is listed at 6.8 volts, but inspection of three or four International Rectifier 1N1521s revealed that one of the group operated at 6.3 volts.<sup>2</sup> Each I.R.C. zener comes with a plotted

<sup>2</sup> The heater voltage for the 7587 can run up to 6.9 volts without exceeding the  $\pm 10$  per cent rated tolerance. — *Editor*.

test-data sheet showing the operating voltage.

Nuvistors have been used for some time now as crystal oscillators but, to the best of my knowledge, this is the first time one has been tried in a self-excited circuit for s.s.b. use. Obviously, the heater-voltage control is critical in the dark-heater series and, should future endeavor be extended in Nuvistor work, this fact should be kept well in mind.<sup>3</sup>

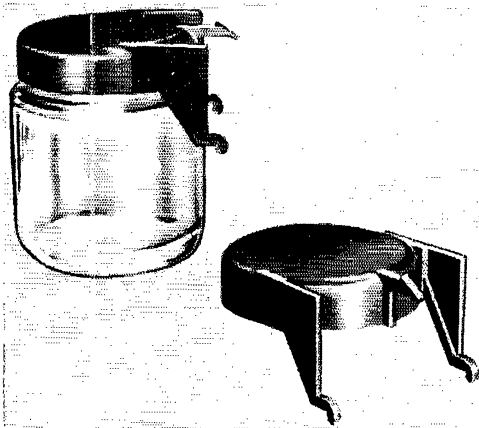
There is nothing unusual about the circuitry of the v.f.o., but the components used, the small size, ruggedness of construction, and the frequency stability obtained may make the design of interest to others.

One last word of caution: Don't lose any of the screws for the cover of the box. Our British friends use screws with metric threads, making it rather difficult to find a replacement if any of the original screws are lost. QST

<sup>3</sup> While this characteristic may be more pronounced in dark heaters, variation in oscillator-tube heater voltage is an often-overlooked source of oscillator instability, to a greater or lesser degree, with other types of heaters. — *Editor*.

## • New Apparatus

### Handy Dandys



**A**MATEURS have, over the years, used everything from coffee cans to ink bottles for small parts storage. But, storing the collection of bottles and cans in the workshop so they look neat has been quite a problem. A little device called a Handy Dandy has been introduced to use with baby-food jars for storage of hardware and parts. The Handy Dandy is a molded hard-plastic cover with three prongs that fit into a standard  $\frac{1}{8}$ -inch peg board. The cover is threaded to fit the top of baby-food jars, and are on and off with a twist.

The food jars are soaked to remove the label so one can easily see the contents. The caps are mounted on the peg board by simply pushing them in. Finding baby food jars is an easy task. If no neighbor or relative has a baby just stop by the local supermarket and wait till you see a mother really loading her cart — she is the one to ask about obtaining empty jars!

Handy Dandys are made by Wickliffe Industries, Inc., Wickliffe, Ohio. The price is \$1 for 12, \$2.50 for 36, and \$4 for 72. — *WIKLKE*

# The Filterfier

## An Audio Low-Pass Filter/Amplifier for Phasing-Type Exciters

BY CHARLES R. MacCLUER,\* W8MQW AND WALLACE T. THOMPSON, JR.,\*\* WB2NFD

To repeat an old argument, the intelligence in the human voice is found between 300 and 3000 c.p.s. Therefore, any transmitted audio frequencies above 3000 c.p.s. represent wasted energy doing little but precipitating complaints. Several means of suppressing unwanted high audio frequencies exist. One may construct several types of filters, use capacitive roll off in the audio amplifiers, or use a limited-response microphone. Unfortunately, capacitive roll-off is not likely to be as sharp as one would like, and any filter designed for the high-impedance levels found at the plate of a vacuum tube requires expensive chokes. Moreover, many hams prefer not to make extensive changes in the circuitry of commercial exciters.

The filter presented here in Fig. 1 has the advantage that small inexpensive chokes are used; the filter is external to the exciter, and it will provide a slight gain over the microphone if desired.

### The Circuit

The idea is simple: Transform the microphone

\* 3080 Lakewood, Ann Arbor, Michigan 48103.  
 \*\* 8125 Centre Lane, East Amherst, New York, 14051

impedance to a low value, filter the speech spectrum, then transform the impedance back for entry into the exciter. The 2N1086 transistor in the common-collector configuration has high-impedance input to match a crystal microphone, and a very low output impedance so that, together with the 1000-ohm resistor  $R_1$ , the filter has a source impedance of 1106 ohms. The filter is a standard  $m$ -derived pi section with two  $m$ -derived end sections followed by a resistor to drop impedance and, lastly, a constant- $k$  pi section to prevent pop up. The  $m$ -derived sections were designed with the choice  $f_c = 2.4$  kc.,  $f_\infty = 3$  kc.,  $m = 0.6$ , and  $R$  chosen to be 1106 so that the plentiful telephone toroids<sup>1</sup> could be used. The constant- $k$  pi section was designed at  $f_c = 1.7$ ,  $R = 470$  ohms. (For the meaning of the notation, see "Low-Pass Filters," *ARRL Handbook*.)

The 2N107 in a common-emitter configuration transforms the 470-ohm output of the filter again to high  $Z$ . The failure to bypass the emitter resistor of the 2N107 is no oversight. Degenerative feedback is employed to insure that the filter is terminated correctly with 500 ohms (two 1000-ohm resistances in parallel). In fact,  
<sup>1</sup> See Ham Ads columns, *QST*.

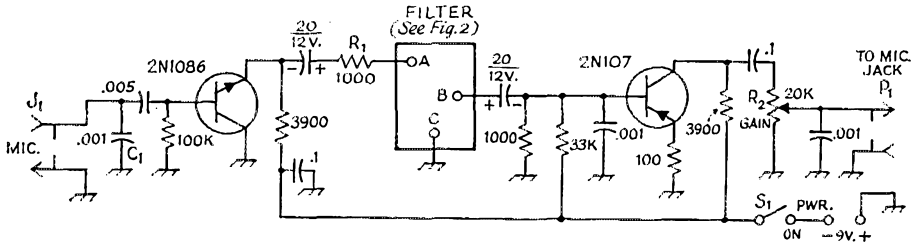


Fig. 1—Circuit of the Filterfier. Capacitances are in  $\mu\text{f.}$ ; resistances are in ohms ( $K = 1000$ ). Capacitors with polarity marking are electrolytic; others are paper or ceramic. Resistors are  $\frac{1}{4}$ - or  $\frac{1}{2}$ -watt. Component indicators not shown below are for text-reference purposes.

$J_1$ —Connector to suit microphone.

$P_1$ —Plug to fit microphone jack of exciter.

$R_2$ —Audio-taper control.

$S_1$ —S.p.s.t. switch, any type.

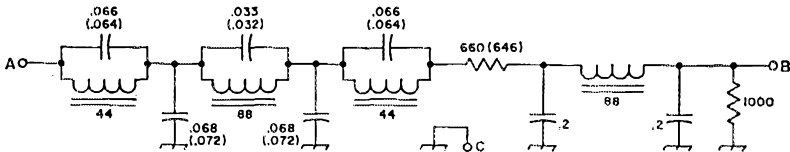


Fig. 2—Circuit of the low-pass filter. Capacitances are in microfarads, inductances are in millihenrys, and resistances are in ohms. Where calculated values differ from values actually used, calculated values are shown in parentheses. Capacitances of  $0.066 \mu\text{f.}$  are made up of two  $0.033 \mu\text{f.}$  capacitors in parallel. Capacitors should be Mylar, 10-per-cent tolerance. Inductors are "telephone" toroids. Resistors are  $\frac{1}{4}$ - or  $\frac{1}{2}$ -watt. Resistance of 660 ohms is made up of two 330-ohm resistors in series. Terminals A, B and C correspond to similarly-labeled terminals in Fig. 1.

each part in the circuit has been chosen with care and with a purpose in mind, so substitutions are made at your own risk. It is of primary importance that good capacitors with a tolerance of 10 per cent or better be used in the filter.

### Construction

The toroids and capacitors of the filter were assembled on a 4 × 5-inch vector board, the transistor circuit on a 4 × 2-inch vector board. The two boards were mounted on opposite inner sides of a 5 × 4 × 3-inch Minibox. The bypass  $C_1$  must be placed directly across the microphone connector to prevent r.f. rectification. If desired, one could install a toggle switch to bypass the entire circuit so that comparisons could be made. However, with phasing exciters such as the 20-A or HT37, 10 seconds of monitoring with the filter in place will show that the toggle switch is unnecessary. The difference is profound! We believe sincerely that the Filterier is one of the most inexpensive yet effective ways of bringing the old war-horse phasing exciters up to the modern state of the art. QST

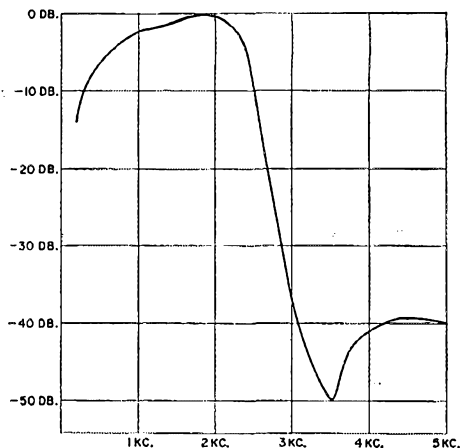


Fig. 3—Response characteristic of the filter of Fig. 2. With the assistance of K8DKC, measurements were made using a Heath AV-3 v.t.v.m., a Racal SA520 frequency meter, and a Heath IG-72 audio signal generator.



November 1940

An important "first" in amateur radio annals took place in New York on September 27, 1940 when the first two way television contact was made over a distance of 8 miles between W2USA at the New York World's Fair and W2DIJ/2 in the New York Daily News Building.

The television channels were in the 112-Mc. band while the sound was transmitted in the 56-Mc. band. Arthur H. Lynch, W2DKJ, managing director of W2USA was master of ceremonies and the group included many notables including George Bailey, W1KH, President of the ARRL, Hudson Division director Kenneth T. Hill, W2AHC, former directors Dr. Lawrence J. Dunn, W2CLA and Dr. A. L. Walsh, W2BW. Also present was Jim Lamb, W1AL, ARRL research director, W. A. Ready, president of the National Company and representatives of the R.C.A. Mfg. Co.

Since duplex operation was not permitted in the 56-Mc. band, an "on-off" switch was provided. The powerful 1000-watt lamp used in transmitting was turned off during reception periods so that the viewers could see the picture being received in better detail.

... R. Carleton Greene, W8PWU presents the facts concerning balloon supported antennas, the answer to many amateur's prayer for a real "sky-hook." Supporting weights and dimensions are given together with a warning concerning the explosion hazards of hydrogen. In this connection we remember the burned eyebrows and moustache of ARRL's F. Cheney Beekley, W1GS who permitted an inflated hydrogen balloon to rise up into a skylight over his desk. While attempting to retrieve it, the balloon let go and the resulting pressure wave blew out the windows in one of the front offices of the League!

... Don H. Mix, W1TS describes a simple two-tube exciter with plug-in coils for the various bands and capable of delivering up to 50 watts power.

... The Eighth ARRL Field Day results are tabulated with W1DMD/1, (Merrimack Valley Radio Association), with one transmitter as high scorer.

... John D. Kraus, W8JK, famous antenna authority and author describes square-corner reflector-beam antennas for the ultra-high frequencies. Full constructional details are given together with performance data.

... Ed Tilton, W1HDQ discusses the problems involved in increasing coverage on five meters. He says "about the only thing five is good for is 'ground-wave' work." Seems he is frequently away from the rig when the band opens up!

... George Grammer, W1DF, Technical Editor shows how to modernize the 1941 version of the regenerative superhet. Chief results to be expected are a five-fold gain over the original circuit, lessened interaction between the h.f. oscillator and mixer, and a high order of stability. These benefits are the result in certain circuit changes.

... A vast increase in interest in code speed proficiency is reported among the members who are urged to apply for the certificates even though they may only be eligible for 15 w.p.m. at the present time . . . The 1.7 Mc.-band has been changed to 1950 kc.-2050 kc. from the old 1915-2000 kc. band. We give up 35 kc. of exclusive c.w. territory and receive 50 kc. open to A1, A3 and A4 modes of operation.

... Members are urged to refrain from discussing certain personal affairs over the air such as jobs, transfers, etc. — W7ANA

**SWITCH  
TO SAFETY**

# I.A.R.U. News



## RECIPROCAL OPERATING RULES FOR CT

Through the courtesy of Jose Maria C. Vitorino, CT1SE of the *Rede dos Emissores Portugueses*, we have information on operation in Portugal by Americans.

The application is typed in essay form in Portuguese on official stationery, addressed to the Director dos Servicos Radioelectricos, Lisboa. Information required includes name, birth place and date, nationality, parents' names, home address, profession and schooling, class and call of the home amateur station and issuing authority. A photocopy of the license must be attached. A fee of \$8 for a full year or of \$5 for a short period must be paid. U.S. amateurs heading that way may get personal assistance from the R.E.P., Rua de D. Pedro V. 7-4, Lisboa, Portugal.

## REGION I EXECUTIVE COMMITTEE

The Executive Committee of the Region I Division, IARU met July 10-11 in Opatija, Yugoslavia, was to plan for the Region I Conference, in the same city the week of May 22, 1966. Organizational questions were discussed, including financing of the Division's activities. The group discussed the European Band Plan (which allocates space between phone and c.w. on a "gentlemen's agreement" basis), reciprocal operating, a suggested "International Sports Code", regional and world championships, European Oscar activities, fox hunting rules, and QSL Bureau affairs. (From *Region I Bulletin*)

## NEW OFFICERS

Six directors were recently elected by members of the *Reseau Des Emetteurs Francais* from a field of 13 candidates: F9DW, F8BO, F3KK, F9MR, F9VR and F8VF. The full Board of 18 then elected the following officers: president, F9VR; vice presidents, F8TM, F8BO, F9DW; secretary of the Board, F9YK; treasurer, F3FA. Directors serve for three year terms, officers for one.

DL1QK was re-elected president of the *Deutscher. Amateur Radio Club, e.v.* for a four-year term at the General Meeting of the Council last May. DJ5UD became chairman, DL1CS vice chairman, and DL3NE a counsellor. Officers of the special-interest groups within DARC will be elected at the Fall meeting of the Council.

Other news from Germany includes two call sign changes. Calls beginning DL2, formerly assigned only to foreign amateurs, now will be assigned to German citizens. Calls in the DK block with suffixes AA to RZ are being used in West Germany, with the rest of this series in East Germany. (From *Region I Bulletin*)

## AMATEURS IN TURKEY?

ARRL is in receipt of a letter from *Turkiye Radyo Amatorleri Cemiyeti* (TRAC), which translates as "The Turkish Radio Amateur Association." TRAC makes its headquarters in Istanbul (P.O. Box 699, Galata) and publishes a magazine with the intent of training new amateurs. It reports that the government is sympathetic and new regulations are being written.

Attempts to establish amateur radio in Turkey have been made sporadically for the past ten years, but apparently in each previous case the obstacles have been too great. Amateurs everywhere will join us in wishing TRAC the best of luck in its efforts.

## IARC CONVENTION

Several hundred amateurs from around the world gathered in Geneva, Switzerland, the weekend of September 18 for the annual convention of the International Amateur Radio Club. From the opening ceremonies, which were highlighted by the presence of such dignitaries as Gerald C. Gross, ITU Secretary-General and U. S. Ambassador Clare Timberlake, right through the technical sessions, banquet and 4U1ITU operations, the meeting again this year showed increasing understanding of amateur radio's international problems and cooperation in its growth.

At special panel discussions, with substantial audience participation, the status of amateurs worldwide was extensively examined and general agreement reached on the importance of closer liaison with government authorities, of demonstrating the capabilities of amateurs in service to their nations and the public, and of encouraging the growth of hamdom in newly-emerging countries. Highlights of the technical meetings included a briefing on European moonbounce activities and "Oscar" type 2-meter translators lifted in balloons; a detailed evaluation of amateur band occupancy capably presented by a representative of the German Bundespost (FCC); and an extensive discussion of reciprocal licensing/operating procedures which showed rapid developments (and more to come) further breaking down national barriers on amateur activities.

The convention was honored by the presence, during the Friday evening reception, of some 60 government officials from various nations who completed an exhaustive day as delegates to the Plenipotentiary Conference at Montreaux and then journeyed by bus to Geneva to join in social conversations — and of course informal discussions of amateur radio activities and progress in then journeyed by bus to Geneva to join in social



# Happenings of the Month

## ELECTION RESULTS

At its meeting on October 1, the Executive Committee examined nominations for director and vice director in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions. For nine positions there was only one candidate who was lawfully nominated and eligible. **Noel B. Eaton, VE3CJ**, was declared reelected to his fourth term as director and **Colin C. Dumbrille, VE2BK** starts his third term as vice director from the Canadian Division. In the Dakota Division, **Charles G. Compton, W0BUO**, was reelected to a fourth term as director and **Charles M. M. Bove, W0MXC** to a second term as vice director. **Charles C. Miller, W8JSU**, will enter his third year as vice director from the Great Lakes Division. **Sumner H. Foster, W0GQ**, who has completed ten years as vice director from the Midwest Division, will continue in that post. In the Pacific Division, **Ronald G. Martin, W6ZF**, was reelected to a fifth term as vice director.

In the Southeastern Division, where the incumbent **Thomas M. Moss, W4HYW**, didn't run, the present vice director, **Charles J. Bolvin, W4LVV**, of Miami, Florida, will move up to the director's chair. Chuck is a supervising engineer in air conditioning and pneumatics for Pan American World Airways. Prior to his current term as vice director he had been an assistant director of the Southeastern Division in 1954 and again in 1963. He's a director, past president and past treasurer of the Dade Radio Club. He edits the bulletin of the Florida DX Club and is a past president of that group. He holds League appointment as Official Observer, and is a member of the A-1 Operator Club. Since 1934 he has operated under the calls W8LVV and W7GMA in addition to his present call.

The new vice director in the Southeastern Division is **Albert L. Hamel, K4SJH**, at present an assistant director and Section Communications Manager for Eastern Florida 1961-1962 and 1964 to date. Al is a past president of the Broward Amateur Radio Club, and holds appointments as Official Relay Station and Official Phone Station. He's a member of the A-1 Operator Club and of the Amateur Radio Emergency Corps. He is a member of Army MARS and is assistant radio officer in RACES. A retired Air Force officer, he lives in Pompano Beach, Florida. First licensed in 1925, he has previously operated under the calls WIDTP, K2ILN, W3ORO, KAIUS, VO1T, DL4EF and other club and portable calls.

There are eighteen candidates for the remaining seven offices, and ballots have been sent to licensed members in the Atlantic, Delta, Great Lakes, Midwest and Pacific Divisions, returnable to headquarters by noon of November 20.

## LOG-KEEPING IN CANADA

Director Eaton has been informed by the Department of Transport that blind amateurs who record their logs in Braille do not have to transcribe them into written form. Should a departmental inspector wish to inspect the log, the sightless licensee can then transcribe the portions in question. Members may wish to pass this information along to blind VEs in QSO.

## THIRD-PARTY TRAFFIC WITH 4U1TU

The International Telecommunications Union and the United States have agreed to permit the exchange of third-party communications between 4U1TU at Union headquarters in Geneva, Switzerland, and amateur stations here from September 1, 1965 to February 28, 1966.

A standing agreement between the government of Canada and the ITU provides for similar privileges whenever Canadian delegates are present at an intergovernmental conference in Switzerland. With the Centennial Plenipotentiary Conference of ITU now in session, Canadian amateurs are also permitted to exchange third-party communications with the station.

### Minutes of Executive Committee Meeting

No. 306

October 1, 1965

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Headquarters offices of the League in Newington, Connecticut, at 9:45 A.M. October 1, 1965. Present: First Vice President W. M. Groves, in the Chair; Directors P. Lanier Anderson, jr., Robert W. Denniston and Noel B. Eaton; General Manager John Huntoon; Vice President F. E. Handy; Treasurer David H. Houghton. Assistant Secretary Perry F. Williams was also present. President Herbert Hoover, jr., was unable to attend because of travel in Europe largely concerning IARU matters.

The Committee proceeded to examine nominations in the director elections, with careful attention to the application of the eligibility rules concerning membership, license status and freedom from commercial radio connections. The Committee made findings and ordered actions as detailed below, all by unanimous action.

### Atlantic Division

#### For Director:

Gilbert L. Crossley, W3YA, and George S. Van Duke, jr., W3ELI, were found lawfully nominated and eligible, and their names ordered listed on ballots to be sent to Full members of the division.

#### For Vice Director:

Jesse Bieberman, W3KT, Allen R. Breiner, W3ZRQ, and Edwin S. Van Deusen, W3ECP, were found lawfully nominated and their names ordered listed on ballots to be sent to Full members of the division.

#### **Canadian Division**

##### *For Director:*

Noel B. Eaton, VE3CJ, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-laws, to be duly re-elected as Director from the Canadian Division for the 1966-1967 term without membership balloting.

##### *For Vice Director:*

Colin C. Dumbrille, VE2BK, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-laws, to be duly re-elected as Vice Director from the Canadian Division for the 1966-1967 term without membership balloting.

#### **Dakota Division**

##### *For Director:*

John M. Maus, W0MBD, was found lawfully nominated but ineligible due to lack of the required membership continuity. Charles G. Compton, W0BUO, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-laws, to be duly re-elected as Director from the Dakota Division for the 1966-1967 term without membership balloting.

##### *For Vice Director:*

Charles M. Bove, W0MXC, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-laws, to be duly re-elected as Vice Director from the Dakota Division for the 1966-1967 term without membership balloting.

#### **Delta Division**

##### *For Director:*

A petition was found for Floyd Teetsen, W5MUG, but declared invalid due to lack of the required number of signatures. Franklin Cassen, W4WBK, and Philip P. Spencer, W5LDH/W5LXX, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the division.

##### *For Vice Director:*

A petition was found for Franklin Cassen, W4WBK, but declared invalid under By-law 17 because of his nomination also for director. A petition was found for William H. Egbert, jr., K4JIG, but declared invalid due to the lack of the required number of signatures. Max Arnold, W4WHN, W. C. Goggio, W4OGG, Maurice Singer, K4YMM, and John A. Swanson, W5PM, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the division.

#### **Great Lakes Division**

##### *For Director:*

A petition was found for Leonard M. Nathanson, W8DQL, but declared invalid due to the lack of the required number of signatures. Dana E. Cartwright, W8UPB, John E. Siringier, W8AJW, and James W. Voorhees, W8EGR, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the division.

##### *For Vice Director:*

Donald R. Van Sickle, K8GOU, was found lawfully nominated but ineligible due to class of license. Charles C. Miller, W8JSU, was found lawfully nominated and eligible. Being the only eligible

nominee, he was thereupon declared, pursuant to the By-laws, to be duly re-elected as Vice Director from the Great Lakes Division for the 1966-1967 term without membership balloting.

#### **Midwest Division**

##### *For Director:*

Robert W. Denniston, W0NWX, and William J. Schmidt, W0OZN, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the division.

##### *For Vice Director:*

Sumner H. Foster, W0GQ, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-laws, to be duly re-elected as Vice Director from the Midwest Division for the 1966-1967 term without membership balloting.

#### **Pacific Division**

##### *For Director:*

Donald Johnson, W6QIE, was found lawfully nominated but ineligible due to lack of the required membership continuity. Harry M. Engwicht, W6HC, and Larry M. Reed, W6CTH, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the division.

##### *For Vice Director:*

Rubin L. Hughes, WA6AHF, was found lawfully nominated but ineligible due to lack of the required membership continuity. A petition was found for Larry M. Reed, W6CTH, but declared invalid under By-law 17 because of his nomination for director. Ronald G. Martin, W6ZF, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-laws, to be duly re-elected as Vice Director from the Pacific Division for the 1966-1967 term without membership balloting.

#### **Southeastern Division**

##### *For Director:*

Albert L. Hamel, K4SJH, was found lawfully nominated and eligible; however, the Committee was in receipt of a communication from Mr. Hamel withdrawing his name as a candidate for director. Charles J. Bolvin, W4LVV, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-laws, to be duly elected as Director from the Southeastern Division for the 1966-1967 term without membership balloting.

##### *For Vice Director:*

Thomas M. Moss, W4HYW, was found lawfully nominated and eligible; however, the Committee was in receipt of a communication from Mr. Moss withdrawing his name as a candidate for vice director. Albert L. Hamel, K4SJH, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-laws, to be duly elected as Vice Director from the Southeastern Division for the 1966-1967 term without membership balloting.

On motion of Mr. Denniston, unanimously VOTED that P. Janier Anderson, jr., Charles G. Compton, and Noel B. Eaton, with F. E. Handy and David H. Houghton as alternates, are appointed

a Committee of Tellers to count the ballots in the current elections.

At this point the Committee heard an extensive report from the General Manager on his recent visits to IARU member-societies in several European countries, and informally discussed international problems of amateur radio.

The Committee was in recess for luncheon from 12:30 P.M. to 1:15 P.M. During the recess, and continuing thereafter, the Committee was joined by Don Waters of Don Waters & Associates, as well as former Director Milton E. Chaffee, and discussed at length the survey of League membership now in progress by the Waters firm. Messrs. Waters and Chaffee departed from the meeting at 2:10 P.M.

On motion of Mr. Eaton, unanimously VOTED to grant approval for the holding of a Rocky Mountain Division Convention in Colorado Springs, Colorado, June 18-19, 1966; a Hudson Division Convention at Tarrytown, New York, October 15-16, 1966; a Great Lakes Division Convention at Muskegon, Michigan, October 21-22, 1966; and, in confirmation of earlier mail approval, the holding of a West Gulf Division Convention in Arlington, Texas, June 3-5, 1966.

On motion of Mr. Anderson, affiliation was unanimously GRANTED to the following societies:

Albemarle Amateur Radio Club  
Charlottesville, Va.  
Amateur Radio Communications, Inc.  
Lansing, Michigan  
Bilderssee Jr. High School Amateur Radio Society  
Brooklyn, New York  
Bossier High School Amateur Radio Club  
Bossier City, La.  
Explorer Amateur Radio Society  
Rome, Georgia  
Fort Hood Amateur Radio Club  
Fort Hood, Texas  
Haddonfield Teen Hams Association  
Haddonfield, N. J.

Howland Junior Hams (H.S.)  
Warren, Ohio  
Limestone Radio Society  
Fayetteville, N. Y.  
Louisville's Active Radio Operators  
Louisville, Ky.  
Memorial Amateur Radio Club (H.S.)  
Houston, Texas  
The Palm Springs High School Electronics Club  
Palm Springs, Calif.  
Washington Area Young Ladies Amateur Radio Club  
Washington, D. C.  
Wausau Technical Institute Electronics Club  
Wausau, Wisconsin

On motion of Mr. Denniston, in view of resignation from the Headquarters staff of Raymond T. Higgs, unanimously VOTED to withdraw his authorization to sign checks on League depositories on behalf of the Secretary.

On motion of Mr. Denniston, unanimously VOTED that the League casts its vote in favor of IARU Proposal No. 112, relating to admission into membership of the Nigerian Amateur Radio Society.

The Committee was in receipt of an invitation from the Club de Radio Aficionados de Guatemala, inviting the President of the League to attend the sixth convention of the Federacion de Radio Aficionados de Central Americana y Panama. The Committee agreed the League should be represented at the convention, but chose to await the return of the President before designating an official representative.

In the course of its meeting the Committee discussed, without formal action, WIAW rehabilitation and operating schedules, an FCC-proposal concerning the Disaster Communications Service, the Building Fund, an extension of FCC examination schedules, and the required notice of portable or mobile operation extending more than 48 hours.

There being no further business, the Committee adjourned, at 3:45 P.M.

JOHN HUNTOON  
Secretary

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## Men Who Made League History

### *All-time list of ARRL Directors*

COMPILED BY PERRY F. WILLIAMS, WIUED\*

No organization can be stronger than the men who make its decisions, who set its policies and its objectives. At the start, in 1914, ARRL had about 300 members, little or nothing in the treasury, no formal headquarters or staff. Today the League has 100,000 members, is in strong financial condition, owns its own headquarters administration building, and has a full time staff of 70 people to provide the numerous and varied services rendered to and for members and affiliated clubs, and to coordinate the efforts and activities of several thousands of administrative and field organization officials and appointees.

This striking growth has come about because the founders of our League constructed the or-

ganization on sound grounds, and because our governing Board of Directors in the intervening years have remained true to those principles. We in amateur radio owe a considerable debt to our founders. And over the years we have been extremely fortunate in the continuing quality of men who have been officers and directors. Here, for the nostalgic recollection of oldtimers, and for the edification of newcomers, are the names of our directors since the League's inception:

#### *The Committee*

Early records are scant, but it appears that the six men listed below, an outgrowth of a "relay committee" appointed by the Hartford Radio Club, served as an informal Board of Directors from May 18, 1914 to February 28, 1917.

\* Senior Assistant Secretary, ARRL

Chairman, Hiram Percy Maxim, 1WH, 1ZM  
 Secretary, Clarence D. Tuska, 1WD, 1ZT  
 Counsel, Lawrence A. Howard  
 David L. Moore, 1ZZ, 1BBL  
 Rae C. Palmer, 1WK  
 W. W. Howe

**The Board of Directors at Large**

Under the constitution of 1917, directors were nominated by the Board itself, and vacancies were filled by the Board alone. Toward the end of this period, we find record of ballots on which members all over the country could vote for 17 out of 22 nominated by the Board, with at least one member being named from each part of the country, but with the East being more heavily represented.

During most of this period, except for the war years, those members of the Board who could make it met monthly in New York. Some others gave their blanket proxy to another member. Some areas were never represented at an actual meeting, either in person or by proxy. This seems like poor representation and it was; one reason was that the League was too poor to pay the travel expenses of directors to the meetings.

Below are the directors at large with the terms served and calls, where known. An aside: many members of the Board went into the radio business for themselves or in established firms, and resigned from the Board upon so doing.

President Hiram Percy Maxim, 1ZM, 1AW, 2/28/17 — 7/1/24<sup>1</sup>  
 Secretary Clarence D. Tuska, 1ZT — 2/28/17 — 2/21/20<sup>2</sup>  
 General Manager A. A. Hebert, 2ZH, W1ES — 2/28/17 — 7/1/24<sup>1</sup>

Director	Calls	Took Office	Left Office
C. R. Runyon, Jr. <sup>4</sup>	2ABG, 2ZS	2/28/17	6/4/20 <sup>2</sup>
R. H. G. Mathews <sup>4</sup>	9IK, 9ZN	2/28/17	2/21/20
J. O. Smith	2LK, 2ZL	2/28/17	6/4/21 <sup>2</sup>
H. C. Seefred	8EA	2/28/17	2/21/20
W. T. Gravely	3RO, 3BZ	2/28/17	2/18/22
Victor F. Camp	2RL	2/28/17	7/1/24 <sup>1</sup>
Howard L. Stanley	2FS	2/28/17	12/2/21 <sup>2</sup>
Theodore E. Gaty	3CV	2/28/17	9/8/19 <sup>2</sup>
John C. Cooper, Jr.	4BI	2/28/17	8/27/20 <sup>2</sup>
William T. Fraser	8FR	2/28/17	2/19/21 <sup>2</sup>
Frank M. Corlett	5ZC	2/28/17	7/1/24 <sup>1</sup>
W. H. Smith		2/28/17	12/5/19 <sup>2</sup>
Miller Reese Hutchinson		2/28/17	9/6/19 <sup>2</sup>
Kenneth B. Warner <sup>4</sup>	9JT, 1BHW, W1EH	5/3/19 <sup>4</sup>	7/1/24 <sup>1</sup>
Charles A. Service, Jr. <sup>2</sup>	3QZ, 3ZA, W4IE	9/3/19 <sup>4</sup>	7/1/24 <sup>1</sup>
Charles H. Stewart <sup>1</sup>	3ZS	9/3/19 <sup>4</sup>	7/1/24 <sup>1</sup>
John F. Clayton	5BV, 5AF, 5ZL	2/21/20	2/18/22
F. F. Hamilton	9ZJ	2/21/20	1/14/22 <sup>2</sup>
M. B. West	8AEZ, 9DEA	2/21/20	7/1/24 <sup>1</sup>
A. L. Bessey	6BR, 6ZK	2/21/20	12/8/22 <sup>2</sup>
Fred H. Schnell <sup>4</sup>	1MO, W9UF, W4CF	9/19/20 <sup>4</sup>	7/1/24 <sup>1</sup>
Harvey M. Anthony		9/19/20 <sup>4</sup>	7/1/24 <sup>1</sup>
(Robert) S. Kruse	3ABI, 9LQ	2/19/21 <sup>4</sup>	3/8/24 <sup>2</sup>
Rev. Sebastian Ruth	7YS	9/2/21 <sup>4</sup>	2/18/22
H. A. Beale	3ZO, 3OI, 3XW	2/18/22	7/1/24 <sup>1</sup>
Clyde E. Darr	8ZZ, 8CB	2/18/22	7/1/24 <sup>1</sup>
W. C. C. Duncan <sup>4</sup>	Canadian 9AW	2/18/22	10/12/23 <sup>2</sup>
F. A. Hill	4GL, 4BY, W9UD	2/18/22	9/15/22 <sup>2</sup>
Dr. A. E. Kennelly		2/18/22	2/17/23 <sup>2</sup>
A. H. Babcock	6ZAF	12/8/22 <sup>4</sup>	7/1/24 <sup>1</sup>
Henry B. Joy	8IA, 8PC	2/17/23 <sup>4,11</sup>	
Lt. Com. Stanley M. Mathes		2/17/23 <sup>4</sup>	7/13/23 <sup>2</sup>
Karl W. Weingarten	7BG	10/12/23 <sup>4</sup>	7/1/24 <sup>1</sup>

A. H. K. Russell	XRF, c9AL	10/12/23 <sup>4</sup>	7/1/24 <sup>1</sup>
George L. Bidwell		12/9/23 <sup>4</sup>	7/1/24 <sup>1</sup>

- <sup>1</sup> Term ended by constitutional change.
- <sup>2</sup> Resigned.
- <sup>3</sup> Appointed by Board.
- <sup>4</sup> Also served as treasurer.
- <sup>5, 7, 8</sup> Also served as vice president.
- <sup>6</sup> Hired as secretary-editor-general manager — 5/3/19.
- <sup>9</sup> Hired as traffic manager — 9/18/20.
- <sup>10</sup> First Canadian director; designated as Canadian general manager 2/17/23.
- <sup>11</sup> Declined the interim appointment.

**The Representative Board**

The 1924 Board has gone into League history as the one whose members voted themselves out of office. They adopted a modified constitution setting up 12 U.S. divisions each with an elected director chosen for a two-year term by its members, in broad plan the system which is still in effect. Canadian members were represented by the Canadian general manager (elected in the same manner as the directors) until 1951, when adoption of the present Articles of Association made Canada a regular division with a regular director. (In actual practice, there was never any difference between the office of Canadian general manager and of the U.S. directors.)

**Atlantic Division**

Director	Calls	Took Office	Left Office
George L. Bidwell		7/1/24	1/1/26
Dr. Eugene C. Woodruff	8CMP, 8CIK	1/1/26	5/8/36 <sup>1</sup>
Walter B. Martin	W3QV	8/6/36 <sup>2</sup>	1/1/46
Edward G. Raser	3ZI, W3ZI, 3CS W2ZI	1/1/46	1/1/48
Walter B. Martin	W3QV	1/1/48	1/1/52
Alfred C. Heck	W3GEG	1/1/52	1/1/54
Gilbert L. Crossley	W3YA, W3DKN	1/1/54	

- <sup>1</sup> Resigned to become president.
- <sup>2</sup> Chosen in special election.

**Central Division**

Director	Calls	Took Office	Left Office
Clyde E. Darr	8AJD, 8CB, 8ZZ	7/1/24	12/10/29 <sup>1</sup>
D. J. Angus	W9CYQ	4/15/30 <sup>2</sup>	1/1/31
Loren G. Windom	W8GZ, W8ZG	1/1/31	1/1/35
Edward A. Roberts	W8HC	1/1/35	1/1/37
R. H. G. Mathews	W9ZN	1/1/37	1/1/41
Goodwin L. Dosland	W9TSN	1/1/41	1/1/45
John A. Kiener	W8AUH	1/1/45	1/1/47
Clyde C. Richelieu	W9ARE	1/1/47	1/1/49
John G. Doyle	W9GPI	1/1/49	1/1/51
Wesley Marriner	W9AND	1/1/51	1/1/55
Harry Matthews	W9UQT	1/1/55	1/1/57
John G. Doyle	W9GPI	1/1/57	1/21/63 <sup>3</sup>
Philip E. Haller	W9HPG	1/21/63 <sup>4</sup>	

- <sup>1</sup> Died in office.
- <sup>2</sup> Chosen in special election.
- <sup>3</sup> Resigned.
- <sup>4</sup> Moved up from vice director.

**Dakota Division**

Director	Calls	Took Office	Left Office
Cyril M. Jansky, Jr.	9XI	7/1/24	1/1/30
Cy L. Barker	W9EGU	1/1/30	1/1/32
Lawrence E. Lindsmith	W9GKO	1/1/32	1/1/34
Carl L. Jabs	W9BVH	1/1/34	1/1/38
Fred W. Young	W9MZN	1/1/38	4/1/41 <sup>1</sup>
Adolphus A. Emerson	W9ITQ	4/1/41 <sup>1</sup>	1/1/42
Tom E. Davis	W9VVA	1/1/42	1/1/48
Goodwin L. Dosland	W8TSN	1/1/48	5/10/52 <sup>2</sup>
Alfred Gowan	W8PHR	5/10/52 <sup>2</sup>	1/1/60
Charles G. Compton	W8BUO	1/1/60	

- <sup>1</sup> Left division.
- <sup>2</sup> Became acting director.
- <sup>3</sup> Became president.
- <sup>4</sup> Moved up from vice director.

<b>Delta Division</b>			
Benjamin F. Painter	5MB	7/1/24	1/1/30
M. M. Hill	W5EB	1/1/30	1/1/36
E. Ray Arledge	W5SI	1/1/36	1/1/46
George Acton	W5BMM	1/1/46	1/1/48
Victor Canfield	W5BSR	1/1/48	1/1/52
James W. Watkins	W4FLS	1/1/52	1/1/54
George H. Steed	W5BUX	1/1/54	1/1/56
Victor Canfield	W5BSR	1/1/56	1/1/60
Sanford B. DeHart	W3RRV	1/1/60	1/1/62
Floyd Teetson	W5MUG	1/1/62	1/1/64
Philip P. Spencer	W5LDH/LXX	1/1/64	

<b>Great Lakes Division<sup>1</sup></b>			
Harold C. Bird	W8DPE	1/1/47 <sup>1</sup>	1/1/50
John H. Brabb	W8SPF	1/1/50	1/1/60
Dana E. Cartwright	W8UPB	1/1/60	

<sup>1</sup> Division created 5/10/46, effective 1/1/47.

<b>Midwest Division<sup>1</sup></b>			
Dr. Lawrence J. Dunn	2CLA	1/1/25 <sup>1</sup>	1/1/29
Dr. A. Lafayette Walsh	W2BW	1/1/29	1/1/33
Bernard J. Fuld	W2BEG	1/1/33	1/1/35
Kenneth T. Hill	W2AHC	1/1/35	1/1/41
Robert A. Kirkman	W2DSY	1/1/41	9/1/46 <sup>2</sup>
George Rulfs, Jr.	W2CJV	9/1/46 <sup>2</sup>	1/1/47
Joseph M. Johnston	W3ABI, W2SOX	1/1/47	1/1/53
George V. Cooke, Jr.	W2OBU	1/1/53	1/1/59
Morton B. Kahn	W2KR, K4KR	1/1/59	1/22/65 <sup>4</sup>
Harry J. Dannals	W2TUK	1/22/65 <sup>4</sup>	

<sup>1</sup> Division created 7/23/24, effective 1/1/25.

<sup>2</sup> Turned over duties to Alternate Director Rulfs.

<sup>3</sup> Became acting director.

<sup>4</sup> Held over until election of successor.

<sup>5</sup> Elected 1/22/65 in run-off after a tie vote in regular election.

<b>Midwest Division</b>			
L. Boyd Laizure	9RR	7/1/24	1/1/26
Porter H. Quinby	9AY, 9DXY, W0AY	1/1/26	1/1/30
Louis R. Huber	W9DOA	1/1/30	12/22/30 <sup>1</sup>
H. W. Kerr	W9DZW, W9GP	12/22/30 <sup>2</sup>	1/1/36
Floyd E. Norwine, Jr.	W9EFC	1/1/36	10/14/46 <sup>3</sup>
C. A. Colvin	W9VHR	10/14/46 <sup>3</sup>	1/1/48
R. Leonard Collett	W0DEA, KZ5LC	1/1/48	3/1/51 <sup>6</sup>
Alvin G. Keyes	W0KTQ	3/1/51 <sup>6</sup>	1/1/52
William Schmidt	W00ZN	1/1/52	1/1/56
Robert W. Dennison	W0NWX	1/1/56	

<sup>1</sup> Resigned.

<sup>2</sup> Special election.

<sup>3</sup> Became acting director.

<sup>6</sup> Turned over duties to alternate director Keyes.

<b>New England Division</b>			
George H. Pinney	1CKP	7/1/24	1/1/25
Dr. Elliot A. White	1XAV, 1YB, W1BMK	1/1/25	1/1/29
Frederick Best	W1BIG	1/1/29	4/15/32 <sup>1</sup>
George W. Bailey	W1KH, W2KH	1/15/32 <sup>2</sup>	5/9/36 <sup>3</sup>
Percy C. Noble <sup>4</sup>	W1BYR	8/6/36 <sup>4</sup>	1/1/55
Philip Rand	W1DDB	1/1/55	1/1/57
Milton E. Chaffee	W1EFW	1/1/57	1/1/65
Robert York Chapman	W1QV	1/1/65	

<sup>1</sup> Resigned.

<sup>2</sup> Special election.

<sup>3</sup> Elected vice president.

<sup>4</sup> Also served as a vice president from 5/15/54 to 5/13/60.

<b>Northwestern Division</b>			
Karl W. Weingarten	W7BG	7/1/24	1/1/33
Ralph J. Gibbons	W7KU, W7BLX	1/1/33	1/1/41
Karl W. Weingarten	W7BG	1/1/41	1/1/47
Harold W. Johnston	W7DXF	1/1/47	1/1/49
R. Rex Roberts	W7CPY	1/1/49	1/1/65
Robert B. Thurston	W7PGY	1/1/65	

<b>Pacific Division</b>			
Allen H. Babcock	W8ZD	7/1/24	1/1/32
Clair Foster	W6HM	1/1/32	11/1/32
S. G. Culver	W6AN	3/1/33 <sup>2</sup>	1/1/38
J. Lincoln McCargar	W6EY	1/1/38	5/10/46 <sup>3</sup>
William Ladley	W6RBQ	10/20/46 <sup>4</sup>	1/1/50
Kenneth E. Hughes	W3CIS	1/1/50	1/1/54

Raymond H. Cornell	W6JZ	1/1/54	3/14/55 <sup>4</sup>
Harry M. Engwicht	W6HC	3/14/55 <sup>4</sup>	

<sup>1</sup>, <sup>5</sup> Resigned.

<sup>2</sup> Special election.

<sup>3</sup> Elected vice president.

<sup>4</sup> Moved up from vice director.

<b>Roanoke Division</b>			
W. Tredway Gravely	W3BZ, W4CB	7/1/24	1/1/33
H. L. Caveness	W4DW	1/1/33	1/1/49
Everett L. Battey	W1UE, W4IA	1/1/49	9/15/49 <sup>1</sup>
J. Frank Key	3ZA, W4ZA	10/8/49 <sup>2</sup>	1/1/51
William H. Jacobs	W4CVQ	1/1/51	1/1/53
P. Lanier Anderson, Jr.	W4MWH	1/1/53	

<sup>1</sup> Resigned.

<sup>2</sup> Became director with change in By-Laws allowing automatic succession of the alternate director.

<b>Rocky Mountain Division</b>			
Paul M. Segal	9EEA, W3EEA	7/1/24	1/1/31
Russell J. Andrews	W9AAB	1/1/31	1/1/37
Edward Stockman	W9ESA	1/1/37	1/1/39
Glen Glascock	W9FA	1/1/39	1/1/41
C. Raymond Stedman	W9CAA	1/1/41	11/26/45 <sup>1</sup>
Howard R. Markwell	W9TFP	11/26/45 <sup>2</sup>	1/1/47
Franklin K. Matejka	W0DD, W1MT	1/1/47	1/31/53 <sup>3</sup>
Claude M. Maer, Jr.	W0IC	2/1/53 <sup>3</sup>	1/1/61
Carl L. Smith	W6BWJ	1/1/61	

<sup>1</sup> Died in office.

<sup>2</sup> Became acting director.

<sup>3</sup> Resigned.

<sup>4</sup> Moved up from vice director.

<b>East Gulf/Southeastern Division</b>			
(Name changed 7/26/24)			
Harry F. Dobbs	W4ZA	7/1/24	1/1/32
J. C. Hagler, Jr.	W4SS	1/1/32	2/1/35 <sup>1</sup>
Bennett R. Adams, Jr.	W4APU	2/1/35 <sup>2</sup>	1/1/40
William C. Shelton	W4ASR, K6AAK	1/1/40	1/1/50
Lamar Hill	W4BOL	1/1/50	9/14/53 <sup>3</sup>
Ernest W. Barr	W4GOR	9/14/53 <sup>3</sup>	1/1/54
James P. Born, Jr.	W4ZD	1/1/54	1/1/64
Thomas M. Moss	W4HYW	1/1/64	

<sup>1</sup> Resigned.

<sup>2</sup> Special election.

<sup>3</sup> Moved up from vice director.

<b>Southwestern Division<sup>1</sup></b>			
Charles E. Blalack	W6GG	1/1/36 <sup>1</sup>	6/1/40 <sup>2</sup>
John Bickel	W6BKY, W6NY	6/1/40 <sup>2</sup>	1/1/47
Hans R. Jepsen	W6KET	1/1/47	1/1/49
John R. Griggs	W6KW	1/1/49	1/1/55
Walter Joos	W6EKM	1/1/55	1/1/59
Ray E. Meyers	W6MLZ	1/1/59	1/1/65
Howard F. Shepherd, Jr.	W6QJW	1/1/65	

<sup>1</sup> Division created 5/10/35, effective 1/1/36.

<sup>2</sup> Elected vice president.

<sup>3</sup> Acting director; became director 10/1/40 in special election.

<b>West Gulf Division</b>			
Frank M. Coelett	W5ZC	7/1/24	1/1/35
Wayland M. Groves	W5NW	1/1/35	1/1/39
William A. Green	W5BKH	1/1/39	4/9/41 <sup>1</sup>
W. T. Caswell, Jr.	W5BB	4/9/41 <sup>2</sup>	1/26/42 <sup>3</sup>
Wayland M. Groves	W5NW	4/13/42 <sup>4</sup>	5/5/50 <sup>5</sup>
David H. Calk	W5BHO	5/5/50 <sup>6</sup>	1/1/51
A. David Middleton	W5CA, W7ZC	1/1/51	1/1/55
Robert E. Cowan	W5CF	1/1/55	1/1/57
Grady A. Payne	W5ETA	1/1/57	1/1/61
Dr. Roemer O. Best	W5QKF	1/1/61	

<sup>1</sup> Turned over duties to Mr. Caswell.

<sup>2</sup> Became acting director.

<sup>3</sup> Died in office.

<sup>4</sup> Special election.

<sup>5</sup> Elected vice president.

<sup>6</sup> Moved up from alternate director.

<b>Canadian General Managers &amp; Directors</b>			
A. H. K. Russell	c9AL (XRE)	7/1/24	1/1/30
Alex Reid	VE2BE	1/1/30	5/13/60 <sup>1</sup>
Noel B. Eaton	VE3CJ	5/13/60 <sup>2</sup>	

<sup>1</sup> Resigned upon election as a vice president.

<sup>2</sup> Moved up from vice director.

Q57

# A Turnstile|Dipole for

## 6-and 2-Meter

### Mobile

## Modifying a Popular 2-Meter Antenna for Two-Band Use

BY EDWARD P. TILTON,\* WIHQD

**H**ORIZONTAL antennas have definite advantages for v.h.f. mobile work. In hilly terrain they may give somewhat better average signal strength than verticals, and the improvement in signal-to-noise ratio when the change is made from vertical to horizontal is appreciable, especially on 50 Mc. The price of these improvements is the installation on the family car of some sort of antenna that only a ham could love. His affection for his 6-meter halo is certainly not based on its attractive appearance, and it is seldom shared by non-ham members of the family.

Thus it was that this writer, about to take off on a transcontinental trip with the wife as a passenger, began to scratch to think up something in the way of a 6-meter mobile antenna that was not quite so obnoxious as the 3-ring circus commonly used in 6-meter mobile work. A bright idea dawned one day when we inadvertently put our 2-meter turnstile on the 6-meter rig. To our surprise, we heard a few signals, and even worked one local station, with results about comparable to the none-too-good coverage we'd been getting with a 6-meter whip.

If our "Turnstile for Two,"<sup>1</sup> worked that much on 6 in its original form, it should be possible to make a useful 6-meter antenna out of it without too much trouble. The obvious step was

\*V.h.f. Editor, *QST*.

<sup>1</sup>"Turnstile for Two," Campbell, April, 1959, *QST*.

to fit it out with loading coils at the inner ends of the elements, to resonate them in the 6-meter band. After doing this, we found that the originator of the design, W1CUT, had done it with his some years ago. This information came too late to save us a few hours of cutting and trying that resulted in the antenna to be described.

The original 144-Mc. turnstile described by W1CUT<sup>1</sup> has a round block of insulating material about  $\frac{1}{2}$  inch thick and 1 to  $1\frac{1}{2}$  inches in diameter, at the center, which acts as a support for the four elements. One pair of elements is fed from the coaxial line to the transmitter. The other pair is fed through a loop of coax 90 degrees long. This is about  $13\frac{1}{2}$  inches for solid-dielectric coax. The conductors of this loop are in parallel with the main coax at one end, and the elements are connected to the inner and outer conductors at the other end of the loop.

To modify this complete setup for 50-Mc. service involves four loading coils, and the installation of a 50-Mc. phasing loop. This was more than we wanted to undertake, since the objective was an antenna that could be changed from 144 to 50 Mc. easily. We com-

promised on a 50-Mc. dipole, using one pair of 144-Mc. elements and two loading coils. These elements are fed from the main coaxial line. The 2-meter phasing loop is left in place, and two 6-32 screws are run into the insulating support, to hold the lugs on the ends of the phasing loop in position when their two 2-meter elements are removed.

### Construction

The method of mounting the 6-meter loading coils and the elements is shown in Fig. 1. This is one side of the system, the loading coil itself is omitted in the interests of clarity. Another combination is fastened in place on the right side of the center support in the complete conversion for 6.

The 2-meter element, A, has a stop nut on its threaded end. A star lug goes under this nut, and the element is screwed into a 1-inch ceramic pillar, B. A piece of poly rod  $\frac{1}{2}$  inch in diameter and 1 inch long, threaded for 6-32, would serve equally well. The other end of B has a section of 6-32 screw threaded into the end, with another star lug and locking nut. The right end of this screw threads into the turnstile center support, C. A lug at that point provides for connecting the coaxial feedline.

The 6-meter loading coils are  $11\frac{3}{4}$  turns of prepared coil stock,  $\frac{5}{8}$ -inch diameter, 16 turns per inch; in this instance B & W Miniductor, No.

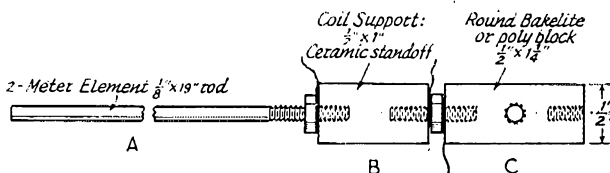


Fig. 1—Details of one element of the 2-band mobile v.h.f. antenna. The 2-meter element, A, is used alone, or a loading coil is inserted in series, as at B. The insulating support C, carries 4 elements when the antenna is used as a 2-meter turnstile, or two, with loading coils, when a 6-meter dipole is wanted.

3007. This coil stock just slips over the half-inch ceramic pillar, and it stays rigidly in place when the leads are soldered to the lugs. The last turn of the coil is unwound and then rewound loosely, so as to permit a slight adjustment of the inductance by changing its spacing. The resonant frequency of a loaded antenna of this kind is quite sharply defined, so a small adjustment range after the assembly is mounted in place is helpful.

The mount for the antenna is similar to one described by the writer in *QST* for June, 1962. Though the trim features that made this kind of mount applicable to a 1962 Corvair are not present on the 1965 version we're now driving, it was a simple matter to adapt the no-holes principle to the new car. The support for the antenna is a length of 1/4-inch rod, which sets into a 1/2-inch rod section about 2 inches long, mounted on a bracket fashioned for the purpose and attached to the air vent just in back of the rear window. A coaxial fitting on this mount carries the coax running to the operating position. Thus, the turnstile/dipole assembly can be lifted out, the coax disconnected, and a whip or other antenna substituted at will. The whole thing can be removed in a matter of minutes, if we want a totally "clean" car now and then, a feature that will be appreciated at trade-in time.

### Adjustment

The system must be pruned to get it to resonate in the portion of the band desired. The resonant frequency can be checked by disconnecting the coax leads, connecting a small loop of wire between the inner ends of the loading coils, and coupling a grid-dip meter to this. We started with "guess" coils of Miniductor consisting of what was available when a standard piece was cut in half. This turned out to be quite low in frequency, and the coils were pruned in equal amounts on each until the resonant frequency was about 50.35. This works reasonably well up to about 50.7 Mc., and down to the low end.

The unwound turn at the end of each coil comes in handy here. Don't expect a low s.w.r., if the system is fed with 52-ohm coax. The impedance of a loaded antenna of this kind is quite low, and the minimum s.w.r. on our dipole turned out to be about  $2\frac{1}{2}$  to 1, which is quite close to what would be expected. There are ways that this could be matched, but with the short feedline and low power in a mobile setup, little would be

gained by precise matching. The main consideration is to get the antenna to take power. Changing the length of the feedline may help in this. This is *not* matching, but getting the line to a resonant length may improve the results over what develops with a random length.

### Results

An antenna about 40 inches long is not going to break any 50-Mc. DX records, but it does work. Many comparisons have been made with a quarter-wave whip, mounted in the same spot on the car. In working with horizontally polarized stations the difference is very marked indeed, if (and this is important) the horizontally polarized beam is aimed at you. What little radiation there is off the sides of such an array may be largely vertical, and consequently some very confusing indications can result from random listening checks. When you are off the side of a beam the signal may be very much stronger on a vertical whip than on any horizontal antenna. This is just another one of those anomalies that make antennas valuation anything but a simple matter.

Polarization does not mean too much in 50-Mc. skip work, and a whip may turn out to be quite a good antenna in comparison with a halo or this loaded dipole, where the inferior signal-to-noise ratio of the vertical whip is not too much of a problem. In local work with horizontally-polarized home stations, however, even these small antennas have a marked advantage.

It has been found that the loading coils can be left connected in one set of elements, and the unloaded 2-meter elements left in place on the other pair of terminals, resulting in a 2-band mobile installation of sorts. What you have this way is two dipoles, however, and the directional properties are quite marked on both bands. In the WHDQ mobile installation a coaxial switch is connected in the line from the antenna mount, so that the antenna can be connected at will to either the 50- or the 144-Mc. transceiver, without diving under the dash for cable changing. This is useful on a long jaunt, where 6 is often monitored for possible band openings and 2 is used for local work in areas of high population density.

The hybrid array used in this way is no world-beater, but it does well enough to permit routine contacts on both bands — conveniently, and with less offense to passengers and passersby than results from separate mobile antennas for both bands.

**QST**

# Announcing the 32nd ARRL Sweepstakes

## CONTEST PERIODS

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

It's that time of the year again when a peculiar malady strikes the domestic contester. Once bitten he's never the same when an ARRL Sweepstakes comes along! The middle weekends of this month of November have been set aside as follows: starting time for phone is 2100 GMT November 13 ending at 0300 GMT November 15. The c.w. period starts 2100 GMT November 20 ending at 0300 GMT November 22. This separate weekend pattern worked well in 1964 and has been retained for 1965 with a time-out addition permitting 24 hours of operation out of a 30-hour period. However, the "off" periods may not be less than one-half hour at a time. This would permit 12 half-hour "offs", 1 six-hour "off", or any combination in between.

The basic exchange (a simulated message preamble), stays as in '64. Follow the example shown, using the *year* of your first license as the **check** and the *month* and *day* (not year) of birth as the message **date**. Remember to send this information as it refers to you, the operator, whether you operate your own or another station.

Certificate awards will go to the section and club leaders, both phone and c.w. Novice and Technicians may be eligible for awards too, see contest rule 6. A handsome coco bolo gavel will be awarded to the club with the highest aggregate score.

Log forms and Operating Aid No. 6 (to avoid duplicating QSOs) are now available. Please request your forms as soon as possible from the ARRL Communications Department, 225 Main St., Newington, Connecticut 06111. Logs must be postmarked by Dec. 15, 1965, to be eligible for score listing and awards.

*CU in the SS!*

## Rules

1) **Eligibility:** The contest is open to all radio amateurs in (or officially attached to) sections listed on page 6 of this issue of *QST*.

2) **Time:** All contacts must be made during the contest period indicated elsewhere in this announcement and between amateurs in (or officially attached to) the 74 sections. Yukon-N.W.T. (VE8) counts as a separate multiplier, for a possible total of 75 multipliers. Time spent in listening counts as operating time.

3) **QSO:** Contacts must include certain information sent in the form of a standard message preamble, as shown in the example. C.w. stations work only c.w. stations and phone stations only other phones. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your preamble and/or receipt of a preamble.

4) **Scoring:** Each preamble sent and acknowledged counts one point. Each preamble received counts one point. Only two points can be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (see p. 6) worked during the contest is the "section multiplier." It is not necessary for preambles to be sent both ways before a contact may count, but one must be received, or sent and acknowledged, before credit is claimed for either point(s) or multiplier. Apply a "power multiplier" of 1.25 to c.w. entries and 1.5 to phone entries if the d.c. input to the transmitter output stage is 150 watts or less at all times during contest operation.

The final score equals the total "points"  $\times$  the "sections multiplier"  $\times$  the "power multiplier."

5) **Reporting:** Follow the sample shown in reporting contest results. Printed contest forms will be sent free on request. Indicate starting and ending times and dates for each period on the air. All Sweepstakes reports become the property of ARRL and none can be returned.

There are no objections to one's obtaining assistance from logging, "spotting" or relief operators, but their use places the entrant in the multiple-operator class, and it must be so reported.

A single-operator station is one manned by an individual amateur who receives no assistance from other persons during the contest periods. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during a contest period. The operation of two or more transmitters simultaneously is not allowed. Contest reports must be postmarked no later than December 15, 1965, to insure eligibility for *QST* listing and awards.

A transmitter used to contact one or more stations may not subsequently be used under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC/DOT).

6) **Awards:** Certificates will be awarded to the highest c.w. scorer and to the highest phone scorer in each ARRL section. A certificate will also be awarded to the highest scoring Novice or Technician in each section where at least three such licensees submit logs in each mode. A certificate also will be awarded to the highest scoring Novice and Technician from sections of less than three entries . . . that in the opinion of the Awards Committee displayed

## EXPLANATION OF "SS" CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the . . . . NR		Call	CK	Place	Time	Date
Exchanges	Contest serial numbers, 1, 2, 3, etc., for each station worked	Send your own call	CK (Last two digits of year first licensed)	Your ARRL section	Send GMT time of transmitting	Send month and day of birth (not year)
Sample	NR 1	W0AIH	49	MINN	0001	DEC 25



## W6ISQ'S "AA" CITATION REQUIREMENTS

(See page 144 November 1963 *QST* for further information.)

	C.W.		PHONE	
	Points	Sections	Points	Sections
Conterminous U.S.A.	67,000	72	44,000	60
All Canada, plus KH6, KL7, KP4, KZ5, etc.	6000	40	4000	30
Novice	600	20		

exceptional effort. Only single-operator stations are eligible for certificate awards. Multiple-operator scores will receive separate *QST* listing in the final results.

A gavel will be awarded to the highest club entry. The aggregate scores of phone and c.w. reported by club secretaries and confirmed by the receipt at ARRL of contest logs constitute a club entry. Segregate club entries into phone and c.w. totals. Both single- and multiple-operator scores may be counted, but only the score of a bona fide club member, operating a station (his or another club members'), in local club territory, may be included in club entries.

The highest single-operator c.w. score and the highest single-operator phone score in any club entry will be rewarded with a "club" certificate where at least three single operator phone and/or three single-operator c.w. scores are submitted.

7) *Disqualification*: Failure to comply with the contest rules or FCC/DOT regulations or the necessity for avoiding interference with channels handling amateur emergency communication shall constitute grounds for disqualifications. In all cases or question, the decisions of the ARRL Awards Committee are final.

### HOW TO SCORE

Each preamble sent and acknowledged counts one point.

Each preamble received counts one point.

Only two points can be earned by contacting any one station, regardless of the frequency band used.

For final score: Multiply totaled points by the number of *different* ARRL sections worked; that is, the number in which at least one bona fide SS point has been made. Multiply c.w. scores by 1.25 and phone scores by 1.5 if you used 150-watts-or-less transmitter input *at all times* during the contest.

### Message Credit

Put all that preamble-exchange experience to work and earn 25 points *before* SS multiplier by the following:

1. Within 5 days following the end of each of the SS weekends, check into a net at local or section level<sup>1</sup> and send a message to your SCM (p. 6, *QST*). The message must be in proper form.<sup>2</sup> To earn this credit for your phone and your c.w. entry you must originate such a message following the corresponding SS periods.

2. An example of a message in proper form<sup>2</sup> appeared in the Operating Aid 9A enclosure in August 1965 *QST*. The message text (in not more than 20 words) should report claimed contacts, sections, mode, power and claimed score. An exact copy (showing station receipting for the radiogram and time-date sent) *must* be attached to your SS entry for any credit.

3. It's all or nothing. If all the rules are complied with to the letter, the procedure will net you 25 points before multiplier—the equivalent of 12½ QSOs.

4. Leave the figuring to us!

<sup>1</sup> If there's difficulty reaching a traffic net in your section, it may be sent to a netter in the region or you may try to clear using the NCEFs (see p. 64A June *QST*).

<sup>2</sup> Time Filed and Handling Instructions are *optional*, i.e. not a "requirement" for crediting the message started, but all other message parts as shown in 9A are necessary.

## ARRL NOVEMBER SWEEPSTAKES

CALL		SENT (1 POINT)				MODE	RECEIVED (1 POINT)				P O I N T S			
DATE TIME ON/OFF	R A D I O	N R	C K	S E C	T I M E	DATE	N R	S T A T I O N W O R K E D	C K	S E C	T I M E	D A T E	N R	D I F F S E C
		1												
		2												
		3												
		4												
		5												
		6												
		7												
		8												
		9												
		10												
		11												
		12												

MULTIPLIER CHECK-OFF LIST												
1	2	3	4	5	6	7	8	9	0	VE		
Conn	ENT	E-PA	Ale	Ark	EKey	Ariz	Mich	Ill	Calif	Mar		
EMass	NH	HDC	EFla	La	LA	Iowa	Ohio	Ind	Iowa	Que		
Me	NHJ	Del	Ca	Miss	Del	Mass	WV	Wis	Pa	Ont		
MH	SNJ	WPa	Vy	NHes	SbW	Nev			Me	Man		
RI	NY	NC	NTar	SCV	Ont	Chg			Ma	Seak		
VT		SC	Okla	SDgo	Utah				Neb	Alto		
WMass		Tenn	Star	SP	Wash				N Dak	BC		
		Ve	KZ5	SJV	Wyo				SDak	Yuk		
		#Fla			SoV	KL7						
		W.I.			KH6							

**ENTER SUMMARY BELOW ON LAST SHEET USED**

No. diff. stns. wk'd \_\_\_\_\_, nr. diff. sects. wk'd \_\_\_\_\_, Inpt. \_\_\_\_\_, WTS, total time on air \_\_\_\_\_

SCORING: \_\_\_\_\_ points & \_\_\_\_\_ sections & \_\_\_\_\_ power Mult. = \_\_\_\_\_ CLAIMED SCORE

\*Power Multiplier: C.W. = 1.25, phone = 1.5 for 150 watts or less, or all times.

Type Transmitter (tick line up if home built) \_\_\_\_\_ Antenna \_\_\_\_\_

CHECK ONE: Single Operator Station  Multioperator Station  If multioperator, please show calls of all operators \_\_\_\_\_

Participating for award in the following club \_\_\_\_\_

I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is correct and true to the best of my knowledge.

SIGNATURE \_\_\_\_\_ CALL \_\_\_\_\_ MAILING ADDRESS \_\_\_\_\_

Enclose your remittance for stamps, photos, etc., & mail promptly to ARRL Communications Dept., 325 Main Street, Newington, Connecticut 06111.

# Operating the RTTY Station

BY IRVIN M. HOFF,\* K8DKC

## Station Control, Assembly of Equipment, Operating Procedure

As additional equipment is added to the station, questions arise as to the most convenient way to connect things. Indeed, merely hooking up a station to operate at all often becomes a problem. Such things as antenna change-over relays, choice of several different antennas, c.w. monitors, "bugs," electronic keys, Monitor-scopes, panadapters, s.w.r. bridges, speaker muting for transmitting on voice, u.h.f. equipment — the list can become quite long, and the problem of where to put what and how to connect it can become quite acute. Many setups are so complex that an outsider would have little idea of how to operate the station even if he owned similar equipment.

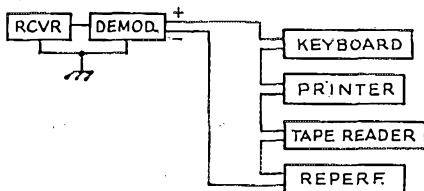


Fig. 1—How to add extra items of RTTY equipment to the station.

The addition of Teletype equipment only makes things more difficult. However, with a little common logic, it need be no more troublesome than adding one of the items listed above.

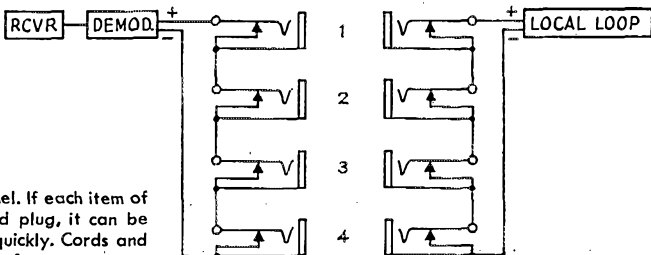
The "normal" RTTY station consists of a printer, a demodulator, a receiver and a transmitter. The input of the demodulator is connected to the output of the receiver, usually across the 500-ohm tap so that headphones may be plugged in without interrupting the RTTY signal. The output of the demodulator is connected to the teleprinter. Modern circuits such as the Mainline TT/L Demodulator<sup>1</sup> allow the printer's selector magnets and keyboard to remain hooked in series for the greatest convenience and flexibility, while the transmitter

\* 1733 West Huron River Drive, Ann Arbor, Michigan 48103.

<sup>1</sup> Hoff, "The Mainline TT/L F.S.K. Demodulator," *QST*, August, 1965.

<sup>2</sup> Hoff, "Transmitting Radioteletype," *QST*, May, 1965.

Fig. 2—Wiring for a simple control panel. If each item of equipment is provided with a cord and plug, it can be connected into either loop easily and quickly. Cords and plugs could be provided, for example, for the keyboard, printer, tape reader, and reperforator.



NOTE: ALL JACKS MUST BE INSULATED FROM THE CHASSIS

is keyed directly from the same loop supply.<sup>2</sup>

As equipment is added, the switching systems become increasingly complex. A typical station would involve a printer, a reperforator to cut tape either from the incoming signal or from the local station, and a tape reader to play the tape at machine speed automatically. Fig. 1 shows how these might be arranged so that reasonable flexibility can be attained.

Essentially all RTTY equipment is hooked in series. Since the keyboard and tape-reader contacts are merely switches they cause no current drain, and thus numerous units can be added. The selector magnets in the printer and reperforator each total 50 ohms when wired in parallel for 60-ma. operation, and numerous units can be hooked in series without causing concern. It is quite unlikely that the average station would ever accumulate enough printers to cause unsatisfactory operation with all of them connected to the output of the demodulator at the same time. Each unit does develop about 75 volts of inductive kick, in a 60-ma. loop, when the circuit is broken, as in a space pulse. Thus with several units in the circuit at one time, substantial voltage can be developed momentarily. The 6W6 and other vacuum tubes often used as keying tubes can easily handle this voltage, but care must be exercised when using transistor circuits.

In all but the most complex RTTY stations, one local loop in addition to the demodulator's own loop system is ample. This gives a flexibility that is quite sufficient for nearly any purpose. Fig. 2 shows how the various units can be changed between the demodulator's loop and that of the local loop for cutting tape or for running local checks.

Fig. 3 shows how this can be accomplished with instant switching, a system I have used with success for some time. By adding extra

*This is the ninth and last of the comprehensive series of articles by K8DKC on amateur radioteletype. It suggests how to hook up the equipment to make an operable station, and discusses some features of practical RTTY communication. The series, begun in January 1965 QST and continued throughout the year, is a veritable "Handbook" for RTTYers, especially those who are interested but haven't yet made a start.*

*Although this article concludes the planned series, readers will be glad to know that the author has other articles in mind for the near future. Keep an eye out for them!*

4-p.d.t. switches similar to the one shown, the operator can have complete control over the various units in the system. Make-before-break ("shorting-type") switches should be used. If the current through the machine is in the same direction for both loops there will be no interruption in the circuit when the switch is thrown. Otherwise the circuit will be momentarily open, as an ordinary switch has no such make-before-break, and an error invariably results if the switch is

shown in Fig. 4. The two switches could be placed on or near the printer so that one would need to reach only a short distance to have complete control over the printer for receiving and transmitting. With such an arrangement all that is needed to go from receive to transmit is to close  $S_2$  and type. Surprisingly enough, few stations so far have such one-switch simplicity, yet without it station operation becomes most cumbersome. If the transmitter has no push-to-talk line, it has some means of being placed on the air by pushing or twisting a switch — and that switch can be paralleled by the second section of  $S_2$  for flexibility similar to that shown in Fig 4.

For greatest convenience, other functions can be switched at the same time the transmitter is placed on the air. For instance, the tape reader can be switched so that it will automatically start when the station begins transmitting, as in Fig. 5. Additional switches have been included so that manual control as well as automatic control of the tape reader can be achieved. A manual control switch for the demodulator standby line has been added in Fig. 5 in the event that "re-transmit" is desired from an incoming signal. Normally, the demodulator standby line is closed automatically for transmit (Fig. 4) so that the transmitted signal may still be monitored through the receiver without having the demodulator attempt to trip the transmitter while the operator is typing (in voice circles this would be called "feedback").

#### Other Switching Circuits

The schematics shown in Figs. 1 to 5 should satisfy all but the most unusual requirements. They should also give the operator some ideas on how to proceed in designing other switching circuits he might need or prefer. Certainly there is a multitude of ways of achieving equipment flexibility, and figuring out switching circuits is a fascinating aspect of assembling an amateur radio station.

To name a few things that might be done, at K8DKC a model 28ASR is programmed through the "transmit" switch not only to play the tape reader automatically, but also to change the printer and keyboard over to 100 speed for cutting tape if desired. Also, if the blank key is struck while in the transmit configuration, a c.w. identification machine starts up, interrupts the tape, sends the required c.w., and then turns the tape

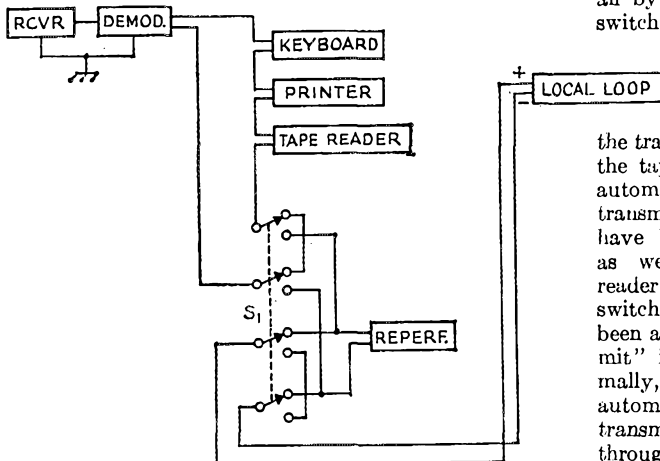


Fig. 3—A system using switches rather than jacks gives maximum convenience. (For simplicity, only one switch is shown.) No interruptions occur when switching if polarities of both circuits are the same. A make-before-break (shorting) switch such as the Centralab 1459 should be used.

thrown while receiving an incoming signal. The voltage rises momentarily as the switch goes through the midposition, but this need not cause concern.

Figs. 2 and 3 can also be combined, for utmost flexibility. The only limiting factor on switching circuits is the operator's imagination. These two simple circuits should satisfy all but the most unusual requirements. In my station the switches go to octal plugs, and various items can be plugged in quickly and easily.

#### Transmitter Switching

Here again, the method used will vary considerably with the demands of the operator. The simplest system would be one similar to that

back on—all automatically. When in the receive configuration, an incoming blank key has no effect on the system. At the end of a transmission, striking SPACE FIGURES H will turn the transmitter off. An incoming signal sending the same SPACE FIGURES H will turn the transmitter on again for complete automation. Thus a tape can be left on the tape reader and an incoming signal will turn on the transmitter; the proper c.w. identification is automatically inserted and the transmitter turned off at the end of the tape.

Such switching circuits are an immense personal pleasure to figure out and wire up, and certainly add to the fun of RTTY. Other circuits have been in use by various people, and no doubt from time to time some of these will receive additional publicity. The reader will get ideas from these examples which can be used in the individual station, and perhaps will think of a few innovations that the rest of us would enjoy reading about as well.

### Transmit-Receive Change-Over

Since RTTY consists of 100 per cent key down, "instant carrier" occurs when the push-to-talk circuit is activated. The push-to-talk system usually operates an internal relay that does several things: (1) removes cutoff bias on one or two stages in the transmitter, (2) applies voltage to the antenna change-over relay, (3) mutes the speaker for transmitting, and (4) usually provides an extra set or two of contacts for other purposes. Full output of the transmitter exists as soon as the relay closes. Unfortunately, the antenna change-over relay is energized *after* the p.t.t. relay closes, and it would be impossible for a mechanical relay to close before the r.f. voltage hits its contacts. In fact, it is merely beginning to *think about* closing at the time that full r.f. voltage is present. With a full kilowatt this can be a serious problem, and the RTTY enthusiast can go through antenna change-over relays very quickly if high power is consistently used.

There is a very simple remedy for this: Fix the contacts on the antenna change-over relay to control the cutoff-bias on the transmitter. Since the p.t.t. relay normally grounds the cutoff bias, just lift this wire off its ground connection and install a jack as shown in Fig 6. If no plug is inserted into the jack everything operates normally as in the "before" illustration. By inserting a plug connected to the auxiliary contacts of the antenna change-over relay, the cutoff bias cannot be removed until *after* the antenna change-over relay is already on the line, thus providing the necessary timing sequence. Now the antenna change-over relay should not be subjected to the high r.f. voltage that builds up when the transmitter is momentarily without load, and arcing at the relay contacts cannot occur. Also, additional protection is afforded the receiver by eliminating this arcing. A fringe benefit is that generation of undesired frequencies by the contact arc is eliminated. Television sets in the neighborhood should stop jumping when you key the transmitter.

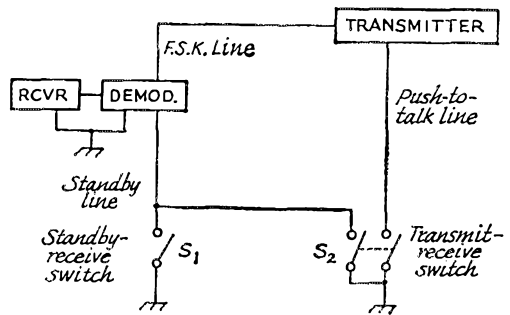


Fig. 4—Typical station control system offering rapid send-receive switching.  $S_1$  is a single-pole single-throw toggle and  $S_2$  a double-pole single-throw toggle. Both switches should be mounted close to the printer for greatest convenience in operating.

### Distortion and Bias

Distortion occurs when the pulses are not of the standard 22-millisecond duration at normal 60 w.p.m. Several kinds of distortion occur in practice:

1) *Bias*. If the timing of the signal is such that all the mark pulses are longer or shorter than 22 ms. (which automatically makes the space pulses shorter or longer), this is a uniform or systematic type of distortion called "bias." This type of distortion can be corrected at the receiving station by changing the trigger point on the slicer—or more easily, in most cases, by merely moving the range selector on the printer magnets enough to compensate.

However, if the demodulator controls are properly set and the printer's range selector is in the middle of its best printing range, some  $\pm 45$  per cent bias distortion can be tolerated by the printer. This means that the transmitted signal must really be horrible when it will not print. The chances are that you will never hear a signal *that* bad. With a good threshold corrector in the demodulator, little or no need would exist for a distortion or bias control. Thus the Mainline TT/L unit offers no such correction device. Some demodulator designs use mechanical relays having "bias" windings, and by varying the voltage on such windings distorted signals can be compensated for. However, such circuits introduce serious disadvantages which far outweigh the minor correction possible.

If the mark pulses are longer than normal, it is called "marking bias;" if the space pulses are too long, it is "spacing bias."

2) *Fortuitous distortion* is nonuniform (random) distortion caused by noise bursts, QRM, mechanical trouble, and similar unpredictable phenomena.

3) *Characteristic distortion* involves timing errors introduced by improper filter design in the demodulator, where the rise time of the filter adversely affects the pulse timing. This is quite typical in certain simple demodulator designs using one 88-mh. toroid in each channel filter. However, the printer will accept rather large

amounts of distortion, so very few amateurs recognize the fact that their units may have much greater inherent distortion than they believe. Published circuits would indicate that few designers of amateur RTTY demodulators have concerned themselves at all with characteristic distortion.

4) *Systematic waveform distortion* is introduced in the sending setup; an illustration is contact bounce on the keyboard or tape reader. Many f.s.k. systems using a shift pot and partially-saturated diode have this systematic waveform distortion — often so badly that just by listening to the signal it will be immediately noticed. As Merrill Swan, W6AEE, has often said, "It sounds like a wet mop or a man walking through heavy, sticky mud."

There are probably other types of distortion, but these are the ones of most interest to the amateur. In general, with a well-designed f.s.k. system on the transmitter and a properly-designed demodulator on the output of the receiver, distortion will be minimal. If it does exist, in all probability the keyboard contacts on the printer or tape reader should be cleaned.

### Narrow Shift

The use of 170 c.p.s. shift offers so many advantages that it is a little surprising that so few signals are heard using it. Of course, the transmitter stability and receiver tuning become five times more critical when compared with 850 shift, but with the current high-quality s.s.b. equipment used by many RTTY stations, there is no reason why good operation on 170 shift cannot be realized. For one thing, the signal takes only a fraction of the bandwidth that 850 consumes, and thus conserves space in our already-crowded bands. However, the real advantage lies in the reduced bandwidth possible in the receiver: optimum selectivity for 170 shift is only 275-300 cycles. As a result, nearly all extraneous signals can be rejected.

An additional benefit not to be overlooked is the absence of Morse stations in or near the same frequency. This is based on physiological aspects of the human ear — basically, it is hard to pick out a Morse signal near a narrow-shift f.s.k. signal in the audio beat-note region that is normally used for c.w. reception. Thus, if you have been badly bothered by Morse interference on 850 shift it is probable you will no longer be bothered by it when using 170. At the same time, the Morse operator benefits because you allow him to have some of the spectrum you were wasting before between the mark and space frequencies.

It is probably true that less selective fading occurs on 170 shift, and this upsets some of the more enthusiastic proponents of the new limiterless "two-tone" demodulators (such as the Mainline TT/L with the limiter switch turned off) as they like to go looking for signals showing selective fading — instead of folding up shop as previously! If a limiterless unit is *not* used, the reduction in selective fading becomes an advantage.

### Receiving 170-Cycle Shift with the Mainline TT/L Demodulator

The f.m. input section included with the Mainline TT/L f.s.k. demodulator has a rather linear response which allows the demodulator to copy shifts from very narrow (under 20 cycles) to more than the normal 850. However, when copying 170 shift, better results will be obtained by using a filter system intended primarily for that shift. The autostart and motor-control systems will then also work normally.

Fig. 7 shows a 170-shift filter system intended for use with the TT/L Demodulator. If a 3-p.d.t. switch is included in the TT/L, the original 850-shift unit can be instantaneously exchanged with the new 170-shift unit while still retaining the advantages of using the limiter or not at the operator's choice.

Note that the capacitor values are only approximate. The correct value for 2125 c.p.s. would be around 0.064  $\mu$ f. and the correct value for 2295 would be around 0.054  $\mu$ f., but the actual values of the capacitors vary so much (even with 10-per-cent-tolerance Mylar types) that only approximate values can be given. Those shown will not, in any event, miss 170 shift far enough to cause much concern.

The bandwidth of each filter is 80 cycles at the -3 db. points. The resistors in series with the two 88-mh. telephone toroids are quite necessary to provide equal bandwidth and proper balance. Without the resistors, the filters would not balance and would be only about 33 cycles wide. Such a narrow bandwidth would distort the incoming signal excessively. About 50 cycles is the minimum usable bandwidth for 60-w.p.m. RTTY signals.<sup>3</sup>

This unit for 170 will have greater output voltage than the 850-shift unit, but this should cause no concern. The tuning-indicator sensitivity control can be changed accordingly.

<sup>3</sup> Poor, "Filters for RTTY," *RTTY Bulletin*, May, 1964.

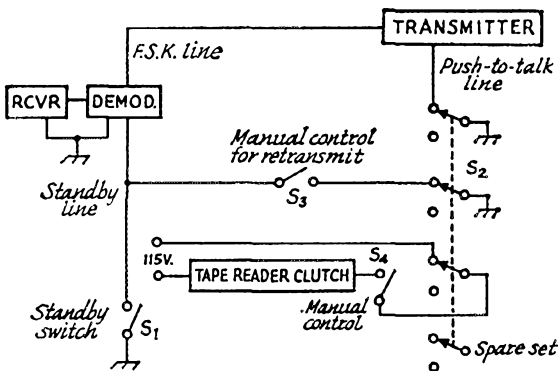


Fig. 5—An advanced station-control system offering "retransmit" as well as automatic control of the tape reader for transmitting.  $S_3$  is seldom used, and  $S_4$  is an integral part of the tape reader.

$S_1, S_3, S_4$ —S.p.s.t. toggle.

$S_2$ —4-pole double-throw rotary (Centralab 1938 or equivalent).

## "Autostart" and the Mainline TT/L F.S.K. Demodulator

The term "Autostart" seems to have caused some confusion among the older readers at least. In the past, "autostart" consisted of rather elementary circuits limited to v.h.f. where the receiver had built-in squelch and where a.f.s.k. was used to minimize drift problems. Thus when we now talk about autostart many readers immediately think of v.h.f. operation in which they may have no interest.

The Mainline TT/L Demodulator incorporates an entirely new type of circuit which allows the demodulator to be used for autostart purposes on any frequency, including h.f. as well as v.h.f. As a result, the operator need not use fixed-frequency reception, nor need he keep the equipment tied up in the hope that some friend may sometime leave a message. (Fixed-frequency autostart is possible and very practical with the TT/L, of course.)

Perhaps the term "automatic copy" would describe an additional purpose of autostart more satisfactorily. The operator can tune in a conversation on RTTY and then leave the room (or leave for the office or go to bed, for that matter) and yet be able to read the copy at his own convenience.

With this in mind, many operators now using the TT/L use the autostart even while on the air. It is this feature of autostart that makes its general use of value to nearly every amateur, even though he may have no interest in the classic version of autostart, which is fixed-frequency operation.

Autostart can thus be used to monitor any conversation, fixed-frequency for occasional traffic or messages or call-ups by friends, or even for use in receiving commercial or MARS frequencies automatically.

### Maintenance

The Teletype Corporation publishes manuals on each of the machines it has manufactured. The U.S. Government publishes many manuals for the correct maintenance and adjustment of the various machines it has bought. Procurement of these manuals should not be too difficult, and many times they are advertised for sale in this and other publications. Also, it should be possible to induce a local repairman working for the Teletype section of the Bell System to come over on one of his free evenings and "routine" your machine once a year — all it will need with normal ham service. It is also possible that after one time with such an experienced person, you will henceforth be able to do ordinary oiling and maintenance yourself. One of the fascinating things about RTTY is working with the machinery, although in a few isolated cases this will not be practical.

As a quick summary, oil all felts which appear to be provided for the purpose; use a flashlight and search out all places where mechanical motion seems evident and give them a drop of oil. More damage can be done on the typical machine by

lack of oil than by over-oiling. When finished, be sure to clean off the keyboard contacts, as a thin film of oil is often sprayed on them by the various rotating mechanisms which flip it off.

### Ribbons

Ordinary typewriter ribbons can be used, but it seems they only last a short time. Actually, the ribbon does not wear out, but even one roll of paper represents a great deal of printing. I would venture a guess that one double roll of Teletype paper might be roughly the equivalent of a ream of typing paper. So it is not unusual for a ribbon to print quite lightly at the end of a large roll of paper.

The average amateur will make a ribbon last until he can barely read the paper. Actually, the ribbon may still be in excellent condition but simply have used up most of the ink it originally had. Several inexpensive "re-inkers" are on the market for those who would rather do a little work on the ribbon than spend the \$1.50 to \$2.50 that a new ribbon will cost.<sup>4</sup>

### Where To Find Amateur RTTY

In each month's issue of *QST* typical RTTY frequencies on the various bands are listed in the same section that contains the W1AW operating schedule. These are:

- 80 meters: 3605 to 3640 kc.
- 40 meters: 7040 ± 2-3 kc.  
7140 ± 2-3 kc. (most often used for 170 shift)
- 20 meters: 14,085 to 14,100 kc.
- 15 meters: 21,090 ± 2-3 kc.
- 6 meters: 52.6 Mc.
- 2 meters: 146.7 Mc.

With the exception of v.h.f., where the activity depends entirely on the local area, most of the operation at night is on 80 meters, while in the afternoon and early evening it is on 20 meters. Occasionally, especially during contests, signals will be heard on 15 meters. On Sunday mornings a group will be heard around 7140 kc., where most of the 40-meter activity at one time existed. Since the Europeans are limited to 7100 and below, the suggested frequency for the 40-meter band is now 7040, but signals are heard on the old 7140 frequency nearly as often.

There is so little activity on 10 meters that there is no suggested frequency, but signals are heard occasionally around 29,090 kc.

### Technique on the Air

When first coming on the air, remember that some operators may be receiving you on automatic copy, and their printers may be producing mostly garble when you send your Morse identification. Thus (although very few operators do this) it would be most kind to push the LETTERS key five to ten times to let the other operator's printer get back into operation properly, and then turn up two new lines of paper. This will

<sup>4</sup> W7ARS has a patent on such a device, which he sells at a modest cost.

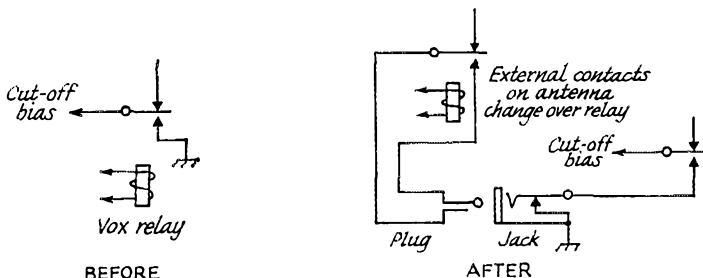


Fig. 6—Using external contacts on coaxial antenna switch to prevent arcing at the antenna contacts. Transmitter cutoff bias line cannot be grounded until antenna-relay contacts have closed.

isolate the Morse garble so it will not interfere with quick scanning of the paper. The same thing should be done at the end of the message, just prior to sending the final Morse identification, to leave a little empty space between what you last sent and the Morse. Many operators just quit in the middle of the line and send Morse, forgetting that at the other end garble will result. Also, the carriage may be caused to return to the beginning of the line where it might wipe out the copy already typed, by over-printing.

At the end of each line, the operator should get in the habit of sending

- CARRIAGE RETURN
- CARRIAGE RETURN
- LINE FEED
- LETTERS keys

It is amazing how many unfortunate variations of this correct procedure have been invented by various operators. As many machines have now been adapted to various types of non-overline protection, systems other than this may and often do turn up unwanted extra lines.

### Breaking into a Round-Table

On voice and Morse, it is customary to send a quick "Break" and then stand by. On some s.s.b. frequencies this technique merely infuriates those already on the frequency. On RTTY, many operators take the c.w. key and send "BK" in Morse, but it is seldom they are acknowledged when this occurs, as most teleprinters do a poor job of receiving Morse. A method that normally works quite well is for the station intending to break to ascertain previously that he is on the correct frequency so that when he starts transmitting he will be heard instantly.

When "Henry" has finished his transmission and has just turned it over to "Dusty" via RTTY identification of the stations, Henry must finish his transmission with a Morse identification. The best possible time to throw your carrier on is while Henry is still sending his Morse, as Dusty is already reaching for the switch. If you wait until Henry finishes and has killed his carrier, you probably are already too late to break in.

So while Henry is on Morse, start to transmit and send ten to fifteen LETTERS keys to let Dusty's printer get synchronized once more, as he probably turned it to standby while Henry was on Morse. Then, if you like, indicate your

intention of breaking, follow with your call letters, send your Morse, and then kill the carrier. Dusty will in this case undoubtedly hear you and let you in on the round-table.

Other methods may work, but this is one of the most reliable.

### Unshift-on-Space

Some machines, particularly those used by the military and many Europeans, do not have unshift-on-space. (This was discussed to some extent earlier in this series.) This means that once you have gone to FIGURES case, the machine will remain in FIGURES case until a LETTERS character is received. This can be a most aggravating nuisance on RTTY, and is certainly most undesirable for ham operating. We only mention it at this time because hams all over the world should realize that most amateurs use machines that *do* have unshift-on-space, so the printer goes back to LETTERS case immediately after hitting the space bar between words. Many Europeans who wish to send: "73 73 73 73" do not send a new FIGURES character after each space bar, and thus are printed by most of us as: "73 UE UE UE." People on both sides of the Atlantic should always remember that a LETTERS key should be sent to return to LETTERS case (that is, don't use the space bar for lower case), and that any time the space bar is struck a new FIGURES character will be needed for any subsequent numbers or punctuation.

### Abbreviations

On Morse it is quite advantageous to use as many abbreviations as possible, hence the "Q" code and number code (such as "73" "SS"). Unfortunately, many operators seem to think that such abbreviations are suited to RTTY operation as well. It is my opinion that RTTY should be conducted just as you would write a personal letter either on a typewriter or in long-hand. An example of carrying abbreviations to the ultimate was heard on the air recently on 80 meters:

"... ALSO 4 MEN TT DONT HAVE 2 WRK ... AND NEITHER 1 OF TM IS ME ... MEBE 1 OF TM IS U ... OR DO I SND JEALOUS? THE GEN MGR OF TT STN IS A GUD FRND OF MINE AND A POTENTIAL TTYER ... BUT HE IS SO BSY TT HE MAY NVR GET 2 IT ... BURT HAS BEEN HOT 2 TROT ON 6 AFSK ON

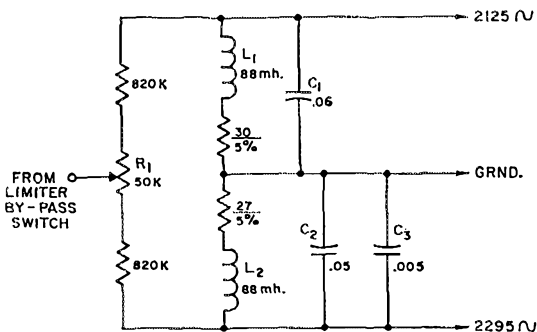


Fig. 7—Narrow-shift filter system (170-c.p.s. frequency shift) for the Mainline TT/L Demodulator. Capacitances are in  $\mu\text{f}$ .; resistances are in ohms ( $K = 1000$ ). Fixed resistors are  $\frac{1}{2}$  watt.

$C_1, C_2, C_3$ —Mylar.  
 $L_1, L_2$ —88-mh. toroid.  
 $R_1$ —Linear-taper control.

Note:  $C_1$  selected to tune  $L_1$  to 2125 c.p.s.;  $C_2, C_3$  selected to tune  $L_2$  to 2295 c.p.s.

AUTOSTART ON TT FREQ. HE HAS BN  
 BUGGIN ME 4 A CPLE MNTHS 2 GET TT  
 6M RIG GG SO WE CUD GET THE AUTO-  
 START NET GG . . . SO MEBE U SHUD  
 TNK ABT GTG ON IT 2. . . ."

I think most of you would agree this is overdoing things — at least somewhat!

### Traffic Handling

One of the outstanding features of RTTY is its ability to handle traffic quickly and accurately. However, we should like to point out that the teleprinter is a different machine from an automatic Morse key, and the content of messages can and should be somewhat different. It is my contention, backed up by many outstanding men in the field, that messages are best handled in the same way as office business correspondence — there should be few, if any, abbreviations, and regular punctuation should be used. The business of spelling out a "." as "PRD" or "PERIOD" is almost too silly to discuss.

With the introduction of the Mainline TT/L with integral autostart and optional motor-start control, unlimited possibilities exist for 80-meter and other h.f. autostart unattended nets to operate during all or any hours. By carrying things to extremes, it is possible (although not too likely) that an intercontinental autostart net could automatically handle large volumes of traffic with very few operators actually being present. Automatic retransmit could be achieved easily enough, although at present this would require some experimental waivers by the FCC.

### DX

Quite a number of enthusiasts now have the WAC (Worked All Continents) award on amateur RTTY. Asia is so hard to come across that one active station there for a few days would certainly swell the ranks. However, 20 meters is an excellent band to work DX RTTY, and hardly an

afternoon goes by but that several DX signals are copied. 14,090 to 14,100 kc. are the most usual frequencies for hearing DX, and the best hours are usually around 1800 to 2200 GMT, which is evening in Europe. On week ends this is modified somewhat. DX RTTY activity follows voice DX activity to a great extent. Leading enthusiasts have already worked over 40 countries on RTTY.

A note here regarding the demodulator might be in order: The best results on DX RTTY will probably be achieved with a limiterless demodulator using fairly-narrow channel filters. The weak incoming signals are too easily blocked by Morse stations who do not know the frequency is being used. Limiterless reception seems to work very well on weak signals showing selective fading. Again, use of 170 shift offers distinct advantages for DX work.

### Contest Work

Contests on RTTY are becoming increasingly popular. A contest sponsored by this country is held each fall, and several different European countries are now holding international DX-RTTY contests in the spring and summer. Here again is an opportunity for the sharp operator to strut his stuff. Having a limiterless demodulator that copies well on mark only (ATC) as well as on both mark and space (DTC) at keyboard or tape speed is a decided advantage. A receiver with quite narrow i.f. selectivity also helps, as does having optional filters in the demodulator that are quite narrow.

Quick tuning via the audio comparison method with a "mark standard" oscillator, as mentioned previously,<sup>5</sup> is most valuable in this case. A limiter system working from a receiver with a fairly broad i.f. is all but hopeless without many repeats and great patience. With narrow filters and the ability to copy on mark only, with no limiter and no a.v.c. used in the receiver, stations can be rather easily singled out: even quite weak stations will be copied with no errors other than their own keyboard errors. Such a system enabled me to take top honors in the North American continent in a recent contest.

Contest logs are another thing, but can usually be filled out while running "CQ contest" tapes automatically on the tape reader. A well-organized contest station is the height of operator proficiency, and here quick break such as in Figs. 4 or 5 is almost a requirement.

### Conclusion

The preparation of the material contained in this series of articles has taken a great deal of the time of a number of people in addition to the author. It represents the current state of the art so far as we are capable at this time of determining it. Although the presentation has been influenced to some extent by the author's preferences and experience, a conscientious effort has been made to give all sides of the story as

(Continued on 164)

<sup>5</sup> Hoff, "RTTY Indicator Systems," *QST*, October, 1965.



# FLOODS

## IN THE

## MIDWEST

**W**HILE the East Coast sat baking from the lack of rain, the Midwest was being drowned with water from heavy spring rains. Rivers and streams throughout Minnesota, Indiana and Iowa grew to tremendous size with the millions of gallons of water being flushed into them from the melting mountain snow. Major flood areas were along the Mississippi River near La Crosse, Ind., and Winona, Minn., and another flood, separate from the Mississippi in Mankato, Minn., where the Blue Earth and Minnesota Rivers meet.

By Apr. 7, things in Mankato were getting rather serious, and amateurs, who up to now hadn't been called upon for assistance, were pressed into service, providing communications in places where the existing communication service was overloaded, or where there were no other means of communication. WØRNY and WØTCK had set up a 6-meter f.m. base unit at the flood headquarters in downtown Mankato, using the call WØWCL. At this time, several mobiles went into service, providing direct contact with flood headquarters for the city, county, c.d., Red Cross and Salvation Army. This system was also used to handle security traffic. The mobile units were stationed in each of the flooded, or to be flooded areas, critical points along the dikes and to various places where larger numbers of volunteer workers were stationed. Wherever possible, officials were permitted to talk directly with each other to save time and avoid confusion in relaying information.

During the late evening hours of April 7 and early morning of April 8, only v.h.f. was permitted to operate to direct evacuation of the Le Hillier area and position the National Guardsmen, who had been called out to help the volunteers and guard against vandalism in the flood area. Members of the Ramsey Co., Minn., AREC who were equipped with mobile gear were sent to Mankato to help alleviate the load on the existing mobile patrol units. The cars were equipped with 2-meter f.m., and a base station unit was also provided. When the coast guard was called into action, the flood headquarters crew set up a 6-meter link between hq. and the coast guard van which was stationed outside the city, on high ground so communications between the van and the coast guard headquarters, in St. Louis, Mo., could be maintained.

A permanent link was also set up between Red Cross headquarters at the flood control and the Red Cross evacuation center on the Mankato State College campus. This helped lighten the load on the telephone circuits, and reduced the transit time for traffic from several hours to almost instantaneous. On April 8, a 75-meter station with areas up and down the river and other with areas up and down the river and other points. Contact was maintained with all key points in the state, and much traffic was handled.

On April 9, c.d. officials requested additional mobile units, and the call went out. Amateurs

### *Amateurs Again do*

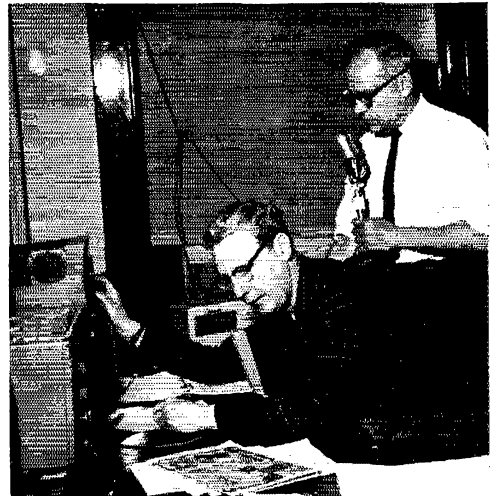
### *"What Comes Naturally" and*

### *Provide Emergency*

### *Communications to Flooded*

### *Towns*

COMPILED BY  
PETER CHAMALIAN,\* WIBGD



The Clinton, Iowa, flood control center operated under the call WAØEIQ/Ø. Seated is KØSCW, Clinton EC, and standing is WØBLH. WAØEIQ was kept on the air for 17 consecutive days during the worst part of the flood.

\*Communications Asst., ARRL



At the other side of the Mankato control center, we have WAØDFT manning one of the rigs.

from a 100-mile radius of Mankato responded, and those who couldn't be used by c.d. were sent to Chaska, another hard hit area, and New Ulm, upstream from Mankato.

In the Minneapolis area, WAØCQG had formed a 6-meter net, with the primary coverage being Minneapolis. By April 25, the net was called into action to provide emergency communication from Watertown to Minneapolis for Red Cross traffic. KØQYP set up another station and maintained communication with the Carver County flood control center in Shakopee. As many as five mobiles were in operation at one time, taking care of watching the dikes, checking the bridge coming into Watertown, checking on gravel being brought for the dikes and other important details. A station was set up at the Red Cross headquarters using the call WØREA. Amateurs from the Ramsey AREC helped man the station and many were on duty for almost 24 hours a day during the worst part of the flooding.

In the Winona Co., flood, AREC members had started to prepare for the flood at their monthly meeting, but most of the basics of the operation had been predetermined. Amateurs were to provide statewide and nationwide communications, leaving the local work to the c.d. crew. Operation was started on April 12, initiated by EC WAØIAW and his assistant, WØMLJ. This was to be a day-time-only operation, the primary duties of which involved securing flood reports from cities up-river and relaying them to c.d. headquarters. A coast guard van was set up in Winona, and maintained liaison with the amateur operation via a six-meter link provided by KØYRV.

At this time, it was decided to move the statewide c.d. system headquarters from Rochester to Winona, and their base of operation was set up in the gym at St. Mary's College. A six-meter rig was installed in an army amphibious vehicle, owned by the college, for use by c.d. as their observation vehicle, and communication lines were maintained with their headquarters. Since the telephone lines were intact, amateur activity was limited and used only as a backup for the telephone service and to places where there were no provisions for telephone communication.

Amateurs from Grand Forks, N. Dak., at the request of KSCHE/Ø at the Grand Forks AFB, set up and maintained liaison between the base and East Grand Forks, Minn., where the air force had sent men to assist the flood workers. Mobile units were used to patrol the flooded areas and provide communication where needed. Damage in North Dakota was slight, and the amateurs were able to devote their full effort to the Minnesota town.

On April 11, the c.d. director for Clinton, Iowa, requested the AREC's help in providing emergency communications for the city throughout the disaster period. WØDFZ, WAØGYB and EC KØSCW began compiling a roster of personnel and equipment that would be available for the emergency operation.

On April 16, WAØFIQ/Ø went on the air from the Clinton City Hall to act as the control station for an operation that lasted for 17 days. Mobile units were sent to the sand loading pits to relay to truck drivers information on where their load was most needed. Flood Control hq. had to know what sections along the dike were running short of supplies and they had to know where to send volunteer workers as they reported for duty. The Red Cross and the Salvation Army had to know where their food and coffee wagons were needed. KØZWB handled the liaison between the local operation and the low band nets.

In Lee County, Iowa, KØWYK reports that communication was provided for the Green Bay flood area by the RACES group and liaison was maintained with the Scott Co. RACES headquarters in Davenport.


In La Crosse, Ind., the c.d. director requested communication backup links, and the AREC members set up a local net on 2 meters and a long haul net on 75 meters. On Apr. 18, KØUTN, Vernon Co. EC, was able to lend additional 2-meter equipment which was distributed to pre-selected spots, and by evening most of the units were on the air. Later that evening the local radio officer requested a link to the city hall be set up. WAØFAB operated WØPJ/Ø at the flood control



In Mankato, Minn., AREC and Mankato Radio Club members operated WØWCL. Pictured here are the 75 and 2 meter stations with (l. to r.) KØICG (EC), WØTCK (Minn. SCM), WAØCAE, WØHUU (EC) (front), KØKCJ and WØVOA.

center, relaying traffic to W9MNG who in turn relayed it to Madison. WA9GJD and WA9HXR had set up an emergency communications center on French Island and were handling traffic on both 2- and 75-meters. An additional 75-meter station was required at the city hall, and was set up by the evening of April 19 with WA9HXP and W9ZZI as operators, and W9OOL was used to relay traffic to Madison. On the evening of April 20, K9ZUY took over as NCS from W9PJ/9, while W9GPU and W9VRI acted as back up operators in case W9PJ was forced off the air. On French Island, the FAA had requested a 2-meter link

between the airport and telephone company, where the AREC had its control center. Operation continued 'round the clock until April 22, the flood crest having passed on April 21, when operation was reduced to daytime only until April 25, when the amateur's services were no longer needed. During the entire course of the operation, many amateurs split their time between AREC and Navy MARS which was also activated.

Many of the reports indicated that officials in the areas that amateurs served were grateful for the many hours spent and the tireless efforts of the amateurs. Well done, fellows and gals! 

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## High-Speed Code

BY KATASHI NOSE,\* KH6IJ

**T**HE person who wishes to become proficient in the art of c.w. today will be hard put for practice unless he turns to the amateur bands or that rare press station still serving primitive areas.

Before the advent of the teleprinter, one could get excellent practice from any of the press or point-to-point stations. Monitoring the radio spectrum today will convince you that c.w. is no longer used as a means of handling high-volume traffic.

Let me say that I am writing strictly as an amateur, let me say that I have had considerable experience copying high-speed press news on contract. A press contract meant that I had to produce a certain volume of copy per day. I hit upon the scheme of transcribing the c.w. on a dictaphone (meanwhile tuning to another broadcast) and later playing it back at a higher speed. The pitch was high but I could get off more copy in a shorter time. I could eliminate the deadwood ("thinkpieces") and concentrate on the hot news, but best of all I could raise my code ceiling.

### *Sending*

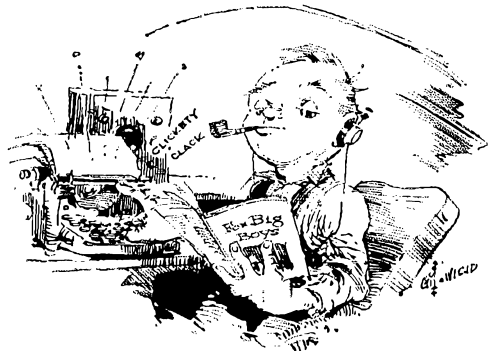
I must admit I cannot copy some of the so-called high-speed stuff being sent sometimes by the "no-weight" artist. The dots are adjusted for 50 w.p.m. but the dashes are loafing along at 25 w.p.m.

The electronic key has done much to eliminate this menace but even this device is subject to stylized sending, through mis-spacing of the letters. An electronic key in the hands of a skilled sender is a joy to listen to. Old timers remember the "Lake Erie" and the "Banana Boat" swings, but like an accent, eventually one got used to it. The electronic key has eliminated this type of accent.

Many schemes have been proposed to keep the bug anchored down, ranging from suction cups to sandpaper. I contend that such schemes are for the slow sender. At high speed you cannot afford to put much force on the paddle. If you move your whole arm, the law of inertia prevents you from attaining high speeds. Pivot on the knuckle of your small finger and use only finger action and a rolling-wrist motion. If your fingers or arms begin to ache after a spell, you are straining too much.

Learn to relax by sending while holding a pencil or pen in the same hand and fingers you use for writing. This eliminates that wasted motion of picking up a pencil and laying it down when working a contest. Imagine picking up and laying down a pencil 6000 times, which is what you would do during the course of a hot contest!

If you have already mastered a bug, it will take about three weeks to convert to electronic-key sending. Once you are converted, you are hooked because now your bug fist is ruined: an entirely different technique is required. The elec-



\* Physics Dept., University of Hawaii, Honolulu, Hawaii

tronic key requires that you cut short the dash and quickly go over to the next character. It also makes the dashes for you. Therefore, you will have a tendency either to stick on the dash side or to send too-short dashes when you go back to the conventional bug.

For those breaking into the higher speeds, I recommend an electronic key because the results are professional-like.

### **Maximum Hand-Copy Speed**

During the early part of my amateur career, I developed the art of listening in my head, mainly to save scratch paper. I quickly progressed to a point where I could copy in my head but was unable to put it down on paper or typewriter, an additional reflex which I had to master later.

During the course of 25 years of teaching c.w. to teenagers, I have found that the average teenager cannot write legibly beyond 25 w.p.m.

You can perform a test on yourself by writing out the words of a familiar poem or passage at maximum speed for one minute. Divide the number of characters written by five to get your writing speed. Teenagers range from 17 to 30 w.p.m.

Beyond approximately 25 w.p.m. therefore, one must resort to the use of the typewriter. Code-speed contestants have been known to copy up to 45 w.p.m. by hand, and many hams qualify for the 35 w.p.m. code proficiency certificate by hand, but they are unusual individuals.

### **Building up a Vocabulary**

Up to about 25 w.p.m., one can afford to follow each letter as sent. Beyond that speed one must learn to build up a vocabulary. A vocabulary consists of a combination of letters. Some common ones are: ed, fl, th, de, be, an, oo.

To progress to higher speeds, one must increase the scope and length of these bits. This classification may include such combinations as ing, all, ent, the, and int.

At higher speeds, you begin to recognize whole words, simple words perhaps, but these words enable you to catch up on your typing. Numbers and punctuations are usually recognized by the fact that they are longer bits than the standard character, and are recognized only after a slight pause. At high speeds, the key is to recognize the pauses between words. This split-second pause gives you the time to get set for the next burst.

Many stories are told of the skilled operator who listens to high-speed code, goes next door, gets a drink of water, and then calmly sits down to type out what was sent. Such stories frequently are colored by the fact that the witness is not a high-speed code man and is dazzled by the burst of speed which to him means nothing. The high-speed operator is able to read this burst, and to retain it up to a limit. I defy you, however, to remember a ten-digit telephone number heard only once and then to transcribe it after a period of delay. There is a ceiling to the retention capability of the human mind. (In fact, this is brought out in a well-known test administered to executives.)

If what is sent on c.w. is a simple sentence or most likely a routine order or command, it doesn't take much to impress the witness. At high speeds, the gap between typing speeds and code speed becomes smaller and smaller.

### **Copying Behind**

I remember vividly the merits of copying behind. As a youngster, I took the ham exam from a Navy operator (no FCC office). He started to send "of" then tacked on an "f." I immediately thought of "off" and got set for the next word. But to my dismay, without a pause he sent an "i" and immediately I tried to outfox him by pre-writing the word "office." To my consternation he kept on going with "cia" and I quickly revised my thinking to "official." But I was still wrong because he finally ended up with the word "officially."

The question then arises as to how far behind one should copy. I find it too much of a mental strain to get too far behind and so have decided that a word or two is a leisurely pace. There is no point in getting too far behind because occasionally an unusual word will throw you off and you will quickly get derailed. This is especially so with foreign proper names and places. Press Wireless, recognizing this, frequently made it a point to leave pauses between letters for unusual names and words.

### **Necessity for Solid Signals**

For amateur work where accuracy is not of prime importance, we can get by with a lot of missing words and letters and still make intelligible copy. DXers are noted for this, and phone men know how well one can double on a transmission and neither one would be too far off track on the next transmission. However, in code competitions for precise copy, a strong signal must be present at all times.

Consider the Connecticut Wireless Association's High Speed Code Tests up to 60 w.p.m. Assuming five characters to a word, this means that an average letter must be sent during an interval of one-fifth second.

During this split second, the brain must recognize the character and send the proper impulse to the typing finger. Any burst of static or fading takes out gobs of information. It is futile to try to make perfect copy from a long distance on a bad signal.

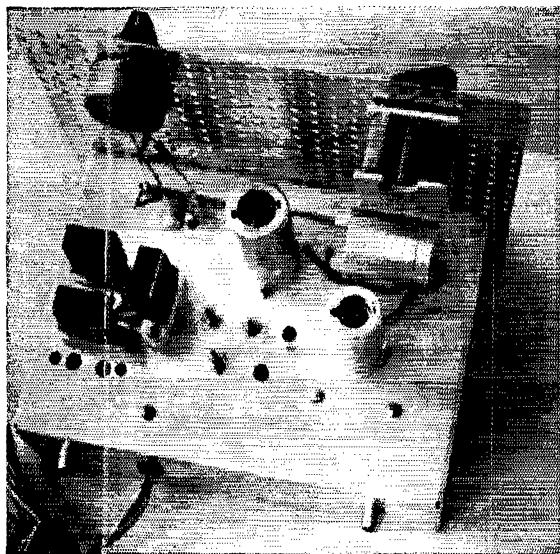
### **Are You Temperamentally Suited?**

There is no question that high-speed code calls for quick reflexes (notice I did not say quick mind), for high-speed code copying is partially dependent on reflex and partially on conscious effort.

You probably have an aptitude for high-speed code if you find yourself making a quick reflex grab for an object which has slipped out of your hand, able to dodge successfully a falling object, or regain your balance when you slip on a banana. The writer absolves himself of the consequences of the latter test.

**QST**

# Modifying the *Handbook* Converter for



Top view of the modified *Handbook* converter showing placement of tubes and related components.

160,

80, and

40 Meters

BY SAM CREASON,\* K6DQB

**A**FTER several months use at K6DQB, the 10-15-20-meter 6BZ6-6U8A converter shown in the *ARRL Handbook*<sup>1</sup> was found to be a sensitive and stable unit. However, the BC-342 which was used as a tunable i.f. at 3.5-4.0 Mc., lacked adequate bandspread and selectivity. To eliminate these objectionable features, a second converter (modified version of the 10-15-20-meter unit) was constructed to provide 40, 80 and 160-meter coverage. Used with a BC-453, as a tunable i.f. at 0.2-0.55 Mc., it covers the three lower-frequency bands. Tuned to 80 meters and connected to the output of the 10-15-20-meter unit, the three higher-frequency bands are covered.

### *The Modifications*

The first of two modifications of the original design<sup>2</sup> was to provide r.f. and mixer tuned circuits to cover the desired frequency range of 1.8-7.3 Mc. For this application, the Allied Radio 15-409 pf. variable capacitor<sup>3</sup> proved ideal. The capacity range is adequate and the unit is physically small enough to require only a half-inch increase in panel height. Since the plate spacing is close in these capacitors, care should be

taken to avoid short circuits from metal chips, small pieces of solder and the like. They should be mounted in place only after the wiring is nearly complete.

Suitable inductors were fabricated from B & W Miniductor stock and are described in Fig. 1.

The second modification was to provide plate coils and three crystals for the local oscillator. The BC-453 tunes only the 0.2-0.55 Mc. range, so a fourth crystal is needed to give full coverage of 80 and 15 meters. A fifth crystal would be needed to completely cover 10 meters, providing the 10-15-20-meter converter had both 24.5 and 25.5-Mc. crystals. Since the author operates mostly on c.w., and 10 meters is spotty, these extra crystals have not been added. Ample chassis space is available, however.

The crystals for 160- and 80-meter operation were chosen as a matter of convenience since they were on hand. The crystal for 40-meter operation was chosen to tune 7 Mc., at 0.55 Mc., with the BC-453, thereby providing a higher i.f.

**The author describes a modified version of the *Handbook* converter which permits improved reception of the 160, 80 and 40-meter bands. The selectivity and sensitivity resulting from the use of this converter, in connection with the BC-453, is reported to be excellent.**

\* 4140 Diego Way, Rocklin, California.

<sup>1</sup> "A Crystal-Controlled Converter for 20, 15, and 10 Meters," *The Radio Amateur's Handbook*, 1962 through 1965 editions.

<sup>2</sup> The builder is referred to the *Handbook* article for the schematic, parts layout, and construction hints.

<sup>3</sup> Allied Radio Corp., 100 N. Western Ave., Chicago, Illinois 60680.

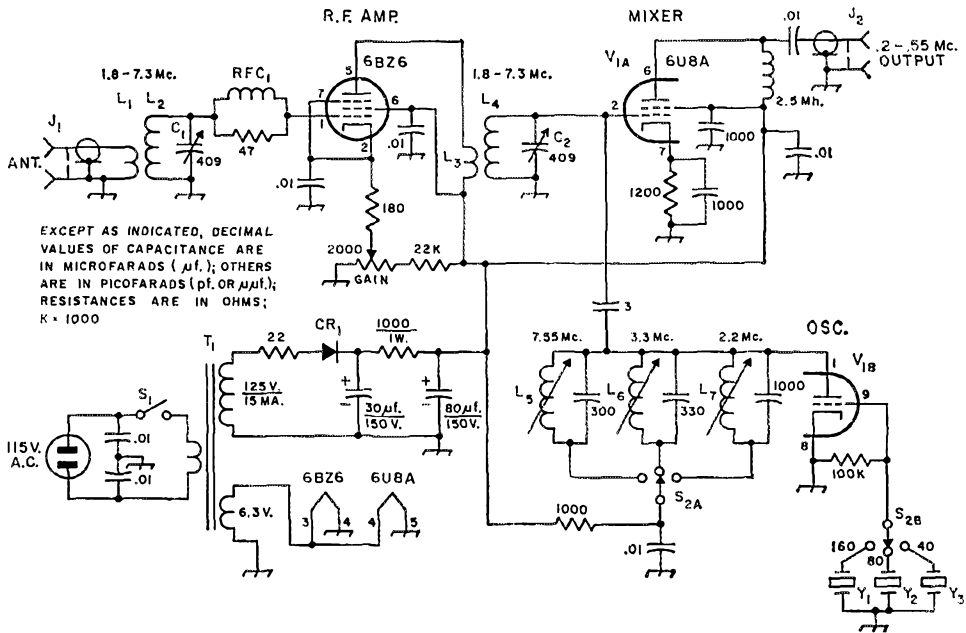


Fig. 1—Schematic diagram of the converter, showing coil and capacitor modifications, permitting its use for 160-, 80- and 40-meter reception. Capacitors are disk ceramic. Capacitors bearing polarity symbols are electrolytic. Resistors are 1/2-watt composition unless otherwise noted.

C<sub>1</sub>, C<sub>2</sub>—15-409-pf. variable capacitor (see note 3).

J<sub>1</sub>, J<sub>2</sub>—coax chassis connector.

L<sub>1</sub>—5 turns insulated wire over cold end of L<sub>2</sub>.

L<sub>2</sub>, L<sub>4</sub>—35 turns No. 24 enam., close-wound, 1-inch diam. or 1 1/8-inch Miniductor stock (B & W 3016).

L<sub>3</sub>—6 turns insulated wire over cold end of L<sub>4</sub>.

L<sub>5</sub>—15 turns No. 30 enam. wire, close-wound on 1/4-inch diam. iron-slug form (Miller 20A000RBI usable).

L<sub>6</sub>—36 turns No. 30 enam. wire, close-wound on same type form as L<sub>5</sub>.

L<sub>7</sub>—26 turns No. 30 enam. wire, close-wound on same type form as L<sub>5</sub>.

S<sub>1</sub>—S.p.s.t. toggle switch.

S<sub>2</sub>—2-pole, 3-position rotary switch.

RFC<sub>1</sub>—8 turns No. 22 enam. wire on 1-watt, 47-ohm resistor.

T<sub>1</sub>—Small replacement power transformer.

Y<sub>1</sub>—2.2-Mc. crystal.

Y<sub>2</sub>—3.3-Mc. crystal.

Y<sub>3</sub>—7.55-Mc. crystal.

at the c.w. end of the band, for better image rejection. The phone operator might consider using a different crystal frequency to provide a more suitable i.f. arrangement.

The crystal frequencies and oscillator plate coil data are presented in Fig. 1. If coverage of the upper end of 75 meters is desired a 3.6-Mc. crystal can be substituted at Y<sub>2</sub>. Slight pruning of L<sub>6</sub> may be required.

The results to date have been pleasing. This is the first piece of gear the author has built which worked well from the start—a tribute to the original design. The bandspread is excellent and tuning s.s.b. signals is a pleasure. The selectivity is greatly improved over the BC-342 arrangement. Casual tuning of the 20- and 15-meter c.w. bands produced South American and African stations with no difficulty. JAs by the dozen, VKs and ZLs were found on 40-meter c.w. The author has poor antennas for 80 and 160 meters, but checks comparing the low-frequency converter/BC-453 set up with the BC-342, have shown the former to be significantly better.

I wish to express my thanks to Chet Clark, K6KFX, for his help in providing photography for this article.

QST

### First-Day Covers Still Available

When the Amateur Radio First-Day Covers were processed in Anchorage on December 15, we gambled and had a few extra unaddressed covers prepared, because orders for the first-day covers were still coming in and we didn't want anyone to be disappointed. We still have some of these left. They are all singles, unaddressed but carrying the amateur radio stamp and the official first-day cancellation, and they will be mailed to you in an envelope. Prices are 35c each, three for a dollar. Send your orders to ARRL Hq., 225 Main Street, Newington, Conn., 06111.

# PICON Has Another Meaning—

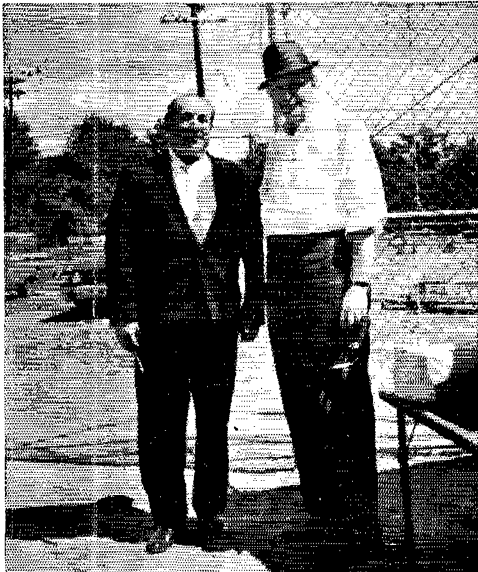
## Plan It Carefully— Or Nothing

BY GRAY BERRY,\* K2SJM

***This is an inspiring case history of how one club, through a carefully-planned program, licked the tower problem in its community against considerable odds. QST recounts it because laying a solid foundation of community support, as was accomplished here, is a most desirable objective whether or not a current tower or other problem exists.***

N EARLY five years ago, WA2DBF, his XYL WA2DBG, and son WA2DBH, moved into the city of New Rochelle, bringing with them a tower . . . and stepping into a mess of litigation almost upon their arrival. The upshot of the matter was that their tower was held by the city to be forbidden under zoning restrictions, and they were ordered to take it down. Root of the problem was the fact that no permissive legislation existed, and that zoning rules set a stringent 35 feet height above ground limit on all construction in residential districts. As soon as the local court determined — and I set a suspended fine as a result — that towers were not permitted, the Communications Club of New Rochelle tried to step in in behalf of all amateurs. We were able to secure a public hearing on a piece of legislation suggested and drawn up by the City Planning

\* Communications Club of New Rochelle, Box 971, New Rochelle, N. Y.



Dr. Sam Rosen, WA2RAU, whose cause brought the New Rochelle case to its peak, and Civil Defense Director Arthur Brooke, whose efforts really put the ordinance over.

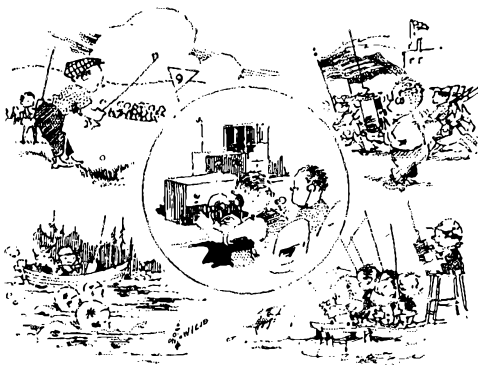
Board without conferring with any amateur group or qualified electronics source. Net result was nil — we lost the vote 4-1 before Council. Fortunately for the WA2DBF family, a change of position forced them to move to another state, along with the disputed tower. But New Rochelle amateurs were still faced with the certainty that it was only a question of time before the same thing would happen to other amateurs.

With that certainty in mind, a "strategy committee" was formed, and a long-range program entered into to get ready for the day the problem would again rear its head. Hence the title of this report — *PICON has another meaning*. The root of the problem was rather clearly misunderstanding of amateur radio purposes and activities on the part of local authorities. Remarks at the hearing clearly showed that amateurs as a group were visualized by the political heads of the city as youngsters, in the first place, and secondly, as a group who spent their time chatting with other people on inanities. It was necessary, then, in our judgment, to stage a long program of public relations and public service to alter the too-prevalent image of amateur radio.

Fortunately, The Communications Club of New Rochelle numbered among its membership a seasoned public relations and advertising man, who was drafted for the assignment of planning and carrying out public relations programs by every available means to assist in the major project of establishing just what the amateurs in the community were really like, and what they were actually doing for the Community. The first step was to establish excellent relations with local news media, both newspaper and commercial radio. Without this, of course, no effort on the Club's part could have accomplished much.

### **Community Service Program**

Once this vital step was taken, the CCNR mobiles were not only made available but were virtually forced on local charitable and civic organizations. In some cases, the sponsors of civic events said they didn't believe that amateur radio could do anything for them: they had to be shown. Over a period of some years, CCNR supplied coordinating communications for several



events such as the City's Memorial Day and Thanksgiving Day parades. They were drafted (or volunteered) for communications for everything from open-air art shows to cross-sound swim races, charity golf tournaments to juvenile fishing contests held by the local Recreation Commission. Of course, CCNR membership is and has been the nucleus of local CD activity, with the club station K2YQJ as our RACES outlet. CCNR members are the heart of two ARPSC nets, on 21.31 and 146.175, meeting regularly each week under the EC for the County, who deliberately qualified for appointment as part of the concerted effort of CCNR to become PICON-active (in the usual sense!). Other members were encouraged to join the NTS and affiliated nets, and to participate to the limit of their abilities.

Special efforts were made during holiday periods with the aid of the local news media to solicit traffic for servicemen away from New Rochelle, as well as to set up contact with Boy Scout representatives at national jamborees. And quite naturally every such effort was publicized as widely as possible. In addition, CCNR was able to arrange at two different times to have half-hour informative broadcasts staged by the local station, WYON, on the subject of amateur radio, and during Field Day week of 1963, an on-site interview program took place.

In other words, from 1959, when we lost our first effort to clarify the tower problem, right to the present time, CCNR has shown in every way possible — and been sure to publicize the fact — that it was dedicated as a club and as individuals to the FCC-required activity in the Public Interest, Convenience or Necessity. And about the middle of this past year, the feared event happened. Dr. Sam Rosen, WA2RAU, in spite of citations from many quarters for his efforts in handling emergency traffic — from the Congo in the early days of the rebellion there through the Alaskan earthquake — was hauled into court on complaint of a neighbor and charged with possessing and using a tower in violation of regulations. The local court dismissed the charges with prejudice, with Judge Murphy holding that he failed to find any violation of law. But the next thing Doc knew, he was called to County Court, and the charges against him were set for trial there.

Now things were really serious. A lost case in County Court would be precedent-setting for the entire state of New York, and quite possibly might spread into other states as well.

With the willing help of ARRL Headquarters, and particularly of the League's General Counsel, Bob Booth, every step taken in this juncture by the Club and by WA2RAU and his lawyer were carefully coordinated, planned to the nth degree. During the '64 national convention in New York, a long discussion took place with W2KR, then Hudson Division Director; Bob Booth, W3PS; W1LVQ of Headquarters and others. As is always true in such cases, local in origin, the League and its General Counsel cannot physically participate, but we of CCNR found Headquarters and the ARRL counsel were completely cooperative right down the line. They gave us valued legal advice, based on wide experience with similar cases elsewhere: we were able to clear each of the subsequent steps taken *in advance* with ARRL — and fully believe our ultimate success was made possible only with their help.

(Here it is well to emphasize that Dr. Rosen carried the considerable burden of actual legal expense himself, though ARRL and CCNR did work closely with WA2RAU's attorney, in setting up a defense and preparing ground for any appeal to higher authority which might have become necessary.)

### Concerted Actions

As soon as the date for WA2RAU's trial drew close, CCNR drafted up a "blast" in the form of a letter to the City Government asking why our well-publicized efforts to assist our neigh-



As part of its program CCNR invites VIPs everywhere and every time there was any excuse. Here (left to right) Field Day Chairman K2YRZ clarifies a point for Mayor Ruskin, while Mr. Brooke looks on.



bors and the city were being rewarded with a court trial. We cited chapter and verse, detailing our many PICON activities over a period of years. And the editor of the local newspaper, thanks to careful and long cultivation, front-paged the letter for us. The results were all anyone could ask. Letters poured into Council: into the papers. We received support from many areas — and the City Government took action.

First, they asked County Court to postpone the WA2RAU case. Second, the City Manager instructed the law department to prepare legislation, if possible, to clarify the question. This latter action meant drafting a law which would pass judgment of some six city departments, and which had to be the subject of a public hearing before enactment. As it meandered its way from Building Official to Law Department, Safety Services to Zoning and back again, the amateurs were fortunate to have the help all the way of Arthur Brooke, Director of Civil Defense for the City. And finally the hearing took place in July of this year. Again, ARRL Headquarters helped immeasurably by sending George Hart, W1NJM, to the hearing to present the story of PICON — and the contributions of amateurs all over the country to health, safety and well-being of friends and neighbors. During the hearing, and in accordance with local laws, only one speaker was permitted in behalf of the legislation, and a CCNR member served as spokesman for the entire amateur group in presenting its cause to the members of Council.

When the Hon. Alvin Ruskin, Mayor, called for speakers in opposition, no one answered his call, and the ordinance was passed unanimously. Prior to making his vote public, Councilman Pisani stated he wished to commend on the record the public spirit of the amateurs, both locally and throughout the country — and particularly WA2RAU for his many long hours of effort for others.

### C. D. Help

As important as the CCNR program turned out to be in final clarification of the status of antenna towers, the all-important factor — and one any club or amateur should bear in mind in a similar situation — was the all-out support given the amateurs in New Rochelle by our Director of Civil Defense. Arthur Brooke has his office in City Hall, which enabled him to maintain day-to-day contact with every City Department and official concerned with the approval of suggested legislation. He “shot down in flames” one criticism after another by individuals, removed possible objectionable (to the amateur or to the city) phrases and requirements from the bill which was finally presented. Without the hard work of Mr. Brooke, backing the Club’s efforts, antenna towers would have disappeared from New Rochelle’s amateur stations. The final permissive legislation is, in a very real sense, a result of his work in our behalf.

So it was that, after nearly seven years of careful planning, with the invaluable assistance of ARRL headquarters, and our former Hudson Division Director W2KR as well as his successor W2TUK, plus that of William Kiser, District Engineer of the FCC and of Arthur Brooke, that New Rochelle now has specific and permissive legislation in the area dealing once and for all with the question of amateur towers. Already, communities in the area have asked for copies of the regulation as it was adopted, and we believe that it will serve as a guide for many others as time goes on.

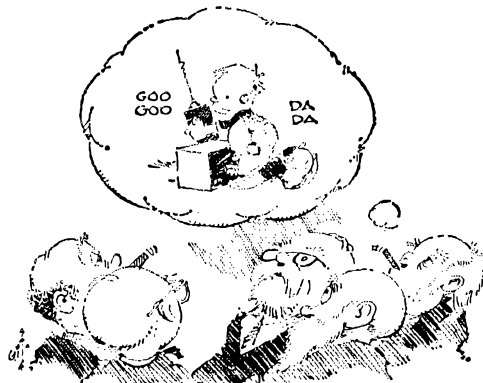
The culmination of the years of argument, discussion and hard effort on the part of the CCNR has brought successful results. Our experience serves to underline for every amateur and every amateur organization the vital importance of PICON — operating in the Public Interest, Convenience or Necessity. Without this concerted activity, day in and day out, on the part of the Club at our own local level — and without the equally-important new “Plan Carefully” meaning we assigned years ago to those famous initials — today we would not have solved a major problem besetting every amateur in the City.

The proof is there — remember your Public Service activities. And plan carefully. Your town may be next. And you may be the next amateur to face the problem. If so, do as we did. Bring the League into the picture early. Keep in touch with your Director and with Headquarters. And the results will be the same as ours.

### ORDINANCE AMENDING ZONING ORDINANCE TO ALLOW RADIO TOWERS NOT EXCEEDING 75 FEET IN HEIGHT BY SPECIAL PERMIT.

BE IT ORDAINED by the City of New Rochelle: Section 1. Article V, Section 5.1 of the Schedule of District Regulations Part 1, Residence Districts, Column 2B, Uses Allowed by Special Permit, R-1AA Zoned District, is hereby amended by adding thereto a new subdivision D to read as follows:

### ARTICLE V SECTION 5.1 SCHEDULE OF DISTRICT REGULATIONS



“CITY FATHERS VISUALIZED THE RADIO AMATEURS AS YOUNGSTERS.”

PART 1 — RESIDENCE DISTRICTS

2  
USES  
B

ALLOWED BY SPECIAL PERMIT

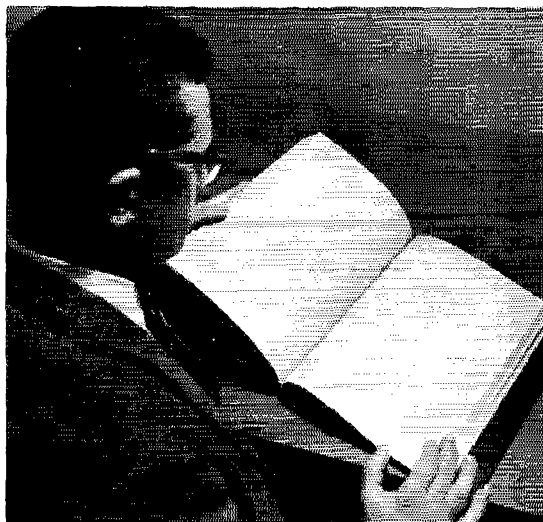
Upon Application to Board of Appeals on Zoning  
See Section 8.3

R-1AA Residence One Family

D. Radio towers for licensed amateur radio stations not to exceed seventy-five (75) feet above the established grade providing the following conditions are met:

1. Located at rear of the Property.
2. Located at least 15 feet from the rear and side lot lines.
3. Tower shall have a smooth, non-climbable surface to a height of ten (10) feet or else a six (6) foot high fence with a locked gate completely enclosing the tower located within ten (10) feet of the tower. (Applicable to all radio towers).
4. Radio tower to be commercially manufactured type with published specifications, standards and stresses.
5. Base of the tower shall be no greater than 2'-0".

*"The Directors of CCNR feel strongly that in planning and carrying out—often single-handed—many of the activities which brought success in New Rochelle, ARRL Assistant Director K2SJV has done a real service for amateur radio and everyone in it."—WA2TEQ, President, CCNR.*



The public relations work of the Communications Club of New Rochelle would fill a book—and here is the book, being examined by a QST staffer.

6. Guy wires when used shall terminate at a solid structure and be located not less than ten (10) feet above grade.

Section 2. This Ordinance shall take effect 30 days after its adoption.

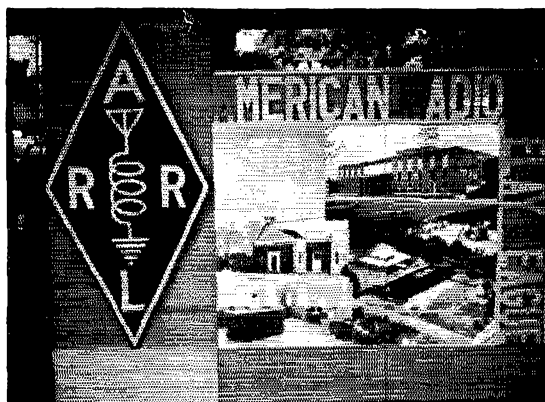
QST

*(Editor's Note: The League desires to keep up-to-date its continuing record of amateur tower cases and pertinent zoning ordinances. We request individuals and clubs to forward to Hq. copies of any existing or pending ordinances affecting amateur antennas or towers.)*

These proud three are winners in the 1965 Hawaiian International Billfish Tournament. Representing the City of Santa Monica, California are Inger Arrasmith (left), Bill Arrasmith, W6TEZ (center), and Cam Pierce, KH6EPW (right). The team made the highest score in the overseas-team entry. Inger's catch weighed 279 pounds, Bill's was 151 pounds and Cam's was a whopping 330½ pounds. In addition, Bill and Cam received a 30 per cent bonus in scoring because they were using 80-pound line!



**Strays**



This handsome display was made by Ed Metzger, W9PRN, ARRL Vice Director for the Central Division, and was used at the ARRL Booth at a recent Hamfesters picnic in Chicago.



# Correspondence From Members -

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

## A VISITOR AT K2US

☐ Another publication wrote hundreds of words for a period of time on the amateur station at the New York World's Fair. It sounded believable, sitting 2000 miles away reading a magazine, but a visit to the fair proved them 100% wrong. One would have to be blind or deaf not to see the entrance at the Coca-Cola pavilion and on every bus tour the loudspeakers proclaimed the existence and location of the ham station. This writer was invited in, along with several others. My license was examined and in a short while (when a space at the very-well-equipped console in an air conditioned room became available) I had a good time operating K2US for an hour. Asked if I could come back again, reply was "of course." I made them prove it by going back in a week with only a photo copy of my license — to put them to the test, so to speak. No, I could not operate, but they would assign a licensed operator to my position to maintain control for me and I could enjoy myself.

So newcomers to the ham ranks, don't be misled by those who may have a special interest in mind and not the good of all. 73, — *H. J. Paine, W9IKY, Omaha, Neb.*

## NEW ORLEANS SAYS THANKS

☐ During the terrible disaster Hurricane Betsy the amateur radio operators did a miraculous job. Without them there would have been no possible means of communication because our local telephone service was completely disrupted during the height of the storm. I have nothing but the highest praise for these dedicated operators who jeopardized their own lives and in many cases separated themselves from their families in order to continue to render their invaluable assistance.

I also want to correct an erroneous report. I was quoted as saying that a message was relayed by a ham radio operator that there were 200 deaths in Plaquemines Parish. I did not make such a statement and a thorough investigation has revealed that no such message was sent or relayed.

In closing, I would like to reiterate an expression of the appreciation we all feel for the tremendous service that these individuals have given to the community as a whole and to the officials involved in their particular jobs during Hurricane Betsy. — *Nicholas J. Chetta, M.D., Coroner, Parish of Orleans, La.*

## NOW IS THE TIME

☐ "Now is the Time", in August *QST*, is a very timely article — one that all classes of amateurs should read. Mr. Grenfell, W4GF, certainly deserves a big hand for this fine article. — *Gene Gillespie, W2EAP, Mt. Vernon, N.Y.*

☐ When I first heard about Docket 15928, I was wholly against it, because the FCC was going to take away from us Generals part of the choice

20-meter DX band, and quite a bit of all the other bands.

But I'm afraid I made a big mistake. After reading W4GF's speech, I realize that there is more to it than just giving the FCC something to do! We need this docket brought into effect or we may not have band limits as extensive as we do now.

I strongly urge all hams to read W4GF's speech in the August 1965 issue of *QST* or write to ARRL Headquarters for a copy. — *Mark Plugra, W4SNMM, Watervliet, Michigan.*

## SWL-ING TRAINS OPERATORS

☐ Congrats to Rod Newkirk, W9BRD, for his fine article in the August issue of *QST* re SWLs. No doubt he will be hearing from both sides of the fence — pro and con — with fervor!

If we had more "listeners" in our ham ranks we would have a lot less QRM on the bands. But that takes patience — an attribute so sorely lacking in the "CQ-DX'er" with his long and frequent calls while the DX is right there trying to get through; in the inconsiderate soul who decides his automatic keyer needs a long check-out on the air; in the kw. boys with their next-door QSOs on the low ends of the bands where the DX stations like to operate; in the dial twister who seems to relish VFOing across the band; in the unthinking one who loads up unendingly on top of a QSO in progress. These are the ones — you may be sure — who never came up through the SWL ranks.

As a former SWL I am truly grateful for the education derived from that hobby. It did not take very long to spot the good operator from the bad one. DX hunting taught me patience and the habit of listening hours on end for the rare ones. The study of propagation tables proved invaluable. Familiarity with prefixes came with practice as did adeptness with the operation of my receiving equipment. Working the many contests and seeking out the data on DX-peditions added much to my knowledge of amateur radio and careful consideration to QSL practices and procedure proved invaluable.

I became familiar, too, with the general attitude of hams towards the SWL. I still retain many comments received from amateurs, varied in nature from appreciation to downright insults. The latter I shrugged off. The former I will never forget; they spurred me on to my license.

Rod has emphasized so splendidly many facets of the SWL hobby. I hope sincerely that he has opened the eyes of the disdainers to the realization that SWLing is an excellent undergraduate course to better hamming. Let's encourage rather than deride these potential amateurs. — *Sam Knox, WB2MRA, Margate City, N.J.*

☐ Bravo for W9BRD on his fine comments about SWLs. Fact is, if it hadn't been for shortwave listening I would never have become a ham. And

when I finally land my General ticket, I'm going to spend at least half my time in the shack monitoring the s.w.b.c. bands. Hearing exotic music, drama and propaganda is, I must admit, X times more fun than many a QSO. And, yes, SWLs are the greatest prospective ham material. Three cheers for listener Tyndall of Vt. who bagged all those — what? — 151 countries on the standard broadcast band! I'd sure like to know how he did it — *Rick Nelson, W9PMSL, Ottumwa, Iowa.*

### KEY KWIVERS

☛ W6ISQ's "Key Kwivers and Pencil Pulses", in September *QST*, was the best article of John's that I have read. In regard to my personal experiences, it was also the most realistic I have read! I felt the same way after my first QSO as a Novice. — *Bob Pace, W6VNB, Los Angeles, California.*

☛ Three cheers for John G. Troster, W6ISQ, on his humorous story, "Key Kwivers and Pencil Pulses", in September *QST*. I felt the same way on my first contact as he described in his clever story. I am looking forward to more of Troster's great stories. — *Paul P. Cook, W7YCSK, Seattle, Washington.*

### RYYRY . . . FB, K8DKC!

☛ I realize that the contents of our good magazine must depend to a great extent on the material submitted to you and also on the percentage of membership interested in a certain mode of operation or field of endeavor. Even with these considerations, in the past I have been disappointed with the amount of information on RTTY both in *QST* and more especially the Handbook.

Then came the very excellent articles by K8DKC and associates, of interest to the beginner and then the old timer as they continued in logical sequence. It gives the newcomer to this mode more information than we could possibly mimeograph and get in his hands. The more-advanced articles will certainly improve operation in those stations that have been on RTTY for some time.

This is one field where the amateur must know something about his equipment, must build and maintain it, and have a program of continual experimentation and improvement. It is hoped that these excellent articles can either be included in their entirety in the Handbook or under separate cover.

Very best congratulations to K8DKC and to *QST*. — *E. H. White, Sr., W4TQD, Glasgow, Kentucky.*

(Editor's Note: W1AW now transmits bulletins on RTTY. See "Operating News" for schedules.)

### LICENSING OVERSEAS

☛ In the September issue of *QST*, under "IARU News", you had an article on Japanese licensing. I think that this is a very highly interesting article; I have talked to many others who have often wanted to know something about the licensing of other countries. I wonder if there could be more such articles in *QST* in the future. — *Barry Minton, K7BII, Cottage Grove, Oregon.*

(Editor's Note: Yes indeed, more are coming in "IARU News.")

### THE CONVERSATIONAL ART

☛ Re W6JQC's editorial in July *QST* and W2JKH's letter in the same issue: (Amen). — *Francis K. Williams, W12UFI, Adams Center, N.Y.*

☛ Thanks very much for your guest editorial in the July issue, by W6JQC.

Thousands of us wanted to write, but W6JQC said it all for us and in a superior way.

It states everything that thousands of us feel is the "state of the art." In effect, let's not clobber the frequencies for QSLs, awards, points; let's try to make intelligent conversation, to advance the state of the art scientifically, to assist newcomers and to make friends. — *Bob Leach, W6KKG, Lomita, California.*

☛ I have been on the air for nearly two years and I find that nothing is more interesting than a good, solid ragchew with a ham in a nearby state. But alas, I am resorting more and more to the Novice bands for that ragchew, even if I have to crank my bug speed down to 7½ w.p.m.

As far as I'm concerned the Novices make better rag-chewers, they are all anxious to converse with me, I find delight in talking with them, and they always QSL promptly, without a request.

I have tried to carry on ragchewing with the Generals, but 90% of the time I get a "FB OM 73." — *Scott Wilkerson, K3FKU, Wheaton, Maryland.*

### T'AIN'T NECESSARILY SO . . .

☛ Have been reading with amusement the comments re the term "ham." Let me tell you how it really started.

Back in the early days of amateur radio when most DX was carried on by U. S. and British amateurs, a couple of Englishmen got together with the idea of finding out what it was all about. One of them, Henry, built up a rig and tried to make contact with the outer world. His friend, George, was there for the big event. George had never heard a signal or tapped out a message before. In fact, he had only heard about radio from his friend.

They sent out call after call and finally, lo and behold, there was their call coming back to them. We've all experienced that never-to-be-forgotten thrill of hearing our call on the air for the first time, so we know how they felt.

"Blimy 'enry," said George, "That's Hamateur Radio."

Naturally "Hamateur" was shortened to Ham and has remained so ever since. — *Al Mumby, W6MCP, Rochester, N. Y.*

(Editor's Note: Was you there, Sharley-er-AI?)

☛ Thanks to Paul Godley for his comments about the origin of "ham." My memory is not as long as his, but *QST* documents his memory; see page 26, October 1926. No one questioned it in the correspondence section of *QST* after its publication. Clint DeSoto, in "200 Meters and Down," did not use the word "ham" in any instance.

These stories about the origin of "ham" sound more like baloney. Yes, we are stuck with it; however, in the true meaning of the term, there are more "hams" today than ever before in amateur radio, even some with electronic bugs. — *Walter Bradley Martin, W3QV, Abington, Pa.*

### THANKS, GANG

☛ I would like to thank all the hams who took part in the "Mayday" operations which concerned my NYL and me on our ketch the *Seaway* off the coast of Baja California, Mexico, several months ago. (See page 75, *QST* for July).

Time will never dull the feeling of encouragement you all gave us during those hours while out there in the Pacific, especially from you XYLs to Relna. Wish we could thank you all personally.

I have been told that numerous letters and cards were mailed to our former address in Pomona, California, but were returned to the senders. If any of you wish to remail we would be very glad to hear from you. — *Oscar Wickstrom, W6SGW, Box 996, Wilmington, California.*

### UNBALANCED AND UNFRIENDLY?

☐ Recently you asked for comments on contests. I think the answers you are seeking are contained in items one and five of the Amateur's Code, published on page six of the current *Radio Amateur's Handbook*. If contests could be conducted without participants being *un-balanced* and *un-friendly*, I would be in favor of them. I do think that in addition to the above they should accomplish some clear-cut useful purpose, and be restricted to a few hours.

If the contests are designed to demonstrate one amateur's superiority over another, multiple-transmitter, multiple-operator stations should not be eligible. What is amateur about a semi-commercial operation of that type? — *H. A. Gilbertson, W5FJZ, Midwest City, Oklahoma.*

### VOTES OF CONFIDENCE

☐ A few days ago I mailed in my five dollars to renew my membership in the ARRL. In my one year on the air the organization has been a prime source of the enjoyment I've gotten from ham radio; probably I never would have gotten my ticket without the ARRL publications. The contests and all of your other activities were a great help. — *Michael Schwartzman, WB2PTS, N. Massapequa, N. Y.*

☐ Please note my complete approval of ARRL policies. Voluntary compliance with the League program (page 10, *QST* for June 1963) would vastly reduce QRM and make amateur radio much more pleasant for all of us. — *James Marler, Jr., WA4PIT, Moundville, Ala.*

### YOU GUYS OUT THERE

☐ It pleased me that the August editorial was published. Unfortunately, most such messages never reach those who need them.

I could go on about "member responsibility," the excellent service rendered by headquarters, and on and on; but, where in the world is there a more democratic organization "of, by and for the amateur"?

Perhaps we should all be reminded to read, often, the material on page 8 which describes the aims and organization of the League. — *Robert W. Gervenack, W6FEN, Monroe, Washington.*

☐ . . . I got the old typewriter out to congratulate you on the editorial in August *QST*. It really hit the nail on the head. I would also like to compliment K3JYZ, W6SAI, WN4ZFT, W4CTS and W1BY for their honest-to-goodness thinking, so well expressed. I lived through the time when amateur wireless was relegated in one fell swoop to the "useless" territory of 200 meters and down because there was no amateur organization big enough to stand up and make itself heard. Because of the incentive licensing program of some years ago I now possess an Extra Class ticket.

My advice to all those who are doing the "hollering" these days is to join the League and elect directors to their liking. Then they can put their money where their mouths are! After all, the policies of the League are formulated by directors elected by the rank and file members, and who act in response to the wishes of the members. — *Ralph N. Chase, K6LX, Yucaipa, California.*

### TIME FOR A CHANGE?

☐ The June '64 issue of *QST* contained a suggestion by W1FH that the current DXCC be terminated and that we start over fresh.

At the time that W1FH made his suggestion, I had no strong feelings on the subject. However, during the past year my DXCC total has increased to a level where I have a reasonable expectancy of some day reaching the 300-country mark — and, perhaps, even the magic Honor Roll. To terminate the present DXCC would be like pulling the rug out from under me. I would like to have the same opportunity of reaching the top as did those who started chasing DX many years earlier.

On the other hand, my DXCC total is now sufficiently high that new countries come few and far between; the excitement associated with working a new one occurs less and less frequently. I believe that this situation, at least in part, is what motivated W1FH to make his suggestion.

What is the solution to this dilemma?

Firstly, do not abandon the present DXCC. Old-timers, newcomers and those between should all have the same opportunity to work 300 countries, to make the Honor Roll, or to reach any other DXCC goal they wish.

Secondly, institute a separate listing (with appropriate awards) based upon the number of countries worked during a specific time interval (for examples, one year, five years or ten years). Something similar to the competition sponsored by the Long Island DX Association for 1965 might be suitable.

I believe that this two-pronged approach of a perpetual DXCC and a periodic time-limited competition is required to solve this problem which apparently exists today. — *S. C. Shallon, K6CYG, Los Angeles, California.*

☐ May I suggest a new type of award? To each of the current operating awards (WAC, DXCC, WAS, etc.) add a distinctive suffix to denote *Home Brew*. The same rules would apply except that, in addition, two of the three major station components (transmitter, receiver, antenna) on each end of the contact must be home built. . . . Why not put a bit of challenge in these awards? — *Walter W. Powell, W5WLD, Houston, Texas.*



**California**—The Oakland Radio Club, Inc. will hold its Old Timers Nite on November 5 at the Oakland Red Cross Headquarters, 2111 East 14th St., Oakland. Please enter from the rear parking lot. The meeting will start at 8:15 P.M.

**Kansas**—The Stateline Amateur Radio Club Picnic will be held at Municipal Hall, Anthony, Kansas on November 14. Covered dish dinner at noon. Bring your own table service. For information, write WA0HHH.



# Hints and Kinks

For the Experimenters



## TRANSIENT PROTECTION FOR POWER SUPPLIES

DAMAGING transients are often set up in a power supply when the a.c. power fails momentarily. A circuit that offers automatic transient protection is shown in Fig. 1. When switch  $S_1$  is closed, the a.c. current passes through a 25-ohm resistor, reducing the voltage at the primary of the power transformer. After about 30 milliseconds relay  $K_1$  will close, shorting out the resistor, and the power supply operates normally. This delay in  $K_1$  is partly due to the time it takes for the normal mechanical action of closing to take place, and partly because the voltage drop across  $R_1$  makes the relay action a little sluggish.

When a power supply with a high capacitance filter is turned on, the charging surge is often many amperes, which may result in damage to the turn-on switch unless it is rated for the surge current. The circuit in Fig. 1 will also help this problem because the turn-on surge is reduced; a switch with a lower current rating may be used safely. — William Watson, K7JHA.

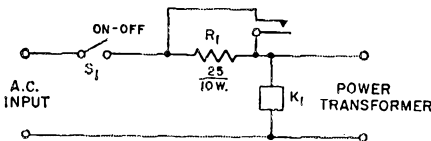


Fig. 1—K7JHA's circuit for transient protection.

$K_1$ —Power relay, s.p.s.t. contacts (Potter & Brumfield MR3A suitable for up to 10 amp.).

$R_1$ —25-ohm, 10-watt w.w. resistor.

$S_1$ —S.p.s.t. toggle switch.

## USING THE QST RX BRIDGE

THE simple RX bridge described by W8CGD (*QST* for June 1965) is an excellent unit for amateurs. Measurements on 1 percent resistors and series resistor-capacitor combinations indicate that the accuracy is very nearly as good as some instruments costing over a thousand dollars.

The article seems to imply that a Smith Chart is required in interpreting the results. Unless impedance measurements made at the transmitter end of the feeders are to be converted to antenna impedance, the Smith Chart does not seem to be necessary. At my station an electrical half wave of coax at the lowest frequency to be used was connected between the antenna and shack and measurements were taken at the input end that are within 5 percent of those taken at

the antenna. A pad of quadrille-ruled paper simplifies layout out the vectors. If a 1 percent 50-ohm resistor is used for the series  $R_1$ , one can immediately lay off the  $E_r$  line of five divisions (assuming the voltmeter reads 5 volts for  $E_r$ ). This method does not even require a ruler — just a pair of compasses.

If a separate v.f.o. is available, the output will usually be sufficient to provide the few volts required for the bridge. A word of caution is in order here: If the v.f.o. is of the oscillator-multiplier breed, the harmonic energy may be high enough to upset measurements made with the bridge. In this case a bandpass filter or high-Q tank connected to the v.f.o. output is required. Fortunately, my v.f.o. utilizes a roller coil as the band-setting device, so it was possible to put the oscillator on the frequency of measurement without multiplying. If attenuated transmitter output is used as in the article, harmonics should not be a problem.

The RX meter has paid for itself at my station. The feed line for my quarter-wave vertical antenna had an s.w.r. of about 2:1, which was considered about normal with a 52-ohm line, since the books say the impedance of this antenna should be about 32 ohms. However, the tuning of my transmitter seemed to indicate a higher impedance. This was found to be the case, as the RX meter indicated 85 ohms resistive. The difference with theory was attributed to ground resistance, since only one ground rod was in use. No time was lost in rushing down to buy a couple of ground rods. The first additional rod dropped the impedance to 55 ohms, and a second provided an additional 5-ohm drop. — W. S. Skeen, K6YRQ.

## WWV ON THE DRAKE 2B

OWNERS of the Drake 2B may receive WWV on 15 Mc. by placing the band switch to 40, the preselector to 10, and tuning to 7 Mc. WWV on 5 Mc. may be copied by placing the band switch on 80, preselector on 10, and tuning to 4090 kc. on the dial. In both cases you are receiving images, by detuning the preselector to degrade the receiver's image rejection. — Craig A. Will, W6GFZ

## CABLE LACING CORD

DENTAL floss makes an ideal substitute for lacing cord and is available in most drug-stores in several sizes, the most useful being approximately  $\frac{1}{16}$  inch in width. However, the smaller sizes are useful with miniature cable.

— Kenneth G. Kopp, W1A4HA

## TURN-TO-TALK MICROPHONE

Most economical microphones available do not have any provision for push-to-talk switching—you either purchase a more expensive microphone with appropriate switching or devise some method of adding a switch. In the author's case, a satisfactory solution was to change the single-conductor microphone output cable to a three-conductor shielded line and mount a miniature mercury switch inside the microphone case.

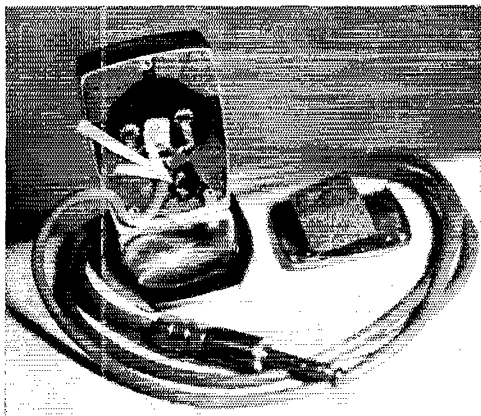


Fig. 2—The mercury switch is mounted at the bottom of the case, as indicated by the arrow.

The mercury switch is mounted so that when the microphone is picked up and tilted, the switch closes. Epoxy glue can be used to secure the mercury switch in place or, as in Fig. 2, a new microphone element and switch were mounted in an old case, using sponge rubber to hold everything in place. The author used a 1.5-amp, 30-volt mercury switch that is  $\frac{3}{4}$  inch long by  $\frac{3}{16}$  inch diameter (Burstein-Applebee No. 17A994). — *Leo J. Mallas, W7NLU*

## ADAPTING CRYSTALS FOR FT-243 HOLDERS

CRYSTALS with  $\frac{1}{2}$ -inch pin spacing and 0.05 inch pin diameter can easily be adapted for use with FT-243 holders ( $\frac{1}{2}$ -inch spacing and 0.093-inch diameter) by soldering sleeves made from the pins of old glass octal tubes over the crystal's pins. Knock the glass off the old tube. Clean out all the glass and wires from the base. Then, using a  $\frac{1}{8}$ -inch drill bit, drill the pins loose so that they are easily pried off. File off the burrs. Sandpaper the crystal's pins thoroughly. Heat the octal pin and melt plenty of solder inside. While the solder is molten, quickly insert the crystal pin into the sleeve and immediately remove the iron. Any excess solder on the outside of the sleeve can be filed off. Don't try to tin the crystal pin with solder before insertion, as this might damage the crystal. — *Arifur Rehman, AP2AR*

## PROTECTING RELAYS

Dust and dirt will make relay operation intermittent. After cleaning a relay's contacts, cover the unit with Saran Wrap to keep dirt out. — *Richard Mollentine*

## VXO WITH THE 20A

Ed Tilton's VXO (*QST* for July 1963) works well with the Central Electronics 10A, 10B and 20A. Crystals around 12.5 Mc. are used on 80 meters, 16 Mc. on 40, 23 Mc. on 20 meters, and 17 Mc. on 10. Connection is made to either the transmitter crystal socket or v.f.o. input, using the coupling method described in the VXO article. — *Lee V. Mincmoyer, W3PQK*

## SOLDERING-IRON HOLDER

AN inexpensive soldering-iron holder can be easily constructed with a few parts from the junk box. I used a  $12 \times 1\frac{3}{4}$ -inch piece of Masonite to which I attached an aluminum bracket to support the tip of the iron. The bracket was filed in a V shape at the top so the iron would always seek the bracket's center. Two Fahnstock clips were then fastened back-to-back at the opposite end of the Masonite, the exact position depending on the iron to be used. Placing the clips back-to-back allows the iron to be positioned so it rests on top of the clips when in use and, by applying a little pressure to the iron's handle, it can be locked in place to prevent accidents during other bench operations or for storage. — *Robert Anderson, K1TVF*

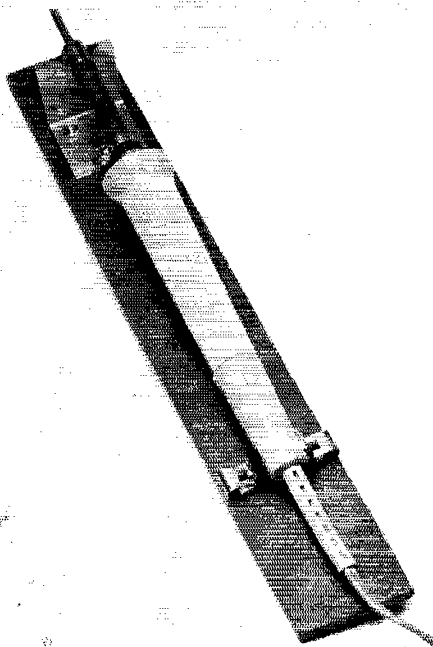


Fig. 3—K1TVF's soldering-iron holder.

# AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,\* WINJIM

## Our Support of Races

Amateur radio involvement in civil defense goes back a long way. All the way, in fact, to a study of civil defense measures made in 1948 known as the "Hoppley Report." ARRL involvement goes back just as far, for the League's general manager and communications manager participated in the committee which drew up this report. As a result, in it amateur radio was mentioned as one of the principal communications media.

What many people do not seem today to realize is the extent, since those early beginnings, of the League's participation in and support of plans for use of amateurs and amateur radio for civil defense communications. This was started in 1950 and was heralded by a strong editorial in December, 1950, *QST*, on the subject—an editorial which still makes good reading today as a philosophical guide to our attitude toward civil defense.

Today, there is a tendency on the part of some to criticize the League for not having given whole-hearted support to the RACES program, and to blame the League for the present uncertainty regarding the status of this amateur radio-civil defense structure. Most of those who make these allegations do not wish to be convinced that they are mistaken. However, for the benefit of those who are open minded about it, let's look at the record.

In 1951, while FCC was mulling over regulations for the new amateur service, *QST* ran eight feature articles on civil defense subjects. The subject was treated twice in *Operating News* and six times in "With the AREC," and was

featured on the front cover of the May issue. In December of that year, ARRL sent its communications manager and NEC to the civil defense staff college for two-weeks, the first week to attend a communications conference and the second week to attend a special course on civil defense communications—or maybe it was the other way around. It was during the conference that we put the pressure on FCC to bring out the new RACES regulations, and out they came the week afterward.

Since then, RACES and/or civil defense has been the subject of feature (i.e., "up front") *QST* articles 51 times, has been treated in *Operating News* lead 27 times, and has been a subject in 140 different installments of "With the AREC" and its successor, this column. Starting in 1955 a special subheading for "RACES News" was included under "With the AREC," and RACES items received preferential treatment therein even while similar AREC items were held over.

The League sent participants to nearly every c.d. communications conference to which we were invited. This included active participation in the amateur-originated and amateur-run United States Civil Defense Amateur Radio Alliance (USCDARA). At every one of these many meetings, no matter where held, the ARRL was represented. In addition, the League sent representatives to civil defense communications meetings in Detroit, Mich., and Olney, Md. (1952); in Boston, Cleveland, Chicago, Harrisburg (Pa.) and Washington, D. C., in 1953; in Columbus and Baltimore in 1954; and so on, through the years, including several trips to New York, Battle Creek, Region 3 headquarters in Thomasville, Ga., Region 1 headquarters in Harvard, Mass., and, more recently, conferences of the

United States Civil Defense Council in Washington, Colo. Springs and Las Vegas.

\* National Emergency Coordinator.



Members of the Hastings, Nebr., Amateur Radio Club are ready for any emergency. The photo shows the members of the board of directors and their c.d. van which can be used at a moment's notice. Pictured (l. to r.) are W0LJO, WA0DLR, WA0CHN, K0FJT, WA0IBB, K0MRH and K0OPC. (Photo by Hastings, Nebr., *Daily Tribune*).



This is not even to mention regular contact, both by telephone and in person, with FCC and OCD officials regarding c.d. and RACES matters, at least once a month and often more frequently than this. During the last two or three years, ARRL has been an active participant in the National Industry Advisory Council on emergency communications, and the League's general manager is chairman of the Amateur Radio Committee.

We haven't even mentioned, above, the hundreds of references to RACES and c.d. in texts of articles and columns in *QST* and in bulletins, or intra-staff deliberations on this subject, or the voluminous correspondence conducted on it.

If a "whipping boy" is sought for the apparent failure of RACES to become the principal vehicle of amateur radio emergency communication, look elsewhere than in the direction of ARRL for it. Your League has done more to encourage and enhance and implement this government-sponsored phase of amateur radio than has the government itself — not just sporadically but continuously, the same people accumulating experience as the years rolled by.

We're not bragging, just documenting our defense against an unjust charge. Despite our best efforts, RACES has not been the unqualified success that was hoped for when it was so optimistically and enthusiastically initiated in 1952. The reasons for and the solutions to the dilemma are probably manifold and complex. They include such things as attitudes, apathy, personalities, leadership deficiencies — and local politics account for some of the limitations. But lack of support and explanation in *QST* and League bulletins is not the responsible factor. Look at the record.

Just between us amateurs, we think more credence ought to be given to setting up of amateur public service functions by amateurs in an amateur organization with the support of but not by direction of the government. We have a specific organization in mind. It's called the Amateur Radio Public Service Corps and it is already in existence and operation. — *WINJ M*

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From down south, deploring and lampooning some c.w. traffic-handling practices, comes "The Roar of the Mud Turtle," to wit:

"They ain't no doubt, break-in's about the handiest thing since the invention of the ham sandwich. Only thing I can think of would save more wasted effort would be a law against callin' CQ DX. Unfortunately, they is some aspects of break-in that's about to give me apoplexy.

"One is the guy which proudly tells ya QSK an then drops into a short fade in some part of the message. You hit the key — he keeps on sendin'. You hit it again — he keeps on sendin'. By this time, you done missed so much of the message, you practically gotta ask him to send the whole thing again. Life would be simpler if this kind

would keep you in the dark about the up-to-dateness of his gear an' operatin' ability.

"Another maddenin' case is the guy who ain't gonna waste no time lissenin' to you send stuff he doesn't know what it means. Let him miss a letter an BLAM! he's in there breakin' you. It don't make no difference that what we woulda copied was "R OSEVELT." He breaks you when he misses that first O. Even if it was gonna be a hard name like, mebbe, "CZIERNUWICZ," he ain't willin' to copy as much as he can an then try again when you repeat it. He breaks you after that first Z. Put me together with one of these apes, throw in a little QRN and in about two minutes, if I had a radio matter-transmitter like in them science fiction novels, I'd give him a fat lip." — *W4DVT* in *NCN Bulletin*.

### Diary of the AREC

During the earthquake in El Salvador, YS1MS provided one of the few links with the outside world, relaying emergency messages and handling incoming health and welfare traffic for as long as 20 meters would stay open. This was done daily for some time. — *K4JGU*.

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On the afternoon of May 8, a rash of tornado activity struck various portions of Eastern and Central Nebraska. Hardest hit was the town of Primrose, where four persons were killed and most of the buildings were demolished. At 1730 CST, the Nebr. AREC Net was called into session by SEC W0HYD with W0DLM as NCS. For the next two hours, amateurs throughout the state called in sightings and reports of the many tornadoes in the area, and this information was immediately relayed to the Lincoln and Omaha weather stations by amateurs in these cities. Welfare traffic poured into the state until the middle of the afternoon on May 9.

Nance Co. EC K0BEZA, along with K0HCV and K0WPG from the Fullerton Radio Club, had soon set up a generator and a fixed station at the Primrose disaster area and they operated through the night and part of the next day handling the bulk of emergency traffic in and out of the area. All power and telephone lines had been destroyed. They were joined by W0s TFW FIG, WN0LW1, K0BJA and WA0BYV. K0HPT operated at the underground c.d. station in Lincoln, handling traffic directed to c.d. officials. A total of ninety amateurs participated. — *W0HYD, SEC Nebr.*

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Just after the copy for the September issue had been submitted, we received a rather extensive and detailed supplementary report on the flood in Sanderson, Texas, from K5ODH.

The blind transmission made by K5HCQ (see Sept. 1965 *QST*, p. 80) was heard by W5RTF and WA5LGH, who was aeronautical mobile. When news of the disaster reached Midland, Texas, K5ROB, communications chairman for the Red Cross, activated W5KGS in an attempt to contact Sanderson. Amateurs from Midland went to Sanderson to establish communications with W5KGS, the first of whom was WA5FDL. When he arrived in Sanderson, WA5FDL set up a station adjacent to the sheriff's office. The second to respond was W5VOH. He and his wife hooked up their camping trailer, picked up a Red Cross Field Director who had flown in from San Antonio, and headed for Sanderson. An emergency Red Cross Headquarters was established in the Sanderson County Grade School, and W5VOH set up his station there. Unknown to W5VOH, until his arrival, W5LQV had set up a station inside the school, and was handling emergency traffic on the 75-meter NCEF. The third outfit to be dispatched from Midland was a bus outfitted with a transceiver, manned by WA5IKT, W5BSM and WA5IRT. This group arrived in the early morning of June 12, and set up a stand-by station for W5VOH.

Band conditions were becoming spotty on the evening of June 11, and mobile units in Sanderson were having difficulty maintaining contact with W5KGS. K5ODH went on

the air and acted as assistant NCS, relaying messages between stations that couldn't copy each other, and generally maintaining order on the net. High line noise disrupted communication between WA5FDL and K5ODH on June 12, so W5VOH and W5KGS had to carry the main flow of traffic on 40 meters.

By Sunday evening, sufficient telephone service had been restored to Sanderson, and the amateurs packed up and headed for home. — *K5ODH*.



W5BSM (at the mike) and WA5IKT are shown here, operating from the van they used in Sanderson, Texas during the flood in June (see Diary for details).

We have two reports of amateur activity in Kansas during floods in June.

Flooding in Sedgwick Co., Kansas, damaged commercial communications links, and amateurs had to provide the necessary emergency communications. K0YWT/mobile checked into the Kansas Weather Net and asked for mobile and emergency communications. K0CKP came from Wichita to provide a 75-meter link, and K0s WAX HAO PHJ EMB ATL YIH BJF LHF, W0s KOL EFZ and MPJ also came to help.

The McPherson Amateur Radio Club had to cancel its Field Day plans in favor of participating in an actual emergency. K0s GQO ZGA UAX EKN FVJ JWY YWT, W0s BBO OSY and W40s GNC AGF operated mobile during a flood that weekend, providing emergency communications for the civil defense directors of the three counties involved. — *K0BXP, SEC Kans*.

After a successful Field Day, members of the Hellgate Amateur Radio Club in Missoula, Mont., were tearing down their station, when W7PX/7, operated by K7LZF, came across an emergency call from W0UID/7, who was driving south from Browning, Mont., and had come onto a car and trailer that had tipped over and was blocking the highway. The nearest telephone was nearly five miles from W7PX's location, and a member of the club was dispatched immediately to notify the highway patrol. Within a matter of minutes, a patrol car and wrecker were on the way to the scene of the accident. — *K7LZF*.

While operating mule-back mobile with a pack train on the North Fork of the Buffalo River in Wyoming, K7MHA put out an emergency call for help on July 8. The group was in need of a helicopter to take some injured boys to a hospital. W7YB, operated by K7RAU, answered the call, and made a long distance phone call to the boys' ranch headquarters near Jackson, Wyo. The ranch dispatched a helicopter from Yellowstone National Park, and W7YB relayed this information to K7MHA. Effective communications were breaking down at this point due to severe thunderstorm activity, making it impossible for K7MHA to copy. W7NPV, who was copying both stations, broke in and relayed the necessary information. Additional instructions were given to K7MHA, and one welfare message was relayed to one of the boys in the train. The helicopter

picked up the boys and delivered them to the hospital in just over four hours from the time the emergency call was made. — *W7TYN, SCM Mont*.

The community of Edgerton, Mo., was struck by a flash flood when Greve Creek, a normally placid stream, turned into a raging river on July 19. Edgerton had already been drenched by 9 or 10 inches of rain. K0UOE was the only means of communication to areas outside the community for the next two days, since the flood had completely destroyed all commercial means of communication. — *W0PFL, VHF PAM Mo*.

On July 28, WA8LSO, K8JQP and WA8ASW/8 were in contact when W8JOR/mobile broke in to report a serious accident on the Ohio Turnpike near Port Clinton, Ohio. WA8ASW placed a long distance telephone call to the Ohio State Police, who promptly dispatched the needed assistance. The entire group remained in contact with W8JOR until the police arrived. — *K8GOU, SEC Mich*.

On Aug. 2, W0VEA called in on the Nebr. AREC 75-meter frequency requesting assistance in locating the relatives of a North Platte, Kans., man who had been injured in a home explosion and was in critical condition. He was answered, but since there were no Colorado stations to be found on 75 at the time, WA0HSK and WA0JZL went to 20 meters where they contacted Colorado stations and brought them to 75. After four hours of searching, the missing relatives were located and informed of the accident. — *W0HYD, SEC Nebr*.

When the possibility of a tornado developed in Northwestern Ohio on Apr. 25, K8s DHF KKK and YWF alerted themselves and stood by for three hours against the possibility that their assistance might be required in providing emergency communications. — *W8BUL, EC Seneca Co., Ohio*.

Forty-three SEC reports were received for July, representing 17,653 AREC members. This is five more SEC reports than last year, but shows a drop in AREC membership by about 300 members. Let's all support the AREC! Those sections heard from this month are: N.N.J., Tenn., N.C., Ind., Iowa, Nebr., Los A., Miss., Alta., Mont., Sask., E. Pa., B.C., La., W.N.Y., Del., Ga., S.F., E. Bay, Hawaii, E. Mass., W. Pa., Ariz., W. Fla., Kans., Wyo., Wisc., Maine, Mich., Ala., Wash., Nev., Ohio, Utah, Mo., Ont., N. Mex., Ark., S. Tex., Va., Colo., S. Dak., Okla.

## RACES News

On Apr. 21, the Ledyard, Conn., RACES unit was alerted by the c.d. director to furnish emergency communication for a search for a lost child in Ledyard. Since all members of RACES were also AREC members, the Norwich Area AREC Net frequency was used. RO KIMRL acted as net control from the child's home, establishing an operational mobile net within 30 minutes of the alert. K1s LMS SRF and ZKY operated mobile, and W1AIP checked in later. Units of the state police, sailors from the submarine base at Groton, Conn., local police and fire departments also participated in the search. K1SRF was the first one to find the child, safe and unharmed, and notified the rest of the searchers. K1MRL notified the state police, who dispatched a car to pick up the child and take him home. — *K1SRF*.



On Aug. 24, an early morning fire in East Brunswick, N.J., blanketed the northwest portion of the city with fumes. The RACES net was activated at 0155 with two operators manning the control center and six mobile units patrolling a 6-square-mile area during the evacuation of over 3,000 residents. The mobile units relieved police cars and reported fume concentrations, directed people to shelters and prohibited people from returning to areas not cleared for re-entry, and reported areas cleared of fumes. The operation lasted for about four hours, with W2s VPL NTS, W4s MAZ NQX, W6s LXI CGE KQ and K2EWA participating. — *K2EWA, Communications Officer, East Brunswick, N.J.*

Members of the San Diego County AREC and RACES manned the civil defense mobile communications van at the San Diego County Fair at Del Mar, Calif., from June 25 through July 5. Amateur radio, RACES, civil defense, and emergency communications were explained to the public, with demonstrations of traffic handling. Some 1,300 messages were handled from the fair, and to handle the overload, special schedules were set up with RN6, PAN and TCC stations. — *W6BGP*.

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### National Traffic System

One of the toughest and probably one of the most thankless jobs in the entire ARRL appointment structure is, in our opinion, that of management of an NTS net at Region, Area or TCC level. Still, the turnover on these jobs is not so great as that of other volunteer jobs. Our staff of high-level NTS leaders is devoted, dedicated and enthusiastic. This is nothing new, but it continues to amaze us. What is the reason for it?

We have a feeling that it is the tightness and conciseness of the NTS structure, especially at these levels. An NTS manager knows precisely what he is supposed to do and precisely how he is supposed to do it. There are standard, recommended methods for every function he has, and standard forms and procedures for most of his paper work. And yet, within the structure there is plenty of room for exercise of his own ingenuity, versatility and originality. Our NTS leaders have a history of following recommended procedures except where deviations are absolutely necessary because of circumstances, of adopting temporary expedients only when they have no disruptive influence on the system as a whole, of seeking to return and actually returning to recommended procedures as soon as possible, and of being both vocal and verbal about their disagreement with any NTS principle or practice, major or minor.

But in NTS we don't panic when disagreement arises. We expect it to, we even want it to. We do *not* expect deviation from existing principles, and seldom if ever get this, but we often get disagreement with them and consider such arguments very carefully. Sometimes they result in a change — a change beneficial to the system as a whole. Sometimes, based on a circumstance peculiar to a single net, a proposal for change has to be discarded. Good or bad, proposals, disagreements, arguments are beneficial to NTS. They keep us thinking, open to suggestion, ever aware of changing methods and practices in a rapidly changing world. They keep NTS going on a practical, methodical, modern basis.

Who are these world-beaters who are holding NTS together in such cohesion? Ordinary amateurs, such as you and I, who have taken on a voluntary task a little more exacting than most of us. They start off with Perce Noble, W1BYR, IRN manager, who for many years has been the only "original" NTS manager, having assumed the reins of this Region net in 1949 and go through the procession as follows (NTS-appointment vintage in parentheses): W4ZGQZ (1962); K3M1VO (1964, after W3UE had been in the saddle for 8 years); W1SHJ (1957); K51BZ (1964); WB6BBO (1963); K7JHA (1962); W8CHT (1962); W9QLW (1963); W0LGG (1963); VE3BZB (1960); K7NHL (1965, replacing W0HXB who was vintage 1963); K1WJD (1964); W9DYG (1960); WB6JUH (1963 — and Johnny was formerly TCC-Central director as K4AKP); W3EML (1963); W4ZJY (1963, formerly RN5 manager); W7DZX (1962).

Note that we *seldom* have more than two or three changes per year. Once an active man gets well established in one of these positions, he doesn't want to give it up in a hurry. This is okay with the net members — and with headquarters, too.

Speaking of net members, we should add one qualifying statement to the general applause for our staff of net managers: net personnel, after being broken in, practically run the net by themselves, leaving the net manager to worry about such things as replacements for NCS's and liaison stations, issuance of certificates and the making of reports. The procedure is standard, and someone new reporting in from a lower echelon quickly learns it, if he doesn't know it already. Missing a report is almost unheard of at Region level and above. Sometimes when the date grows late, managers call us on the landline to make sure their reports make the QST deadline.

Yes, it's that kind of a crew! — *W1NJM*.

### August reports:

Net	Ses- sions	Traf- fic	Rate	Aver- age	Represen- tation (%)
1RN	59	176	.321	8.1	86.2
2RN	62	732	.782	11.8	90.9
3RN	62	682	.444	11.0	98.9
4RN	56	915	.173	16.4	97.9
RN5	62	1318	.451	21.2	96.9
RN6	62	1080	.696	17.4	98.2
RN7	31	705	.611	22.7	85.1 <sup>1</sup>
8RN	59	515	.303	8.7	85.9
9RN	31	377	.501	12.2	97.6 <sup>1</sup>
TEN	59	481	.380	8.2	61.6
ECN	28	191	.275	6.8	73.8 <sup>1</sup>
TWN	16	322	.656	20.1	66.3
EAN	31	1809	1.058	58.4	100
CAN	31	1237	.866	39.9	100
PAN	31	1815	1.129	58.5	88.2
Sections <sup>2</sup>	1220	6721		5.5	
TCC Eastern	124 <sup>3</sup>	740			
TCC Central	93 <sup>3</sup>	788			
TCC Pacific	123 <sup>3</sup>	1230			
Totals	1900	22,134			
Records	1973	25,618	1.440	14.8	100

<sup>1</sup> Region net representation based on one or fewer sessions per day.

<sup>2</sup> Section nets reporting (41): AENB AENII AENMI AENP (morn) AENP (eve) AENR AENT (Ala.); NYC1PN NYCLIVIF (N.Y.C.-L.I.); PTTN EPA (Pa.); BUN (Utah); TSN TPN ETPN TN TSSBN (Tenn.); SCN NCN (Calif.); GBN (Ont.-Que.); MDDS (Md.-D.C.-Del.); ILN (Ill.); SCEN (S.C.); NCN NCN (late) THEN NCSBN NCCW (N.C.); OZK (Ark.); OSSBN (Ohio); CN (Conn.); WSBN WSEN (noon) (Wis.); MTN (Man.); WFPN (Pa.); QMIN Wolverine (Mich.); QIN (Ind.); VTNH (Vt.-N.H.); RISPAN (R.I.); MSN (Minn.).

<sup>3</sup> TCC functions not counted as net sessions.

All things considered, August wasn't a bad month. While we didn't break any records, the traffic was high, eight nets maintained 90% or better representation, and two Area nets broke the 1.0 rate figure. By the time you read this, we will be getting clobbered by long skip, and net managers who find they are having trouble conducting net sessions, especially the late sessions, might consider using 160 as a stand-by (we know this point has been beaten to death in the past, but it's worth mentioning again).

W4ZGQZ kudos the NYS representation, and is hopeful for a better showing from NLI. K3M1VO reports a little gain this month. W4SHJ is so busy SCMG that he doesn't have any time for comments. RN5 certificates were issued to WA5EFO and K5VBA. K51BZ comments that this was a good month for RN5, and they will be losing a few stations to school and college shortly. K7JHA is gratified to see the big improvement in RN7 over the past few months. They also have welcomed representation from VE7s who can also help with other sections. W9QLW has issued 9RN certificates to WA9EBT, W9EJV and W4RHZ. W0LGG is hoping that representation from Minn. and Mo. won't fall off when the schools open. K7NHL is working hard getting proper representation from N. Mex., and Wyo., and early Sept. reports show improvements from these sections. W9DYG sez the boys on CAN are now trying for two years of perfect attendance. WB6JUH passes kudos to WA7EBR and WA6WNG for the fine jobs they have been doing on PAN.

*Transcontinental Corps:* W3EML reports that compared with last August, this month has been pretty good for traffic, but the percentage of successful skeds has fallen slightly. W5PPE turns in his last report as TCC Dir. W4ZJY will resume the post on Oct. 1. W7DZX comments that he is getting the SET schedule set up for the Pacific Area.

### August reports:

Area	Func- tions	% Suc- cessful	Traf- fic	Out-of-Net Traffic
Eastern	124	83.9	2050	740
Central	93	80.6	1559	788
Pacific	123	86.1	2460	1230
Summary	240	86.8	6069	1758

(Continued on page 166)



K7VSG keeps things orderly, as she has two girls sign the guest log.

## K7GS At The

1965

## Girl Scout

## Roundup

BY CATHERINE B. ROCHLITZER\* W7OBH

THE 1965 Senior Girl Scout Roundup, from July 17 to 26, saw 9000 Girl Scouts and 2000 staff encamped at the wartime Navy training base among the pines and mountains at the south end of Pend Oreille Lake, Idaho. It was efficiently organized. The amateurs were invited to take part and did so most effectively.

Erwin H. Schuler, W7BFI, (president of Spokane Radio Amateurs), was named Director of Amateur Communications. John Schuler, K7ISV, generously loaned his camper to be used as one of the stations, in the Rendezvous Area, the center of activities, for the duration. The Washington Water Power Company loaned and set up poles for the antennas. They also trenched the hard, stony ground to bury the power cables as required. W7BFI and K7ISV, with Lee Nelson, K7PJJ, Catherine Rochlitzer, W7OBH, and Al Urness, spent a day putting the stations into operation.



Outside the camper, Scouts pile up for a chance at the rig.

The "Camper" station in the Rendezvous Area was visited by many Girl Scouts, and some 750 signed their names, cities and phone numbers. Whenever K7GS reached a ham in the home town of a Scout, her parents were called and told she was well and having a good time. Meanwhile, the operation of ham radio was briefly explained and its possibilities for public service were actively demonstrated to the girls.

The truck had 3 stations set up, but because the antennas had to be mounted one above the other, only one could be on the air at a time. The equipment was loaned by Northwest Elec-

\* Secretary, Spokane Radio Amateur, Terminal Annex Box 2723, Spokane, Washington, 99220

*Both willingness to serve and suitable opportunity are involved in the success of a radio club's public service activities. When the chance to present amateur radio to 10,000 of tomorrow's distaff leaders at the national Girl Scout Roundup came to the Spokane (Washington) Radio Amateurs, the club made the most of it, as the above story relates.*

tronics of Spokane, IICJ Electronics, the Spokane Radio Amateur Club, and the Collins Radio Company. Another setup was located in the old Navy brig—with the bars still in place!

The call K7GS was issued by the FCC for the Roundup. There were 547 contacts made. QSL cards were sent whenever requested. There were 248 messages handled and 41 states, 14 countries and two maritime mobiles were contacted. Recognition must also be given to the many hams who helped pass the traffic. The combined operating time of the stations averaged 12 hours a day and totalled 108 hours.

The Ralph Faranos loaned their cabin at Twin Lakes, Idaho, for the use of the visiting hams during the Roundup. These operators usually



One station was located in the old Navy brig. Temporary "prisoners" are W7GGV and W7BFI.



The other station was set up in K7ISV's camper. Here two Scouts learn the magic of amateur radio under the eye of W7TWQ.

spent the evenings sending out the balance of the traffic and writing out the QSL cards.

It was a great opportunity for the amateurs to show the public that they are ready to render public service. It was thanks to the splendid cooperation of the officials of the Girl Scout Roundup, the business firms, the Director W7BFI and the faithfulness of the hams in operating the many hours that such a favorable picture was presented of our hobby. Amateurs known to have participated include: W7BFI, W7GGV, WA7BDD, WA7CBX, W7GQA, W7GUQ, K7ISV, K7MFS, W7OBH, K7OUV, K7PJJ, K7PVG, K7PVF, K7RAM, W7TWQ, K7VVQ, K7VSG, WA2UHW, K7AGI, K7LKU, K8EAF and W7YRX.

EST



## Strays

Hams in the St. Louis area, do you know a fellow radio amateur who you think is deserving of the Amateur of the Year Award? If you do, nominate him for the award which will be presented at the St. Louis Amateur Radio Club third annual Amateur of the Year Award Meeting that will be held in St. Louis, November 19, at the CD Control Center, Route 340, Chesterfield, Missouri, at 8:00 P.M. Mail your nomination letters to Ernest Roehm, 619 County Hills Dr., St. Louis, Mo. 63119. All hams in the St. Louis area are invited to the meeting and to participate in the nominations.

W2VC sent us this photograph and suggested the caption, "first ham in space?" The photograph is of project Mercury's chimpanzee astronaut "Ham", who preceded the manned flights into space. Also in the picture is another ham, Air Force pilot and veterinarian R. J. Brown, W0EXD, who is shown administering a physical.



# 1965 FIELD DAY RESULTS

COMPILED BY ELLEN WHITE,\* WIYYM

**F**IELD DAY 1965, June 26-27, was a success judged by any criteria. Though no new record (if you use a numerical basis as *your* yardstick) the 1460 logs, 3400 stations and 14,200 participants represent untold hours of work and fun — an unequalled opportunity to acquire an education in the art of field operation of emergency powered equipment. This issue, we're pleased to record the results a month earlier than in recent years. Space this month is tight and the scores will have to do the talking, but a word to the wise — in almost every case the increased use of sideband made the winning difference in a transmitter class.

Brief or no, an FD report is incomplete without some brief comment on the antics of Murphy, i.e.:

"An hour and a half lost pulling porcupine quills from the dog's nose." — *K6JIM/6*, "The year of the 17-year locusts." — *W18MQE/8*, "I sprained my back getting out of the car to change the antenna coil." — *K2GKK/2*, "Raided by a policeman claiming we were disturbing the peace (and we were a mile and a half from the nearest house)." — *W1AIPY/1*, "Mouse in the c.w. shack caused quite a commotion." — *W8OFG/8*, "After making very careful mobile preparations, we drove to the top of a local mountain and promptly ran out of gas." — *W3ZSR/3*, "We were badly undermanned due to coronaries, compound fractures and a wedding on June 26th." — *W2OP/2*, "Our FD coordinator and 40 c.w. captain were stranded 90 miles away when their car broke down." — *W3GSA/2*, "Thousands of moths at night and S-9 ignition noise from the genny." — *W4REM/2*.

*Vive la Field Day!*

\* Asst. Communications Mgr., ARRL

## SCORES

Class A stations are clubs and groups in the field with more than 2 operators. Scores are tabulated according to the number of transmitters operated simultaneously at each station. The figures and letters following each call indicate the number of valid contacts, the power inputs used, the number of participants at each station and the final score. The "power classification" used in computing the score is indicated by the letters A, B or C after the number of QSOs shown. A indicates power up to and including 30 watts (multiplier of 3); B indicates power over 30, up to and including 150 watts (multiplier of 2); C indicates over 150 watts (multiplier of 1).

### One Transmitter

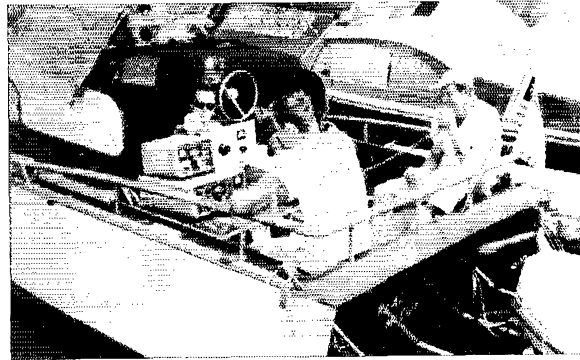
WA2MNO/2	Brookside RC.....	766-	A-6-	6795
W8NCF/8	Fusco RC.....	726-	AB-6-	5862
W6VZT/6	Santa Clara County RACES GROUP....	595-	A-4-	5580
K0UKN/0	(nonclub group)....	860-	H-5-	5310
W46UZA/6	(nonclub group)....	584-	AB-3-	5256
W3BOQ/3	Hopkins ARC.....	515-	A-7-	4860
W3YLJ/3	Greater Gum Tree Stump Volunteer Bucket Brigade and Wireless Assn.....	537-	A-	4833
WB2HJC/2	Chelsea ARC.....	534-	A-4-	4806
W7OTV/7	Tulatin Valley ARC.....	872-	AB-13-	4776
W1PWE/1	Newington AR League.....	750-	AB-12-	4764
W7LRA/7	Utah ARC.....	735-	AB-30-	4590
W4LUP/4	Beaches AR Soc.....	688-	AB-12-	4287
K9KGA/9	Wauwatosa ARC.....	685-	B-7-	4140
W0DEP/0	(nonclub group)....	427-	A-3-	4077
K6LKD/6	Escudido Goodwill & Joy Boys (nonclub group)....	452-	A-4-	4068
WA4MIV/4	Crescent Bay Emergency Net.....	444-	A-3-	3998
K8LDA/6	Peble Healers.....	412-	A-12-	3951
K2ISF/2	RA of Greater Syracuse (c.w. group)....	614-	AB-4-	3849
W2WN/2	Key Klub Klan.....	419-	AB-6-	3834
WA2UKA/2	Hudson Wireless Assn.....	405-	A-3-	3645
K2CW/3	Pleasant County ARC.....	583-	B-4-	3498
VE1JY/1	Laval RC.....	359-	A-7-	3456
WA2JHE/VF2	County Wide ARC.....	390-	A-3-	3420
W481W/8	Candlewood ARC.....	545-	H-10-	3420
W1VB/1	Chippewa ARC ("B" Group).....	418-	AB-16-	3384
W8YPT/8	Delta County ARC.....	345-	A-27-	3330
W0GCB/0	RA of Greater Syracuse (phone group)....	339-	A-7-	3276
W2AF/2	Orden ARC.....	546-	B-5-	3276
W7VSS/7	Newton AR Assn.....	432-	AB-10-	3234
W0NWY/0	The Hell Mountain Boys.....	341-	A-10-	3219
WA2REM/2	Mt. Home AFB MARS station.....	330-	A-	3105
K7FBL/7	Maul ARC.....	1006-	C-6-	3018
KH6RS/KH6	(nonclub group)....	478-	B-10-	3018
K2GUW/2	Mae West Ham Club.....	335-	A-4-	3015
K0KAQ/0	Cransford R Assn.....	501-	B-3-	3006
W1VXL/1	Avation RC.....	473-	B-4-	2988
W8TFZ/8	(nonclub group)....	442-	AB-21-	2979
K4CHE/6	Montreal Field Day Assn.....	405-	AB-3-	2964
VE2WE/2	Mesa RA.....	497-	AB-5-	2958
W7IZ/7	Shy-Wy RC.....	487-	B-15-	2922
K7AYF/7	Stoux Falls ARC (phone group)....	477-	B-15-	2922
W0LWY/0	Sarasota AR Assn.....	486-	B-18-	2916
W4IE/4	(nonclub group)....	459-	AB-16-	2907
W9RHV/9		484-	B-3-	2904

KH6WO/KH6, the Honolulu Amateur Radio Club, found the climate fine in class 6-A, a total of 1738 exchanges for almost 11-K. The food was great too thanks to club president KH6GG superintending the Teryaki Steak.

QST for

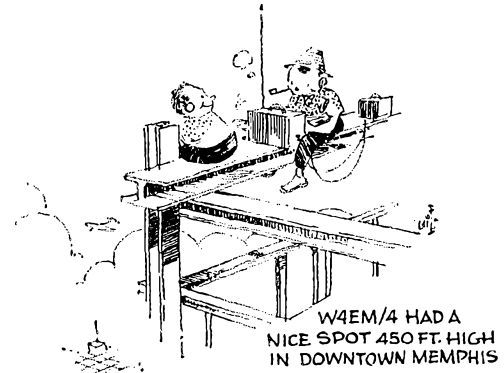


The Chester Creek River Rats, WIICP/1, operated 1-A aboard the "Real McCoy" with the aid of W1s CUT FXK ICP and YNP. A real fun time reported by all while adding up 342 QSOs.



K4YTZ/4	Rock Hill ARC.....	456-	B- 5-	2886
W7ED/7	Galatia ARC.....	413-	AB-14-	2877
W9NGI/9	Society of Radio Op- erators.....	430-	AB-26-	2859
K8LEK/8	Columbus Grove Key Clickers ARC.....	472-	B- 8-	2832
W5UOZ/5	(nonclub group).....	463-	B- 5-	2778
K3PLI/3	Delmarva ARC.....	436-	AB- 6-	2778
W8VY/8	Kalamazoo ARC.....	283-	A-15-	2772
W5BKU/5	Richardson ARC.....	431-	B-10-	2736
K7ERR/7	Bountiful ARC.....	446-	AB-13-	2724
K4BSI/5	Delta RC.....	452-	B- 6-	2712
KH6HV/KH6	Florida Mobile ARC.....	427-	B-12-	2712
W5WVD/5	North Arkansas ARC.....	452-	B-19-	2712
K9AZV/0	Kirkwood High School ARC.....	415-	H- 9-	2640
W1VPU/1	Shelton Emergency R Assn.....	395-	AR-12-	2607
W8EQ/8	Lima Area ARC.....	408-	B-15-	2598
K3BSY/3	(nonclub group).....	287-	A- 5-	2583
W7FO/7	Butte ARC.....	400-	H-14-	2550
K4NSI/4	(nonclub group).....	425-	B- 3-	2550
K7QMF/7	(nonclub group).....	275-	AB- 5-	2529
W0LIT/9	Tri-State AR Soc.....	415-	B-15-	2496
W4RM/4	Mid-South AR Assn.....	407-	AB- 7-	2490
W9ZP/9	GFARC.....	249-	A- 9-	2466
K4JY/4	Alken ARC.....	384-	B-12-	2454
W5NCE/5	(nonclub group).....	352-	AR- 9-	2442
K9YJC/9	(Gibson ARC.....	377-	H-10-	2412
KH6ETG/KH6	Mobile Sideband Club			
W4MBX/8	Hillsdale ARC.....	376-	H- 6-	2406
W1CB/1	Burlington ARC.....	399-	AB- 5-	2397
W7TQC/7	Anaconda ARC.....	241-	A-18-	2394
W0PFN/0	(nonclub group).....	306-	AB- 8-	2382
W4STR/4	Black Jack AR Klub.....	367-	H- 6-	2352
W0BC/0	(nonclub group).....	366-	H- 6-	2346
W7TACS/7	B Soc. Unit of B. C.....	365-	H- 6-	2340
W2ZJ/2	Elmira AR Assn.....	360-	AB- 4-	2316
W2TIO/2	Brantling Hill RC.....	257-	A-22-	2313
W8RTR/8	Canton ARC.....	358-	B- 8-	2298
K8EPV/8	Brass Pounders ARC.....	347-	B-15-	2292
K1ZZI/1	(nonclub group).....	367-	A-10-	2223
W7YABT/7	(nonclub group).....	369-	AB- 1-	2217
W0MXW/0	Hochester ARC.....	221-	A- 6-	2214
W6BOTK/6	Santa Clara H. S. RC.....	360-	B-10-	2160
W4BBBB/8	Derby Wireless Assn.....	214-	A- 3-	2151
W4SFB/8	(nonclub group).....	239-	A- 7-	2151
W3NNL/3	(nonclub group).....	366-	H- 9-	2146
W0ZWY/0	Sioux Falls ARC.....	236-	A- 3-	2124
W2UJS/2	Greene ARC.....	352-	B-18-	2112
W6PNY/6	Calaveras RACES Group.....	321-	H- 8-	2076
W49CG/9	Southport ARC.....	229-	A- 1-	2061
WIICP/1	(nonclub group).....	342-	B- 6-	2052
W2UC/4	Pensacola ARC.....	342-	B- 4-	2052
W2QY/2	(nonclub group).....	314-	B- 8-	2034
W0AGK/0	Oregon Trail ARC.....	292-	AK- 4-	2013
K4JLA/4	Spartanburg ARC.....	308-	H- 4-	1998
W0SG/9	River Park ARC.....	306-	H- 9-	1998
K0SOQ/0	Hastings ARC.....	433-	H- 1-	1998
K2IOE/2	Oswego County AR Assn.....	303-	AB-11-	1995
W0DDN/0	Tri-State ARC.....	326-	B-14-	1956
W7AC/7	Williamette Valley DX Assn.....	648-	C-18-	1944
W4AGJ/4	Hillsborough AR Soc.....	323-	B- 1-	1938
W8AX/8	Thumb ARC.....	271-	AB-17-	1938
W4SABN/5	(nonclub group).....	294-	B-10-	1914
K9USN/9	Navy MARS Ill. Forest Park Task Group.....	316-	B- 3-	1896
W3EAN/3	Revelde Bant.....	302-	AB-10-	1878
K3FBL/3	Mason County RC.....	618-	C- 4-	1854
K8DXF/8	(nonclub group).....	206-	A- 3-	1854
W0SV/0	St. Cloud RC.....	280-	H-10-	1830
W4PL/4	Chatanooga Old Tim- ers R Soc.....	178-	A- 9-	1822
W49FAM/0	Waterville ARC.....	279-	H- 6-	1824
W2AKAE/2	(nonclub group).....	301-	B- 5-	1806
K8CPV/0	South West Iowa AR Assn.....	172-	A- 3-	1773
K0IOG/4	(nonclub group).....	294-	H- 4-	1764
W0LO/0	Red River Valley ARG.....	476-	B- 7-	1746
W7IDA/7	Bonner County ARC.....	548-	AG- 7-	1746
W4CYA/7	Basin ARC.....	290-	H-12-	1740
K0YCO/0	Coon Valley ARC.....	260-	B- 7-	1710
W0UUS/6	Convalr ARC.....	285-	H- 7-	1710
K1RCI/1	CQ RC.....	248-	AB-12-	1677
W4WGB/4	(nonclub group).....	340-	AB- 6-	1655
W5CVU/5	Huguenot H. S. ARC.....	268-	AB- 3-	1611
W4PRI/4	Lake AR Assn.....	152-	A- 5-	1593
W4YK/4	(Central Vermont ARC.....	148-	A-10-	1557
K1YVZ/1	Athens RC.....	233-	H-12-	1548
K8FBV/8	(nonclub group).....	257-	H- 6-	1542
W6KJ/6	IMA RC.....	202-	AB-10-	1497
W4AUF/0	North Jersey DX Chas- ing, Marching and AR Benevolent Soc.....	210-	AB- 3-	1425
W80AVT/2	Baltimore Polytechnic Institute RC.....	217-	AB- 1-	1425
W3CDI/3	Flathead Valley ARC.....	157-	A- 5-	1413
K7LYY/7	Mt. St. Michael RC.....	234-	AB- 7-	1407
W42PXB/2	Valley Council of H. S. RCs.....	131-	A- 6-	1404
K7UFT/7		232-	B- 4-	1392
		198-	AB-12-	1383

W8CWO/8	Jefferson County AR Emergency Corps.....	226-	B- 1-	1356
W7WMS/7	Rodeo City RC.....	117-	A-11-	1332
W4SVI/4	Everglades ARC.....	216-	AB- 8-	1299
VE1YT/1	Shearwater ARC.....	214-	B- 4-	1284
W66QB/6	Central Alberta R League.....	183-	B- 7-	1248
K0JGI/0	Ottumwa ARC.....	205-	B-12-	1230
K2BWK/2	Squaw Island ARC.....	147-	AB-15-	1221
K9RUI/9	Lombard ARC.....	302-	B- 4-	1218
W6HTK/5	Bald ARC.....	380-	C-15-	1215
K00YAI/0	Mid-Missouri ARC.....	192-	AB- 4-	1194
W9AIQ/9	Dood County ARC.....	197-	AR- 1-	1191
W6KII/6	Dunsmuir ARC.....	397-	C- 6-	1191
W4AKOG/5	VHF Club of Memphis. Tenn.....	135-	AB-15-	1191



W4EM/4 HAD A  
NICE SPOT 450 FT. HIGH  
IN DOWNTOWN MEMPHIS

W9JCL/9	Nenah-Menasha RC.....	197-	B- 6-	1182
W44TDV/4	Larko ARC.....	196-	H- 9-	1176
W4IAPY/1	(nonclub group).....	194-	H- 4-	1164
K0JNS/0	Falls City ARC.....	360-	C- 9-	1155
K0GNH/0	Steele RC.....	192-	B- 6-	1152
W49JFM/9	Jefferson County ARC.....	190-	H- 9-	1140
K3WQQ/3	Abington H. S. RC.....	184-	H- 5-	1104
K2DNN/2	Chemung County ARC.....	94-	A-20-	1071
W7AQ/7	Yakima ARC.....	176-	B- 3-	1056
W8ZEP/8	(nonclub group).....	116-	A- 3-	1044
W0RCH/0	Pioneer RC.....	140-	AB-10-	933
W48KFB/8	Hocky Fork Emergency Net.....	110-	A-10-	930
W35ANH/3	Upper Darty H. S. ARC.....	105-	A- 5-	945
W7YB/7	Montana State Univ. ARC.....	152-	B- 4-	912
K2OID/2	(nonclub group).....	100-	A- 4-	900
W49ISL/9	Minnetonka H. S. ARC.....	141-	H- 5-	846
K4CSH/4	CQ RC.....	137-	H- 6-	822
VE2CDC/2	Kentuckian RC.....	65-	A-10-	810
W2FSL/2	Sans Fillister ARC.....	135-	B- 1-	810
W4MRC/4	The Renegades.....	128-	H- 3-	768
W8VVB/8	Hialeah ARC.....	141-	AB- 8-	764
W4RZVA/8	(nonclub group).....	89-	A- 4-	737
W5ABF/5	(nonclub group).....	92-	A- 4-	734
W9BKC/9	Mineral Wells ARC.....	97-	H- 9-	732
K5IVB/5	Arrows RC.....	109-	AR- 7-	714
K1TLL/1	6 Meter Club of Dallas (nonclub group).....	110-	H-15-	660
W8TAL/7	Terrace AR Assn.....	110-	H- 4-	660
W8RZVA/8	(nonclub group).....	82-	H- 6-	642
W8RZVA/8	(nonclub group).....	77-	B- 3-	612
VE7ES/7	The Dil Club.....	210-	C- 3-	610
W8TSE/8	Totem ARC.....	76-	H- 4-	606
W4ATC/4	(nonclub group).....	97-	A- 3-	585
W8TSE/8	North Carolina State Univ. ARC.....	97-	H- 6-	582
W8TSE/8	Shelter Island H. S. ARC.....	96-	H- 3-	576
W8TSE/8	(nonclub group).....	90-	H- 5-	540
VE5DF/5	(nonclub group).....	63-	B- 3-	528
K5HAG/5	Tarrant County 6 Meter Emergency Net.....	58-	A- 5-	522

## Class-A Call-Area Leaders

1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A
W1FWH/1	W1TX/1	W1SEA/1	W1WHF/1	K1MUJ/1	W1MW/1	W1UW/1	—	—	—	*VE3OW/3
*W2MNO/2	W2EUP/2	K2BR/2	W2MBC/2	K2MQW/2	K2AA/2	*W2GSA/2	*W2OYH/2	WB2QBN/2	*W2LL/2	—
W3BOQ/3	W3ATR/3	W3IFE/3	K3SSC/3	W3NC/3	W3SK/3	W3GV/3	—	W3RCN/3	—	13A
W4LUP/4	W44ZON/4	W4KC/4	W4SKH/4	W4CA/4	W4SRX/4	—	K4DPZ/4	K4BFT/4	—	*W4GDP/6
W5UOZ/5	W5YJO/5	W5KHB/5	K5TPY/5	W5DPA/5	W5MS/5	W5SC/5	W5AVT/5	—	—	14A
W6VZT/6	W6IP/6	*W6MSO/6	K6RAG/6	W6TJ/6	KH6WO/KH6	W6PMK/6	W6FA/6	W6MLK/6	W6SD/6	*W2MM/2
W7OTV/7	K7EFA/7	W7DP/7	W7AW/7	W7NCW/7	W7AV/7	W7PNW/7	—	—	W7DL/7	W8KGG/8
W8NCF/8	*W8CEA/8	K8EAM/8	*W8FY/8	W8LCS/8	*W8HLD/8	W8AKAI/8	W8HH/8	—	—	—
K9KGA/9	K9WMM/9	W9BFO/9	W9VZ/9	K9HPV/9	W9SW/9	W9FLP/9	W9LKN/9	*W9FQ/9	—	—
K0UKN/0	W0FTB/0	W0DK/0	K0KKU/0	W0ERA/0	K0LDP/0	W0YV/0	—	—	—	—
VE1JV/1	VE3RAM/3	VE2NE/2	VE3RC/3	VE3NSR/3	VE3DC/3	VE3KCD/3	VE3JJ/3	—	VE3NAR/3	—

\* Over-all class leader

WA9AKU/9	Lawrence Central H. S. ARC.	82-	B-10-	522
VE14AA/4	Winnipeg DX Club	480-	C-6-	505
WA7BUL/7	Woodland ARC.	82-	B-9-	192
K8ZMI/3	Dover Delaware 6 and 2 ARC.	134-	A-6-	477
WA7BSZ/7	(nonclub group)	69-	AB-3-	474
K9FBF/0	Millard ARC.	73-	B-4-	438
K91HM/9	(nonclub group)	47-	A-3-	423
K5STZ/5	Texas Southmost ARC	64-	B-4-	384
WA2YA/2	Pearl River H. S. Eletronics Club.	173-	B-9-	346
WA2FDU/2	Ogdensburg ARC.	40-	AB-5-	246
W8TPW/8	Clarksburg RC.	101-	B-4-	202
W9DKS/8	Bell ARC.	20-	B-10-	138
WA3AZH/3	Wallace for Pres. ARC.	89-	C-3-	89
WNTDIA/7	Wasauk Range RC.	13-	B-4-	78
WA4VAW/4	West Knoxville ARC (VHF Division).	32-	B-	64
WB2MNF/2	Haddonfield Teen Hams Assn.	7-	B-3-	2
W3YC/3	Northeast H. S. R. Transmitting Soc.	3-	A-	27

### Two Transmitters Operated Simultaneously

W3CEA/8	Miami Valley AR Contest Soc.	1723-	AB-16-	12,702
W1TX/1	Connecticut Wireless Assn.	1455-	AB-18-	12,504
W5YJO/5	Caprock AR Soc.	1967-	B-20-	11,802
K0QMH/0	Montrose County ARC	1126-	A-9-	10,134
W0FTB/0	Emporia ARC.	1568-	AB-7-	9,906
W3ATR/3	Beacon RA.	984-	A-12-	9,081
K9WAM/9	(nonclub group)	818-	A-8-	8,262
K5AAD/5	(nonclub group)	1349-	B-8-	8,250
W5DDL/5	Lafayette ARC.	1013-	AB-8-	7,680
WA9LIV/9	Wauhgan V.H.F. Soc.	835-	A-20-	7,515
W5JJA/5	Tombigbee ARC.	1209-	B-9-	7,404
W9AA/9	Hamsters RC.	810-	AC-10-	7,218



"Once upon a time a little boy named Jack foolishly sold a cow for a few beans." Well, at least that's what this photo brought to mind as VE2BOW/2 (Class 1-B with VE2BPH) watches his 40-meter vertical with amazement as a young visitor improves ground conductivity.



WRKSL/8	Edison RA Assn.	701-	AB-14-	5253
W9UDU/9	Macne RACycle Club	848-	B-15-	5238
W6IP/6	Douglas SSC ARC.	838-	AB-14-	5145
WA9MKK/9	Point RA.	814-	AB-15-	5097
K58NH/5	(nonclub group)	832-	B-8-	4992
K5YJC/5	Suburban West ARC.	646-	AB-12-	4713
K3HUO/3	South Community YMCA RC.	756-	B-11-	4686
W8OHN/8	Berea RC and Northern Ohio RA Soc.	749-	B-8-	4644
W8BXO/0	Radio Research Club.	1131-	BC-14-	4635
W9EXE/9	UTRI ARC.	508-	A-11-	4572
W4TAPE/7	Scottdale ARC.	735-	B-15-	4560
K2TCB/2	Northern Irvington ARC.	528-	AB-6-	4533
WA4QCN/4	North Florida AR Soc.	754-	B-30-	4524
W2HO/2	Bolled Owls of New York.	726-	B-8-	4506
W9REG/9	Tipppecanoe AR Assn.	602-	AB-22-	4446
W8AJV/8	West Park Radlops.	663-	AB-20-	4368
WA9DY/9	Hoffman Estates AR Soc.	638-	AB-15-	4266
VE3RAM/3	Ottawa Valley Mobile RC.	641-	B-9-	4134
W5NS/5	Bartlesville ARC.	551-	AR-18-	4122
W2AZV/2	Wartagh RC.	420-	A-20-	4005
K7WAT/7	Nomad ARC.	659-	AB-7-	3981
W1NRG/1	Meriden ARC.	608-	AB-14-	3963
K4QNA/4	Charles E. Newton ARC.	785-	BC-6-	3954
W8MRM/8	Motor City RC.	632-	B-10-	3942
W2DAW/2	Overlook R. Soc.	655-	B-15-	3930
VE2BAW/2	ARC of Sir Geo. Williams Univ.	514-	B-15-	3867
K9BRA/8	Thunder Bay ARC.	534-	AB-	3864
W9YW/9	Rho Foston AR Assn.	477-	AB-10-	3846
VE3WX/3	Georgian Bay Thermos Busters.	482-	AB-3-	3837
W3ZWJ/3	Bedford County AR Soc.	400-	A-18-	3825
W5ABD/5	Westside ARC.	638-	B-14-	3816
W4JNB/4	Mississippi ARC.	631-	B-	3786
W7VPA/7	Richland ARC.	604-	B-15-	3774
W2CWW/2	Staten Island AR Assn.	628-	B-11-	3768
K7AL/7	(nonclub group)	529-	AB-4-	3747
W9KA/9	Chicago R Traffic Assn.	494-	AB-8-	3734
W9OLM/8	(nonclub group)	583-	AB-8-	3732
WA4XD/9	Rockford AR Assn.	586-	B-15-	3678
WB2HLH/2	(nonclub group)	587-	B-4-	3672
W2LZ/2	Walton R Assn.	407-	A-7-	3663



K81EK/8	Port Huron AR Organization	610-	A-11-	3660
W3PSE/3	Keystone ARC	381-	A- 6-	3654
W5PDO/5	Los Alamos ARC	582-	H-12-	3642
K1PQU/1	Western Mass. Collegians	573-	AB- 4-	3504
K4DNB/4	Heart of Georgia ARC	558-	B- 8-	3498
W9QQQ/9	Rockland-Sparta-Toman ARC	523-	AB- 5-	3489
W6KA/6	Paradise ARC	359-	A-16-	3456
K2ALW/2	Lackawanna AR Assn.	577-	B-10-	3420
W1HEB/1	Middlesex ARC	485-	AB-12-	3414
K7SKV/7	Mt. Baker ARC	542-	B-12-	3402
K4KAB/4	(nonclub group)	540-	B- 6-	3390
W2EIC/2	Central Nassau ARC	698-ABC-	8-	3363
VE1HM/1	Annapolis Valley ARC (nonclub group)	642-	B- 8-	3342
W7BK/7	Zion-Benton H. S. ARC	374-	A- 5-	3321
W9ALOT/9	Fort Hood H. S. ARC	682-	BC- 7-	3279
K5WAB/5	Jolinson County RAC	511-	AB-12-	3270
W9ERH/9	Knox RC	445-	AB-11-	3258
W4IXA/4	Cincinnati Buckeye	350-	AB- 5-	3249
W8ECB/8	Wauvers RC	541-	B-15-	3246
K9YBC/9	ARC of McGill Univ.	679-ABC-	7-	3225
VE2UN/2	Nassau AR Assn.	401-	AB-20-	3219
W2FT/2	Vermilion County AR Assn.	510-	B-40-	3210
W9AJL/9	Colva ARC	516-	B-12-	3214
K8EJS/9	Port Arthur ARC	506-	B-11-	3186
W5LQV/5	Rruce Electronics ARC	498-	B- 3-	3138
K6AYB/6	North Augusta-Bevo-dere RC	475-	AB-11-	3123
W4PED/4	Halifax ARC	493-	B-15-	3120
VE1FO/1	Birmingham ARC	516-	B- 6-	3096
K4BSK/4	Travis F.B. ARC	515-	AB- 6-	3093
W8AMI/8	Macon County ARC	515-	B- 6-	3090
W40JKJ/9	Holmes County ARC	439-	AB-12-	3072
W8LQJ/8	Outagamie RC	511-	B-10-	3066
K9IEI/9	Presno ARC	479-	AB-12-	3042
W6TO/6	Accomack Northampton AREC	503-	B- 8-	3018
W4NHLX/4	Carbide ARC	503-	B-12-	3018
K5BHF/5	Hurlington AR Soc.	468-	AB- 5-	2988
W2JUG/2	Nevada County ARC	469-	B- 6-	2964
W6LJW/6	Klamath Basin AR Assn.	460-	AB-20-	2925
K7CBP/7	South Amboy AR Assn	456-	AB-11-	2874
W2SUS/2	Harford County AR Soc.	477-	B- 9-	2862
K3CJT/3	Deconstruction Unlimited RC	431-	H- 4-	2856
W9AIVI/9	(nonclub group)	471-	H- 8-	2826
K5E1F/5	Long City ARC	516-	C-15-	2793
W0BBD/0	Lincoln MARS Club	445-	AB-10-	2775
W0MAO/0	Red Bud ARC	436-	B-12-	2766
K8MIT/8	Atlanta Soc. of Teen R Ops.	460-	H-10-	2760
K4KAZ/4	Greenwood ARC	433-	B-10-	2748
VE1ANL/1	Menomonee Falls RC	352-	AB-14-	2706
K9RIH/9	Coiffe Duncers of Detroit	422-	B-10-	2682
W3AM/8	Chesapeake ARC	369-	AB-12-	2687
W3WTV/3	(nonclub group)	398-	AB- 5-	2652
W6ADR/6	Mid-County Net ARC	294-	A-12-	2648
W2CZZ/2	LA Megacycle Soc.	415-	H-10-	2640
K9CJT/9	Missouri Valley ARC	415-	H- 8-	2640
K9HEB/9	Tube and Shutter Club	416-	BC-10-	2640
W0CVJ/0	Des Moines Tech. H. S. Hams	440-	B- 6-	2640
W0CHZ/0	(nonclub group)	436-	H- 3-	2616
W82GPR/2	Mobile Sixers ARC	410-	BC-12-	2592
W3AWA/3	York North ARC	287-	A-12-	2583
VE3YN/3	Bloomfield ARC	392-	AB-12-	2553
W1CWA/1	Bandhoppers RC	402-	B- 6-	2562
W0RFU/0	Gulf Area YL AR Klub	395-	B- 7-	2520
K5SKF/5	Key Clickers Klub	284-	AB- 4-	2505
W8FFT/2	Massena ARC	404-	AB-12-	2457
K2TRC/2	North Star Hibanders and North Suburban Wireless Assn.	335-	AB-14-	2544
W0EBE/0	Southwest Missouri ARC	381-	B-23-	2436
K1FNU/1	Cronwell AR Soc.	377-	AB- 6-	2412
W3MC/3	Lyridge ARC (nonclub group)	400-	B- 3-	2400
W40AOF/0	Daytona Beach AR Assn.	397-	AB-12-	2385
K4BV/4	Kalspell's Mike Wilson Memorial RC	396-	B- 4-	2376
W9CFB/7	Prairie ARC	386-	AB-22-	2361
W0CIV/0	Fullerton RC	640-	RC-14-	2355
VE3HVC/3	Humber Valley ARC	260-	A-13-	2340
W3ABT/3	Univ. of Penna. ARC	369-	AB- 7-	2328
W9QYQ/9	Hoosier Hills Ham Club	345-	AB-14-	2313
W6DHL/6	Oroville AR Soc.	384-	B- 6-	2304
K9JMA/9	Belleville AR Foundation	254-	A- 4-	2286
K4NXD/4	Jefferson County Emergency Communications Team	298-	AB- 4-	2241

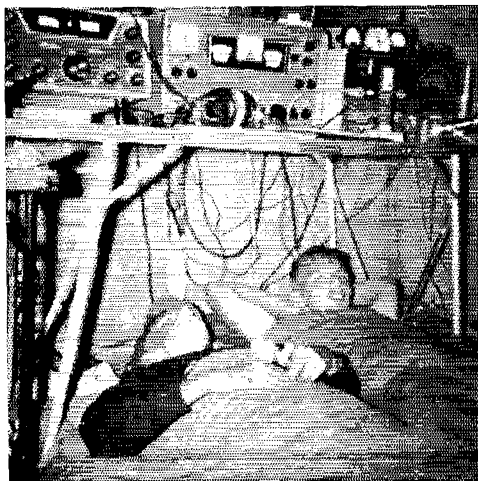
Top to bottom we have K4HUF/1 who says "Many things are proven by FD, even Darwin's Theory." The group operated 3-A atop White Top Mountain, 5534 ft. above sea level near Abingdon, Va. In the center, K7LTD "himself" trimming his way up a natural antenna mast for the Emerald Amateur Radio Society, K7LTD/7 operating 2-A. On the bottom, another 1-A group, the Rodeo City Radio Club, W7WMS/7, approaches the antenna problem in a forthright fashion.





The Suburban West Amateur Radio Club, K5YJG/5 operating 2-A, say this generator should have been fired up before the test. W5VCE to the rescue!

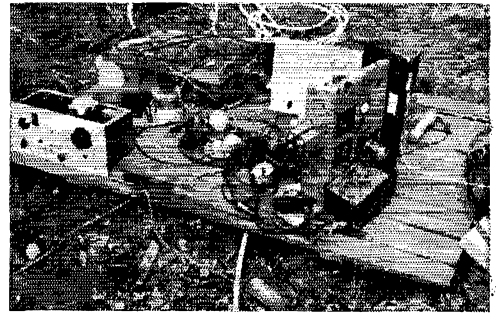
K4GRD/4	Florida AR Transmitting Soc.	747-	C-4	2241
K6JML/6	North Valley ARC	488-	BC-4	2235
W49LNX/9	Central H. S. ARC	217-	A-3	2196
W41BY/4	Pioneer ARC	461-	BC-12	2187
W5ER/5	El Paso ARC	364-	B-10	2184
K6LDU/6	Heathwood AR Club	399-	AC-4	2181
K2BRQ/2	IBM AR Assn.	361-	B-6	2166
W4HEE/9	Arrowhead R.A.	332-	B-11	2142
W2ZQ/2	Delaware Valley R Assn.	238-	B-12	2142
VE3AR/3	ARC of Sarnia	354-	B-12	2124
K7TLD/7	Emerald AR Soc.	347-	B-5	2082
K8DVV/8	(nonclub group)	300-	AB-5	2070
W1OP/1	Providence R. Assn.	318-	B-4	2058
W8KHX/8	Four Flags ARC	227-	A-10	2043
K2HJY/2	Medford Wireless Assn.	264-ABC-	7	2040
W420GW/2	Peckskill Civil Defense	244-	AB-6	2034
K5TPU/5	Curry County ARC	336-	B-5	2016
W6HUM/6	Lord ARC	310-	B-3	2010
K9JML/9	Valley V.H.F. Club	195-	A-13	1998
K1QFX/1	West Hartford ARC	220-	A-5	1980
W3JL/3	Hazleton ARC	239-	AB-6	1965
W1MEP/1	Catamount RC	325-	B-7	1950
VE4BB/4	Winnipeg ARC	206-	B-5	1938
VE4DF/4	Pin Point ARC	204-	B-6	1914
K9ZEV/9	Miami County RC	280-	AB-11	1887
W8RB/8	Buckeye Rag Chewers Club	288-	B-24	1884
W4TUS/4	North Brevard AR Soc.	302-	AB-20	1881



The Kirkwood High ARC, K0AZV/0, went out in 1-A to the tune of 2640 points. Obviously they had confidence!

W4IFR/4	Allegheny Mt. RC	213-	B-6	1878
W4SG/4	Tallahassee ARC	312-	B-8	1872
W9VAR/9	(nonclub group)	384-	BC-4	1872
W8ATH/8	(nonclub group)	207-	AB-11	1866
W4RMY/4	Virginia Highlands ARC	295-	AB-8	1797
W80MW/8	Marion ARC	296-	B-	1776
K0JVN/0	Ornate Order Bloodshot Eyeballs	294-	AB-7	1767
K9RET/2	Aerospace ARC	184-	A-6	1746
W4ATNL/4	Coral Reef ARC	286-	B-7	1734
WB2MJS/2	(nonclub group)	244-	AB-7	1737
W7EVU/7	AR Communication Service	247-	AB-4	1725
W0LHA/0	Northeastern Colorado ARC	287-	B-7	1722
W40KZP/0	Central Iowa ARC	282-	B-10	1722
K9PJX/9	South Milwaukee ARC	282-	AB-13	1713
W44KCD/4	Crescent Hill Baptist Church ARC	293-	B-6	1700
VE5AA/5	Saskatoon ARC	274-	A-10	1644
K25KZ/K75	Canal Zone AR Assn.	366-	BC-5	1629
W6PKR/6	Humboldt ARC	243-	B-6	1608
K8GIV/8	(nonclub group)	228-	AB-3	1602
VE5NN/5	Regina AR Assn.	267-	B-10	1602
K8EWN/8	(nonclub group)	176-	A-7	1584
W46DD/6	Yolo County Civil Defense ARC	191-	AB-9	1584
W9CYX/9	Six 'N Two AR Soc.	256-	B-9	1536
W9ANF/9	Fenwick H. S. RC	182-	AB-6	1524
W40GXL/0	Central Nebraska ARC	253-	B-6	1518
VE7AM/7	Pentleton Civil Defence ARC	226-	B-10	1506
W49MVP/9	Central Indiana VHF/UHF Club	344-	AC-14	1464
K3HDO/3	District Heights RC	213-	AB-7	1464
K5TQC/5	Fayetteville H. S. RC	161-	B-	1449
VE4HA/4	Homebrew ARC	286-ABC-	9	1383
W49JGL/9	(nonclub group)	134-	B-	1377
W7RZ/7	Leitchfield ARC	225-	B-10	1370
W7TD/7	Apple City RC	199-	B-7	1344
W40LOT/0	Independence RAC	222-	B-4	1332
K4CG/4	U. S. Coast Guard ARC	219-	B-6	1314
WB1FZ/8	Richmond Guard	297-ABC-	15	1296
K3WQW/3	Coplay, Pa., Boy Scout Group	143-	A-7	1287
W8CIA/8	Louisville ARC	204-	AB-8	1260
VE7BQJ/7	West Kootenay ARC	206-	B-9	1236
W8BAA/8	Chippewa ARC	178-	B-79	1218
W5UK/5	Group, New Orleans ARC	273-	AC-8	1185
W40KSL/0	Storm Lake ARC	106-	A-9	1179
K9HRU/9	Dewitt County ARC	195-	AB-12	1179
K3HKI/3	St. Mary's AR Assn.	391-	C-4	1173
K7BJL/7	Polk County ARC	159-	AB-4	1149
W5WQP/5	High Sanders (nonclub group)	189-	B-	1134
WB6KSL/6	Lake Shore AR Assn.	153-	AB-3	1131
K3QER/3	(nonclub group)	185-	B-3	1110
K1EVD/1	(nonclub group)	120-	A-5	1080
W8QJN/8	Straths Area RC	306-	BC-12	1074
WB2TQ/2	Amherst ARC	178-	B-8	1068
K9KGG/9	Plattsburgh AR Technical Soc.	171-	B-5	1026
W9ETQ/9	Saint Mary of the Lake RC	113-	AB-6	1008
W8PT/8	Baltimore ARC	142-	BC-25	1002
W7FX/7	166-	B-8	996	
WB2AF/2	Field Day Needle Bend-ers ARC	184-	B-8	984
W4SIFE/5	Wheat Straw ARC	137-	B-6	972
K0PLW/0	(nonclub group)	160-	B-3	960
W8CT/8	Grand Island AR Soc.	158-	BC-17	948
W4SDF/VO1	Hamon ARC	158-	B-6	948
VE5CD/5	Saskatoon Civil Defence RC	133-	B-9	942
W44PDZ/4	Low Country ARC	127-	B-8	912
W40IX/4	Kinston AR Soc.	111-	AB-7	900
WB1A/1	(nonclub group)	148-	B-5	882
K6JHV/6	(nonclub group)	146-	B-5	876
W9NUW/9	Wisconsin Valley R Assn.	228-	RC-8	864
W9HNJ/9	Wabash County ARC	129-	AB-7	843
K2TRS/2	Chemungo Valley Central H. S. RC	118-	AB-7	843
W2RHM/2	Black River Valley ARC	249-	AC-20	837
W43BQA/3	Tipper Dublin ARC	106-	B-4	786
K9AVU/9	(nonclub group)	114-	AB-6	759
W5VFW/5	Halt Titch ARC	314-	AB-5	736
W8PFI/9	M and M RC	116-	B-15	696
W4SEN/4	Johnston County C. D. RC	222-	C-11	686
K8AIGE/8	NLO ARC	139-	AC-5	603
K0ZTC/0	Point Hills ARC	65-	B-5	585
W4HZW/4	Kent County ARC	221-	AB-4	578
K5MJK/5	Amateur Communi-cations Club of North Texas	95-	B-6	570
W45CCU/5	Watonga ARC	38-	A-4	567
K7TA/7	(nonclub group)	50-	B-5	540
VE7AJA/7	Maple Ridge ARC	64-	B-4	534
W17FKQ/K17	Northland ARC	37-	AB-12	516
W4HVG/3	(nonclub group)	78-	AB-3	510
W44TJL/4	(nonclub group)	51-	B-3	456
W49NICB/9	(nonclub group)	47-	AB-6	448
K8EJN/8	Mc Vardon ARC	217-	B-	434
K4VFE/4	Green ARC	199-	B-6	398
WB6A8S/6	(nonclub group)	65-	B-3	390
W44TDW/4	J-H ARC of Fairfax County	190-	B-5	380
W7UAK/7	Shenandoah County ARC	59-	B-5	354
W9ESA/9	Evansston Twp. H. S. RC	51-	B-6	306
W5LWC/5	(nonclub group)	50-	B-4	300
W49FLB/0	Hector Area RC	107-	B-10	264
W46ZMN/6	(nonclub group)	130-	B-	260
W49IOU/0	Blue Valley ARC	44-	BC-6	255

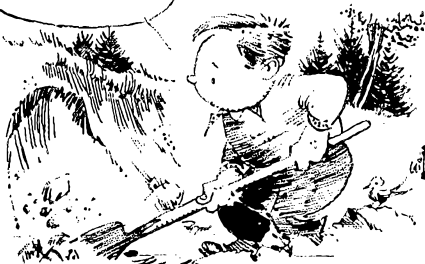
VE2CRG/2	Club Radio Amateur de Granby	13-	AC-15-	225
W90IN/9	Smoky Valley RC	29-	AB- 6-	186
<i>Three Transmitters Operated Simultaneously</i>				
W6MSO. 6	Inglewood ARC	1345-	A-15-12,330	
W0DK/0	Houder ARC	1237-	A-15-11,358	
VE2NE/2	Contest Operators Assn.	1783-	AB- 6-11,190	
VE7ARV/7	Assn. of the Preservation of Key Clicks, Splat-ter and TVI	1211-	A-12-11,160	
W9HS/6	Crescenta Valley RC	1267-	AB- 7-10,584	
W3LIW/3	Germantown RC	1125-	A-8-22-10,434	
K6SDI/6	San Diego DX Club	1290-	AB- 4-10,088	
W9BRD/9	South Eastern Illinois Ham Soc.	1170-	AB-10- 9789	
K2BR/2	Southern Counties AR Assn.	1581-	B-15- 9636	
W4KC/4	Fl. Myers ARC	1007-	A-48- 9288	
W4CVL/4	Louisville's Active R Oprs. (nonclub group)	1438-	B-16- 8628	
K0SLD/0	South East ARC	1412-	B-10- 8622	
K8EMV/8	Seven-Eleven ARC	1388-	B- 7- 8490	
K2ZSR/2	Joliet AR Soc.	1129-	AB-40- 8274	
W3OP/9	Lockport AR Assn.	975-	A-13- 8055	
K2TRN/2	Hurnaby ARC	1272-	AB-15- 8052	
VE7BAR/7	East Whittier RC	1036-	A-8-23- 8025	
W6SJ/6	Mohitana ARC	838-	A-32- 7787	
W9AB/9	Long Island Tri-Banders	995-	AB-15- 7650	
W82BTQ/2	Queen City Emergency Net	1159-	AB-57- 7620	
WRVV/L/8	Blue Ridge R Soc.	839-	A-35- 7551	
W4NYK/4	Blue Ridge R Soc.	1106-	AB-36- 7497	
K3MITK/3	Germantown RC	1223-	B-14- 7488	
W4ABK/4	Kentuckiana RC	920-	AB-17- 7458	
W5KHB/5	Old Natchez ARC	1178-	B-25- 7218	
		907-	AB-16- 7179	



The Maple Ridge Amateur Radio Club VE7AJA/7 operated 2-A and claim that this homebrew 30-watt sideband rig built from a junk box worked very well.

...STRUCK BY LIGHTNING LAST YEAR... RAINED OUT THIS

THE GANG AT VESNN PREPARES TO GO UNDERGROUND IN '66

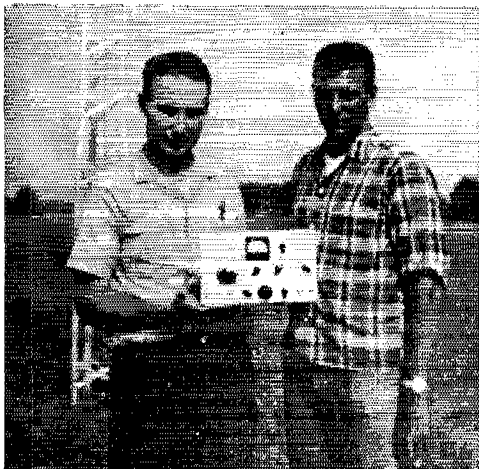


WISEA/1	Open Air Operators Club	1012-	AB-10-	7110
K6CXI/6	Alexander Hamilton Sr. H. S. RC	771-	A-14-	6939
W8VV/8	Keut RC	1102-	AC-	6798
W4TRG/4	Kingsport ARC	1115-	AB-15-	8714
W80FC/8	Sister Lakes Monster Hunting and Field Day Soc. of Mich.	1095-	B-11-	6570
W4NGS/4	Columbus ARC	1048-	B-15-	6450
W491NV/9	RA DOPS ARC	1068-	B-13-	6408
KZSA/KZ5	U. S. Air Force Southern Command MARS Club	1308-	BC-	6408
W5FC/5	Dallas ARC	1029-	B-	6174
W20R/2	Pompton Valley RC	984-	AB-15-	6162
W4AM/4	Prye ARC	1027-	B-20-	6162
W82TTP/2	QRP and Q W.N.Y. Chapter	676-	A- 7-	6084
W8MRN/8	Newark AR Assn.	934-	AB-14-	5894
W9VT/9	Tri-Town RC	929-	AB-25-	5847
K6HAP/6	South Hay Wireless Soc.	757-	AB-10-	5835
W1AQ/1	Associated RA of Southern New England	917-	AB-15-	5793
K9HVK/9	Fall Creek ARC	965-	B-15-	5790
W42PNU/2	Larkfield ARC	822-	AB-22-	5763
W0RC/0	Wichita ARC	933-	B-56-	5748
W9CSF/9	Wichita City ARC (nonclub group)	716-	AB-18-	5730
W4YAL/4	Orleans Co. ARC	607-	A- 6-	5697
W2CVB/2	Nashville ARC	815-	AB-20-	5637
W4KAT/4	Citrus Belt ARC	872-	AB-10-	5598
W6JBT/6	Brookley MARS RC	822-	AB-25-	5559
K4FPC/4	MARS Communicator Club	925-	B-18-	5550
KS4IR/8		825-	AB-25-	5400

WA4NEC logs for WA4KVR as both turn to at the 40 meter position of K4ILW/4, the Bristol Amateur Radio Club. The 4-A group totalled 6642 points, 1082 exchanges.

W0DIN/0	(nonclub group)	865-	B- 9-	5310
K8UZW/8	Parma RC	863-	B-15-	5328
W8AQIP/8	Greater Pontiac V.H.F. Soc.	820-	AB-16-	5319
W8DKU/0	Ter-Ni-Chat ARC	813-	AB-25-	5277
W20FQ/2	Rome RC	639-	AB-21-	5202
W8VA/8	Tri-State AR Assn. (nonclub group)	777-	AB-100-	5139
K4HUP/4	Arlcor Net	850-	AB-12-	5136
W8CPT/8	Ontario DX Assn.	641-	AB-28-	5130
VE301DX/3	Iadc RC	846-	B- 4-	5076
W4NVU/4	Washington AR Soc. (nonclub group)	801-	AB-20-	4962
W82BCV/2	Gloucester County ARC	749-	AB-12-	4944
K4ZCP/4	South Hend ARC	820-	AB- 3-	4941
W42NGI/2	Livingston ARC	548-	A-11-	4914
K9YFG/9	Argenta ARC	318-	A-11-	4905
W2MO/2	General Dynamics, Ft. Worth Recreation Assn.	611-	AB-18-	4818
K1WND/VOI		810-	BC-11-	4749
W58JZ/5	Allison ARC (nonclub group)	766-	B-35-	4758
K9AOM/9	Monterey H. S. ARC	757-	AB- 7-	4716
W0TCC/0	Walla Walla Valley I.A.C.	778-	B-11-	4668
W45MAV/5	Guernsey Co. ARC	787-	B- 7-	4602
W7DP/7	Santa Barbara ARC	705-	AB-14-	4557
W8VP/8	Midwest ARC	728-	B-10-	4518
W6LUC/6	Tidewater Mobile RC	742-	B- 4-	4452
K9ZKN/9	Levittown ARC	714-	B-15-	4434
W4DKP/4	Westchester AR Assn.	695-	AB-25-	4317
W2GLD/2	AR Transmuting Soc.	581-	AB-10-	4257
W2AMX/1	Air Capitol AR Assn.	598-	AB-15-	4176
W4CN/4	Irving ARC	666-	B-14-	4146
W0AMA/0	Anderson RC	630-	AB-18-	4137
W5ACKF/5	INO VHF ARC	644-	B-16-	4026
W4RSK/4	Woodbridge RC	638-	AB-12-	4020
W9BBN/9	(nonclub group)	589-	AB-15-	3993
K20DP/2	Story County RC	591-	ABC-	3972
W6JNX/6	Ottawa RC	643-	A-B- 5-	3936
W0EMA/0	Fishers H. S. ARC	630-	B-14-	3930
K9VHB/9	Jackson County VHF Club	1050-	BC-12-	3921
K9VHF/9	Lere ARC	558-	AB-10-	3888
W8AOL/8	Bloomington ARC	640-	B- 6-	3840
W6LS/6	Valley RC of Eugene	398-	A-13-	3807
W9INL/9	West Branch AR Assn.	607-	AB-30-	3804
W7PXL/7	Loyalist City ARC	606-	B-12-	3786
W35VK/3	Lauderdale Chicago Boys Club AR Assn.	588-	AB-16-	3750
VE1LC/1	Worth Township ARC	620-	B-15-	3720
K9YHB/9	State Line RC	521-	AB-16-	3675
W49PCB/9	Westchester Teenage ARC	643-	ABC-25-	3661
K2LSA/2	Skyride ARC	405-	A-18-	3645
W82XL/2	CRES ARC and Electronics Club	475-	AB- 6-	3642
VE3DRT/3	Chenango Valley AR Assn.	483-	AB-15-	3633
W8JVV/8		527-	AB-20-	3573
W2RME/2		592-	AB-11-	3552

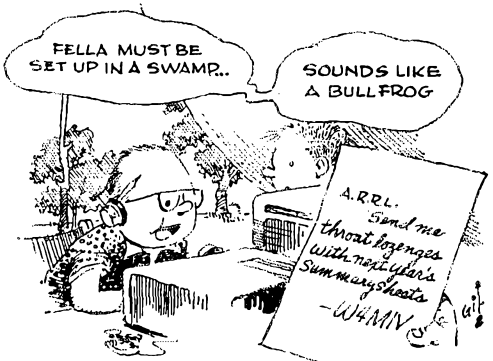




W8IBX (left) operated 2-B with W8MEZ using the W1ICP FD rig to good advantage at the c.w. position.

K5SAM/5	Edmond AR Soc.....	567-	AB-14-	3459
W6GWX/0	Lees Summit RC.....	878-	BC-12-	3456
W6DMM/0	Rat Flink RC.....	549-	B-13-	3444
W3HOX/3	(nonclub group)	569-	B-7-	3414
W3UHN/3	Friendly AR Transmitters Soc.....	543-	B-4-	3408
VE3HB/3	Oakville ARC.....	376-	A-14-	3384
W6BRN/0	Three Rivers ARC.....	536-	B-15-	3366
K25AA/KZ5	MAARS, U. S. Army Forces Southern Command.....	1113-	C-10-	3330
VE3GRN/3	Grey Bruce AR Assn.....	528-	B-8-	3318
K2BPH/3	Auburn AR Assn.....	466-	AB-12-	3303
VE3CYR/3	Cooksville ARC.....	546-	B-8-	3276
W8RAP/8	Setona Valley ARC.....	460-	AB-30-	3201
VE6NQ/6	Calgary AR Assn.....	502-	B-25-	3162
K2YNT/2	Metuchen "V" RC.....	497-	B-12-	3132
W3UQV/3	(nonclub group)	409-	AB-5-	3117
VE2ADK/2	South Shore ARC.....	519-	B-8-	3114
W2IBW/2	Mid-Island RC.....	434-	AB-12-	3081
K4MMB/4	Capital AR Soc.....	546-	BC-12-	3054
W2OGX/2	Westrex Communication Club.....	499-	B-14-	2994
W4AB/4	Broward ARC.....	846-	BC-16-	2958
W6MLX/6	El Dorado County ARC.....	393-	AB-13-	2907
W44YFK/4	Northern Kentucky Soc.....	391-	AB-14-	2901
W0JP/9	Indianapolis RC.....	426-	AB-8-	2892
W1DDD/1	Blackstone Valley ARC.....	578-	ABC-12-	2877
K8TPT/7	Tau Kappa Beta FD Soc.....	409-	AB-5-	2859
W8ABR/8	Michigan Six Meter Club.....	430-	AB-16-	2823
K5SLD/5	Arlington RC.....	582-	BC-18-	2811
W4LEN/4	Triangle ARC.....	435-	AB-15-	2763
K9FKJ/9	Marlinsville ARC.....	373-	AB-14-	2763
W8SWD/8	Milford ARC.....	330-	AB-13-	2745
WBCJN/2	Rampart Regional H. S. RC.....	382-	AB-8-	2730
W1B0D/6	(nonclub group)	418-	AB-3-	2715
W8MWS/8	Orange H. S. ARC.....	405-	AB-9-	2634
W9MHW/9	Cass County RC.....	403-	B-20-	2568
K9HHD/9	Heart Red Cross ARC.....	424-	B-12-	2524
K5OHD/5	Garland ARC.....	407-	AB-18-	2481
K3G00/3	Junata Valley and Junista County ARCS.....	412-	B-8-	2472
K9GLV/9	Shelby County ARC.....	373-	ABC-10-	2451
K2PWK/2	Princeton YMCA Sr. RC.....	311-	AB-15-	2442
W3FXW/3	Etana RC.....	377-	AB-23-	2412
W0JTA/0	Upper Iowa RA Assn.....	374-	B-14-	2394
K9EAM/9	Green Bay Mike and Key Club.....	398-	B-15-	2388
W5MUZ/5	Ouchita Valley ARC.....	396-	B-8-	2352

WA9HDI/9	Random RC.....	360-	AB-8-	2331
K8CJL/8	Lancaster and Fairfield County ARC.....	311-	AB-11-	2292
W86YK/6	Petero RC.....	352-	AB-12-	2283
W4FXU/4	Piedmont ARC.....	356-	B-4-	2286
W86ZC/6	Monterey Park ARC.....	253-	A-11-	2277
WA0ACI/0	(nonclub group)	379-	B-5-	2274
K9UKZ/9	National Trail ARC.....	361-	AB-3-	2232
K9KLD/9	Kishwaukee RC Group One.....	524-	BC-10-	2229
W1EDH/1	Middlesex AR Soc.....	282-	AB-2-	2196
K8TKG/8	Wayne Co. ARC.....	460-	BC-15-	2190
W0BLK/0	Black Hills ARC.....	479-	BC-13-	2184
W0S0C/0	Humboldt, Palo Alto and Kosuth Counties ARRC Group.....	339-	B-12-	2184
K2EC/2	Eastern Suffolk ARC.....	336-	B-10-	2166
W8DSO/8	(nonclub group)	357-	B-20-	2142
VE7IP/7	East Kentonay ARC.....	338-	AB-9-	2136
W40MHG/0	Pilot Knob ARC.....	325-	B-18-	2098
W1AFW/1	Pioneer Valley RC.....	316-	AB-10-	2043
W5ERC/5	Kingsville RC.....	337-	B-5-	2022
VE7FY/7	Royal City AR Assn.....	303-	AB-15-	2019
WA9BWH/9	Notre Dame H. S. RC.....	292-	AB-16-	1980
W8RCO/8	ARC.....	591-	BC-15-	1977
WA6KMG/6	Pismo Beach ARC.....	280-	AB-12-	1902
K4ZKU/4	Virginia Heals ARC.....	282-	AB-10-	1884
WA9IAK/9	La Ha Ge RC.....	209-	A-8-	1881
W0DTE/0	287 Bullshooters.....	282-	B-10-	1842
K8TKA/8	204 RC.....	267-	AB-9-	1800
W83BN/3	Warwick R Emergency Communications Club.....	297-	B-10-	1782
W0AFG/0	Soo RC.....	297-	B-9-	1782
W2DIC/2	Hicksville RC.....	191-	AB-15-	1761
W8CQ/8	Shawwassee AR Assn.....	261-	AB-10-	1752
W3ZRQ/3	stump jumpers, E. Pa. S.C.M. Group.....	239-	AB-12-	1746
W44TFZ/4	Albemarle ARC.....	266-	B-7-	1746
W7GEZ/7	Marionas.....	285-	B-8-	1710
W8DDI/6	(nonclub group)	249-	AB-7-	1701
W4ZA/4	Richmond ARC.....	559-	BC-12-	1699



W9BXR/9	Montgomery County A.R.C.....	255-	AB-	1683
K9ONA/9	Six Meter Club of Chicago.....	182-	AB-17-	1680
W86DFV/6	Poly ARC.....	251-	AB-15-	1650
WA8LWK/8	Grand Lodge H. S. ARC.....	273-	B-5-	1638
K9FEL/9	Porches APB MARS ARC.....	270-	AB-5-	1629
K2VSU/2	Mt. Vernon H. S. RC.....	216-	AB-8-	1617
W44TAT/4	Horse Shoe Bend ARC (nonclub group).....	427-	ABC-15-	1614
W81CS/8	MIC ARC.....	528-	C-5-	1584
W3FZL/3	ARC.....	216-	AB-5-	1549
K8LUC/8	Eyevdale AR Soc.....	444-	AC-10-	1542
W1USS/1	Pittsfield RC.....	286-	BC-11-	1530
VE1CR/1	Sydney ARC.....	194-	AB-7-	1494
W6CBL/6	Northeast Missouri ARC.....	712-	B-12-	1474
W8IAD/8	Sandlar County Wireless Assn.....	245-	B-7-	1470
KL7FFR/KL7	Sitka ARC.....	219-	B-15-	1464
W8CJN/8	Kettering ARC.....	205-	AB-9-	1452
W44SBA/4	(nonclub group)	240-	B-5-	1440
W44TB/4	(nonclub group)	307-	AB-3-	1428
K9CJB/9	PICOBAMS.....	232-	AB-9-	1413
W0FXD/0	St. Charles H. S. ARC.....	232-	B-6-	1407
W9GDW/9	Eau Claire FC.....	463-	C-	1389
W0DDYK/0	Harrisonville AR Klub.....	308-	ABC-10-	1374
W3PN/3	Exploiter Post 401 of Souderton.....	208-	AB-10-	1272
W0OUT/0	Denver RC.....	210-	B-	1260
W8VEN/8	Logan County ARC.....	455-	AB-12-	1239
W5LJV/5	Loyola Univ. ARC.....	203-	B-13-	1218
W5SXA/5	Shawnee ARC.....	220-	BC-15-	1203
W8AKXW/8	North H. S. ARC.....	175-	B-9-	1200
W4JJ/4	Pattana City ARC.....	194-	AB-5-	1200

K3SOM/3 (right) aided by K3FEO in the process of erecting a vertical for their 1-B operation atop Pine Knob with a beautiful view of Uniontown, Pennsylvania.

QST for



W9SOM/9	Society of the Phoenix..	199-	H-7-	1194
K2LXH/2	Lewiston Porter ARC...	188-	AB-20-	1173
WB2SSH/2	Canisteo Valley ARC...	181-	AB-7-	1155
W7JTR/7	North East Washington			
	Sevens..	177-	H-8-	1062
VE7ASC/7	Chilliwack ARC.....	150-	AB-10-	1059
W8MOT/8	East River RC.....	856-	BC-12-	1041
W49KCL/9	Forest View RC.....	140-	AR-10-	1002
K4PBO/8	Mayhams.....	163-	B-	978
K6PDO/6	Klamath Air Force Sta-			
	tion ARC.....	157-	B-6-	942
WB2CRT/2	Ranocosa Valley AR			
	Assn.....	148-	AB-7-	915
K2EB/2	Kessler RC.....	79-	AB-6-	849
K2CD/2	Telephone Employees			
	AR Assn.....	130-	AB-6-	843
W9BOM/9	Kenosha ARC.....	175-	AB-7-	741
W40HRC/0	(nonclub group).....	122-	B-5-	732
W5QEG/5	ARC of Southwest La.	205-	C-16-	615
W49CJN/9	Kishwaukee RC. Group			
	'Two.....	72-	H-20-	582
K3QIO/3	Greater Pittsburgh			
	Telephone & Fraternity	98-	BC-6-	552
	(nonclub group).....	269-	B-	538
VE3HBC/3	Metropolitan Erie VHF			
	Soc.....	243-	H-18-	536
K4AAB/4	(nonclub group).....	95-	BC-4-	465
W2BHW/2	Tu-Boro RC.....	161-	H-9-	372
W9AML/9	Central Illinois RC of			
	Bloomington.....	172-ABC-13-		357
WA4QPL/4	GLERC ARC.....	343-	BC-10-	351
W3PQR/3	Dish-Happy Dash-			
	Hounds.....	307-	C-10-	307

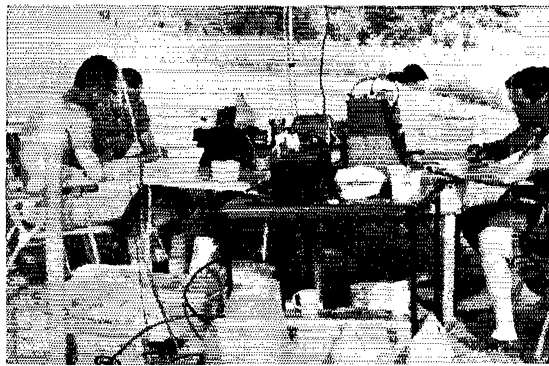


WB2BNE logs for W2LXB at the six-meter post of the South Jersey gang K2AA/2, second highest score in 6A.

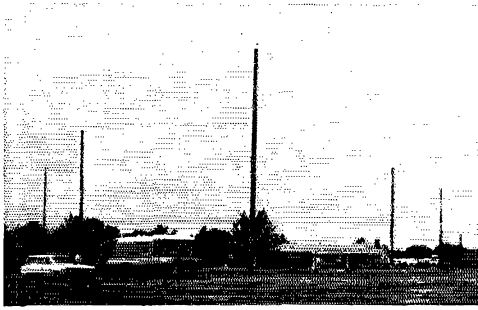
Four Transmitters Operated Simultaneously

W4RY/8	Van Wert ARC.....	1427-	A-25-12-843	
W4SKH/4	Oak Ridge Operator's			
	Club.....	1518-	AB-20-10-638	
K6BAG/6	Pacifico RC.....	1733-	H-10-10-398	
W7AW/7	West Seattle ARC.....	1093-	A-16-10-062	
K3NSC/3	Delmont RC.....	1407-	AB-20- 9849	
W9VZ/9	Fish VHF ARC.....	1364-	AB-15- 8988	
K1BK/1	Conitook Valley RC.....	960-	A-6- 8865	
WA4MBD/4	Blue Grass ARC.....	1319-	AB-22- 8865	
W8MAA/8	Central Michigan ARC	1149-	AB-20- 8040	
W8TO/8	Columbus AR Assn.....	1186-	AB-24- 7899	
W3PPT/3	Reading RC.....	1284-	B-40- 7704	
K5TYP/5	Kessler ARC.....	1168-	AB-20- 7668	
W7IO/7	Arizona ARC.....	1248-	B-17- 7650	
K6HAL/6	North Shores AREC.....	519-	A-8- 7596	
K5VOZ/5	Lawton Pt. Sill ARC.....	1148-	AB-24- 7566	
W601X/6	Palo Alto AR Assn.....	1073-	AB-17- 7080	
W8UD/8	Grand Rapids AR Assn.	1174-	B-40- 7044	
W9LJ/8	Lake County ARC.....	1069-	AB-19- 6771	
K4LW/4	Bristol ARC.....	1082-	B-24- 6642	
W4BER/4	Mike and Key Club of			
	Greenville.....	1055-	B-20- 6480	
W4BFM/4	Decatur ARC.....	1040-	AB-19- 6432	
W7VE/7	AR Assn. of Bremerton	997-	AB-12- 6381	
W4SOLA/8	Arizona RC.....	667-	A-10- 6228	
W8ZO/8	Muskegon Area AR			
	Council.....	1119-	BC-25- 6066	
VE3RC/3	Ottawa ARC.....	985-	B-20- 6060	
W3BC/3	Wm. Penn RC.....	1001-	B-10- 6006	
K5FEZ/5	Air Force MARS, Berg-			
	strom AFB Support			
	Group.....	967-	B-20- 5982	
W6PM1/6	United RAC.....	887-	AB-20- 5886	
W5AW/5	Big Spring ARC.....	929-	H-19- 6724	
VE3UOT/3	Hart House ARC, Univ.			
	of Toronto.....	605-	A-15- 5670	
W2MBC/2	Cherry Hill H. S. ARC.....	657-	AB-12- 5613	
K7OUS/7	Clackamas AR Soc.....	854-	AR-20- 5535	
VE3CBC/3	Canadian Broadcasting			
	Corp. ARC.....	731-ABC-10-	5521	
K3BKC/3	Southern Chester			
	County ARC.....	874-	H-51- 5394	
W5OK/5	Electon Riders ARC	849-	B-40- 5244	
W4DOC/4	Atlanta RC.....	861-	H-50- 5166	
K8SCHL/8	Oh-Ky-In VHF AR Soc.	833-	H-17- 5148	
W1WHP/1	Hamden AR Assn.....	756-	AB-20- 5070	
K9KKU/9	Millie High Highbanders	782-	AB-16- 4965	
W6MCIJ/6	Hellix ARC.....	781-	B-12- 4838	
W2GLQ/2	Nutley AR Soc.....	563-	AB-15- 4743	
W8ODJ/8	Buckeye Shortwave R			
	Assn.....	909-ABC-20-	4716	
W2AJ/2	Union County AR Assn	683-	AB-20- 4560	
W9FBZ/9	U.S. Naval Avionics			
	Facility.....	732-	AB-15- 4551	
W8ACW/8	Goshen County RC.....	577-	AB-40- 4419	
K9HXN/9	Sioux City AR Assn.....	726-	H-20- 4356	
W7B7/7	Lake Washington ARC	655-	AB-30- 4344	
K3RTE/3	Pop Bottle net of			
	'STARS'.....	589-	AB-23- 4278	
K2IYO/2	Saginaw RC.....	707-	H-10- 4242	
K4BEX/4	Lynchburg ARC.....	674-	AB-25- 4194	
W6BXR/6	Davenport ARC.....	672-	H-20- 4032	
K8AXC/8	North East Missouri			
	RC.....	667-	B-12- 4002	
W3EQ/3	Haverford Township			
	Emergency Radio			
	Net.....	637-	H-15- 3972	
WA3DFM/3	Two Rivers ARC.....	660-	B-11- 3960	
WA2OLL/2	Apple Pie Hill ARC....	649-	B-	3894

W9DUK/9	Delaware AR Assn.....	583-	AB-20-	3892
K2JD/2	RARA Band Dis.....	573-	AB-7-	3813
W18YE/1	Newport County RC.....	496-	AB-22-	3810
WA4YWH/4	Honewell ARC.....	609-	B-25-	3804
W0HFP/0	Hamster VHF UHF			
	Club.....	569-	AB-15-	3753
W8MIF/8	Calhoun ARC.....	574-	AB-25-	3708
W4VMT/4	Riserve ARC.....	498-	AB-15-	3654
WA0JBX/0	Weemo ARC.....	582-	B-15-	3642
WB4HT/4	Southern Peninsula AR			
	Klub.....	689-	BC-25-	3621
W2DP/2	Telephone ARC of			
	Manhattan.....	577-	R-19-	3612
W3CWC/3	Antietam R Assn.....	562-	AB-11-	3537
WA6TOW/6	Coastside ARC.....	527-	AB-6-	3399
W1ZST/1	Capeway and Hingham			
	RC.....	503-	AB-17-	3345
W4GG/4	Greensboro RC.....	556-	B-6-	3336
W4AIOE/4	Indiana County ARC	530-	B-	3300
WA2KER/2	Empire AR Soc.....	444-	AB-5-	3297
WA8NTP/8	Davison ARC.....	744-ABC-20-		3225
K3SOO/2	(nonclub group).....	926-ABC-6-		3210
WA9BRE/9	Argonne National Lab			
	RC.....	480-	B-8-	3150
W3QA/3	Friendship ARC.....	528-ABC-10-		3120
WA3DFU/3	Warminster ARC.....	175-	AB-20-	3108
W8BST/8	Lapeer County AR Assn	372-	AB-20-	3066
W4BBB/4	RAC of Knoxville.....	440-	AB-20-	3060
W2QY/2	Niagara RC.....	642-	AC-19-	3054
W8WZB/8	Redford Township ARC	368-	AB-8-	3051
W3CCP/3	ARTC.....	390-	AB-11-	3036
W3VV/3	McKeen County ARC.	605-ABC-14-		3030
K9LXS/9	Elkhart H. S. ARC.....	484-	AB-12-	3006
WA8IMY/8	Morgantown AREC.....	460-	AB-11-	2937
W9AZ/9	Kankakee Area R Soc.	410-	AB-15-	2892
K3CSG/3	Arlington ARC.....	441-	AB-18-	2811
W9CZH/9	Winstow AR Soc.....	457-	AB-	2757
W8TNO/8	Oakland County AR			
	Soc.....	429-	AB-	2691
W8KEA/8	Midland ARC.....	448-	AB-20-	2688
K01R/0	St. Louis ARC.....	373-	AB-12-	2643
W3AID/3	Indiana County ARC.....	430-	B-	2580
WA9HRL/9	ILMO ARC.....	332-	AB-7-	2538
VE1PF/1	St. Croix Valley ARC.....	254-	A-6-	2511
W2ATT/2	New York RC.....	401-	AB-30-	2505
W8OHR/8	Detroit Metropolitan			
	RC.....	273-	A-6-	2457
K0USC/0	Liberal ARC.....	409-	B-8-	2454
W3RVC/3	Allegheny-Kiski AR			
	Assn.....	486-	BC-10-	2445
K8DAC/8	Saginaw Valley AR			
	Assn.....	426-	BC-12-	2424
WITA/1	Nashua Mike Key			
	Club.....	1473-	AC-12-	2369
K9TSM/9	Goshen ARC.....	369-	AB-20-	2367
W3PGA/3	Aero ARC.....	298-	AB-8-	2187
W8ANZ/8	Plymouth ARC.....	351-	B-9-	2256
VE3LON/3	London ARC.....	356-	AB-	2217
K2REY/2	Jersey City RC.....	266-	AB-7-	2193
K7OEH/7	Cross County RC.....	322-	AB-10-	2115



Our vote for the most "typical looking" FD photo goes to the crew at W4ORF/5 operating in 2-A at Baldwin, Miss. Left to right are W4ORF WA4DLR WA4EGB and K4ULT.



The Miami Valley Amateur Radio Contest Society W8CEA/8 took 2-A honors this year, just edging out past champs W1TX/1. The winning crew was located at an abandoned FAA site and operated sideband from the bus and c.w./v.h.f. from the building. The final score was well over 12-K.

K4YIN/4	Explorer AR Soc.	343-	AB-7-	2079
W9AYW/9	Wells Co. ARC	273-	AB-6-	2052
K6HJE/R	Clinton County AR Assn.	262-	AB-15-	1956
K2QDB/2	RC of Brooklyn	274-	AB-12-	1923
W49CJF/9	Tipton County ARC	537-	BC-13-	1872
W9PJ/9	LaCrosse RAC	332-	ABC-14-	1863
W2HLS/2	Matawan Civil Defense	256-	AB-10-	1848
K6PB/6	HP ARC	357-	BC-6-	1848
W82QQC/2	(nonclub group)	269-	AB-6-	1737
W1GLA/1	Framingham RC	200-	AB-8-	1650
W3GDN/3	Somerset County ARC	238-	AR-3-	1491
K0J00/4	Corrie ARC	203-	ABC-7-	1374
K2UNC/2	North Fork RC	175-	AB-7-	1320
W6DYQ/6	Antelope Valley ARC	205-	AB-5-	1287



KIUDD gets a line up over a fine-type tree a la William Tell for the Newington Amateur Radio League, W1FWH/1, tops in the first call area in 1-A.

W5DSC/5	Victoria ARC	202-	AB-7-	1248
W1CPO/1	Midstate ARC	196-	ABC-7-	1101
K1ZKX/1	Whitman ARC	133-	AB-6-	1077
K4TXJ/4	St. Matthew's Area R Transmuting Soc.	246-	AB-10-	1060
W7EK/7	Cascade RC of Everett	162-	B-10-	972
W8APJ/8	Bluffton ARC	197-	ABC-20-	957
VE1ND/1	Central New Brunswick ARC	73-	AB-6-	735
W301/3	Lehigh Valley ARC	181-	C-	543
K3JRO/3	(nonclub group)	236-	AB-4-	531
W3NAV/3	Coke Center ARC	73-	B-9-	438
K9ENAL/9	Communicators	55-	AB-	381

*Five Transmitters Operated Simultaneously*

K2MQW/2	Five Towns RC	1572-	AB-30-	13,959
W6TJ/6	Riverside County AR Assn.	2000-	AB-23-	13,266
W3NC/3	quakertown ARC	1265-	A-20-	11,610
K2GE/2	Raritan Bay RA	1292-	AB-20-	10,272
W20F/2	Watchung Valley RC	1083-	A-25-	9972
W6BQX/6	Livermore H. S. ARC	1078-	A-7-	9702
W3BTD/3	North Penn ARC	1373-	AB-50-	9684
W1CPO/1	Houston ARC	1345-	AB-25-	9314
W8ZE/6	Orange County ARC	1111-	AB-35-	8788
W4CA/4	Roanoke Valley ARC	1204-	AB-26-	7575
K1MJJ/1	Eastern Conn. AR Assn.	1200-	B-30-	7350
K3GTN/3	Andrews AFB MARS	1162-	B-17-	7122
VE3NSR/3	North Shore RC	1101-	AB-22-	7002
W1CPO/1	North Shore AR Assn.	1029-	AB-18-	6858
W2YKQ/2	Lake Success RC	710-	AB-15-	6594
W3CSL/3	Alpeness ARC	1000-	B-18-	6150
W3RQZ/3	Phill-Mount Mobile RC	851-	AB-15-	5949
W7NCW/7	Lower Columbia AR Assn.	705-	AB-15-	5940
W7EJZ/2	Lawrence H. S. ARC	727-	AB-20-	5908
W8ICR/8	Indian Hills RC	889-	AB-25-	5724
K4OXL/4	Limestone ARC	901-	AB-12-	5697
W6AB/6	LERA ARC	912-	AB-20-	5586
W4WVJ/4	Loudon County ARC	876-	AB-11-	5412
W8NWW/8	Palomar RC	994-	ABC-15-	5379
W8GTJ/3	Palmdale ARC	802-	AB-26-	5314
W20W/2	(nonclub group)	803-	AB-	4866
K6LGR/6	Edgewood AR Soc.	792-	B-25-	4752
W2WUX/2	Utica ARC	785-	B-	4710
W8TD/8	Seneca RC	802-	B-25-	4629
W5AEN/6	Soc. of AR Operators	709-	AB-35-	4608
K2VCL/2	Holston ARC	718-	A-12-	4569
K8NOW/8	Metropolitan Radio-ciewers Club	501-	AB-25-	4404
W2RCX/2	Genesee RA	651-	AB-30-	4278
W6OT/6	Oakland RC	561-	AB-20-	4212
W8TQE/8	Adrian ARC	678-	ABC-20-	4152
K9BPV/9	La Porte ARC	678-	AB-	4050
W9JYL/9	Greenwood ARC	649-	B-21-	4044
K6QHO/6	South Bay AR Soc.	602-	AB-15-	4026
W80ERA/8	Pikes Peak RA Assn.	635-	AB-20-	4017
K4POA/4	NASC/CEANA ARC	611-	B-8-	3666
W8AGY/6	Cal Poly AR Assn.	529-	AB-	3639
W8GET/8	Lorain County ARC	611-	B-15-	3546
K1WEW/1	Sub Sig ARC	400-	AB-15-	3375
W8UJ/6	Taft RAC	556-	B-10-	3336
K9AJW/9	Minot AR Assn.	540-	B-30-	3240
W45JKP/5	Institute of Electronic Science ARC	526-	AB-	3207
K8BYL/8	South Eastern Michigan AR Assn.	471-	AB-23-	3180
W2HGR/2	High Point AR Assn.	633-	AC-15-	3099
W9EJL/9	Madison County ARC	513-	B-12-	3078
W8AA/8	Sacramento ARC	402-	AB-	3021
W8DJD/8	Belmont County ARC	454-	AB-10-	2829
W44QN/4	(nonclub group)	449-	AB-12-	2826
VE3CRW/3	Clinton ARC	520-	ARC-16-	2703
W86JUG/6	Silverado AR Soc.	414-	ARC-14-	2496
K4DXO/4	Virginia Wireless Soc.	373-	AB-14-	2469
K3WRS/3	General ARC	430-	AB-	2304
K1Q3C/1	Northern Conn. ARC	369-	AB-12-	2289
W3QZF/3	Horseshoe RC	360-	B-10-	2160
W9AMZX/9	Greater Beloit Area ARC	430-	BC-15-	2154
W1KVI/1	Portland A Wireless Assn.	302-	AB-7-	2124
W9A9HK/9	York High RC	343-	B-10-	2058
W8KAD/8	Ottawa County ARC	299-	ABC-9-	2025
K9TNT/9	Pallsades ARC	400-	ABC-20-	1950
W8UMD/8	Treaty City AR Assn.	499-	BC-16-	1923
W8DRC/8	Tel-Hite AR Soc.	203-	AB-10-	1820
W8DHD/8	O'Brien County AR Assn.	171-	B-11-	1842

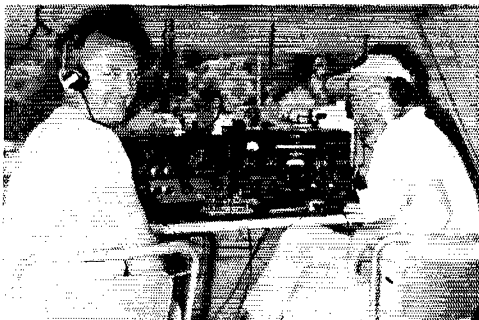
*Six Transmitters Operated Simultaneously*

W8HLD/8	Catalpa AR Soc.	2886-	B-38-	14,466
K2AA/2	South Jersey R Assn.	1870-	AB-35-	13,227
W4ZLQ/2	Grueman ARC	1543-	AB-42-	12,024
K3H6W/K3H16	Honolulu ARC	1738-	AB-38-	10,806
K2AE/2	Nottingham AR Assn.	1600-	AB-6-	9897
W8ZL/6	Newport AR Soc.	1289-	AB-50-	9225
W9SW/9	Chicago Suburban R Assn.	1444-	AB-24-	8961
W9LM/9	Northwest ARC	1132-	AB-16-	8730
W6WVJ/6	South County AR Soc.	1265-	AB-25-	8703
W12RMW/2	New Providence ARC	1206-	AB-20-	7983
W1MV/1	Massachusetts AR Assn.	951-	AB-25-	7542
K6QEZ/6	Ampex RC	1105-	AB-22-	7380
W3SK/3	Wireless Assn. of Windsor and Bucks County ARC	1030-	AB-34-	7149
W86PWW/6	Sonoma County AR Ex-perimenters	1094-	AB-11-	7014
K68YT/6	Anahelm AR Assn.	1109-	AB-32-	7008
W6PW/6	San Francisco RC	1095-	AB-17-	6786
K6EAG/6	Hayward RC	1018-	AB-14-	6485
W8RXN/8	Turlock ARC	1207-	ABC-30-	5856
W8SRX/8	High A H Soc.	817-	AB-10-	5349
W3PIQ/3	High Hills Brass Pounders and Modulators	854-	AB-30-	5295

W3CTC/3	Delaware Valley ARC	967-ABC-30-	5100
K01DP/0	Lincoln ARC	806-	AB-20- 5031
V83DC/3	Hamilton ARC	750-	A-8- 4959
W61J3/6	Sonoma Co. RA	733-	AB-15- 4707
W8P0/8	Toledo RC	721-	A-8- 4614
WA6WXL/6	North Hollywood Opti- mist RC	759-	B- 9- 4554
WA3CKV/3	Northwestern Pennsylv- ania DX Club	466-	A-10- 4194
W7AV/7	Clallam County RC	649-	AB-12- 3975
K2UHD/2	Rockaway ARC	567-	AB-25- 3759
W2HCS/2	Albany AR Assn.	505-ABC-10-	3564
W5MS/5	Corpus Christi ARC	545-	AB-31- 3483
K6QWL/6	North Hills RCs	528-	AB 16- 3432
WA1DGW/1	Somerset ARC	468-	AB-20- 3402
WA1GQJ/1	Forestville AR Assn.	557-	B-25- 3342
WA4TNN/4	Catoctin RC	498-	AB-10- 3276
W4HFH/4	Alexandria RC	373-	AB-19- 3165
K8FDU/8	DPSC MARS	507-	AB-29- 3150
W0KQU/0	Central Kansas RC (nonclub group)	343-	AB-15- 2480
W8VTD/8	Deland RC	303-	AB-35- 2082
WA4WQV/4	Roblin ARC	216-	B-12- 1296
VE3BNK/3	Roblin RC	145-	AH-12- 1080

*Seven Transmitters Operated Simultaneously*

W2G8A/2	Garden State AR Assn.	3250-	A-35-29,547
W5SC/5	San Antonio RC	1583-	AB-25-10,470
W6PNK/6	North Peninsula Elec- tronics Club	1537-	A-B-24- 0606
W0WVY/0	Belleuve ARC	1456-	B-26- 8886
WARKAL/8	Van Buren ARC	1275-	AB-19- 8118
VE3KCD/3	K-W ARC	1176-ABC-	6948
W2US/2	Suffolk County RC	883-	AB-30- 6051
W9FL/9	West Alis RC	839-	B-22- 5184
W28EX/2	AR Assn. of the Tona- wandus	784-	AB-28- 5109
W9YH/9	Twin City ARC	776-	AB-25- 4869
W1UW/1	Merrimack Valley ARC	786-	AB-19- 4839
VE3BSQ/3	Belleville and District ARC	704-	AB- 4341
W3GV/3	RA of Erie	736-ABC- 7-	4017



**K6QEZ/6**, the Ampex RC, went out in 6-A. The 80 and 15 meter c.w. tent housed operators **W6RVY** (left) and **WA6NSG**.

*Eleven Transmitters Operated Simultaneously*

VE3OW/3	Windsor ARC	1976-	AB-45-16,767
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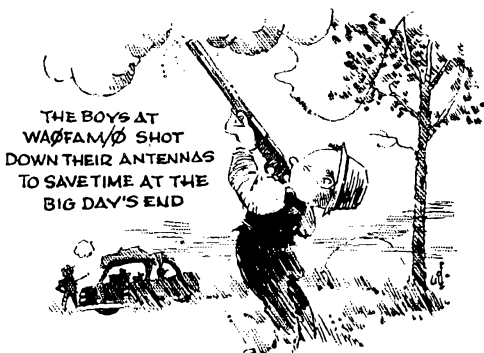
*Thirteen Transmitters Operated Simultaneously*

WA6ODP/6	Livermore AR Klub	1754-	AB-35-15,678
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*Fourteen Transmitters Operated Simultaneously*

W2MM/2	Englewood AR Assn.	2582-	A-59-23,490
W8KGG/8	Huron Valley AR Assn.	982-ABC-	6111

(Continued next page)



W0KY/0	(nonclub group)	625-ABC-14-	3747
W9DUA/9	Sankamon Valley RC	583-	AB-30- 3542
WA6GRO/6	Fort Smith ARC	569-	B-18- 3414
W1NY/1	Hampden County R Assn.	545-	B-11- 3270
WA8FSE/8	Opequon R Soc.	430-	AB-16- 2736
K7NWS/7	Boeing Employees' AR Soc.	411-	BC-18- 2271
W0CKF/0	Minneapolis RC	293-ABC-20-	1557

*Eight Transmitters Operated Simultaneously*

W2QYH/2	Morris RC	1974-	A-21-17,768
K2YJC/2	Communications Club of New Rochelle	2136-	AB-45-15,062
VE3JJ/3	West Side RC	1497-	AB-29-11,232
VE3VM/3	Niagara Peninsula ARC	1654-	B-30-10,074
K4DPZ/4	Gainesville Soc.	1460-	AB-38- 9336
W61FA/6	The Corona Gang	964-	A-11- 8901
W61PMO/6	Associated RA of Long Beach	1045-	AB- 6576
W91KN/9	Elgin AR Soc.	975-	AB- 6261
W8HLE/8	Marletta ARC	580-	A- 5220
W9SWQ/9	Four Lakes ARC	811-	B-45- 4866
K9GXU/9	St. Clair ARC	624-	AB-30- 3984
W5AVT/5	Caravan Club of Shreve- port	489-	AB-12- 2940
W4PAY/4	North Virginia RC	363-	AB-11- 2664

*Nine Transmitters Operated Simultaneously*

W91FQ/9	Wheaton Community RA	2328-	AB-35-14,100
WB2QBN/2	Platibus RC	1983-	AB-35-12,381
W3RCN/3	Rock Creek AR Assn.	1385-	AB-46-11,469
K4BFT/4	Huntsville ARC	1769-	B-18-10,788
W6MLK/6	High Frequency A Mo- bile Soc.	559-	AB-26- 4329

*Ten Transmitters Operated Simultaneously*

W21L/2	Tri County R Assn.	2938-	A-51-26,667
W71J3/7	RC of Tacoma	2166-ABC-40-	13,596
VE3NAR/3	Norton ARC	1388-	A-44-12,735
VE3WE/3	Scarboro ARC	1337-	AB-44- 9666
VE3MRC/3	Metro ARC	1367-	AB-23- 9498
W6SD/6	San Fernando Valley RC	1138-ABC-18-	6537



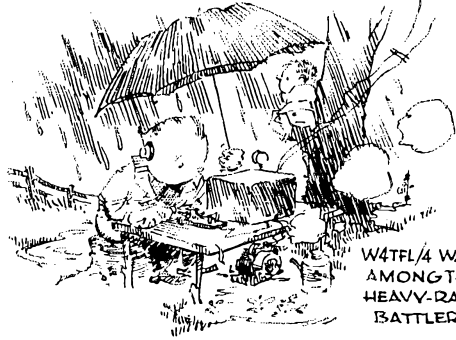
**K2QDF**, charter member of the Communications Club of New Rochelle, and one of the first sightless operators trained by famed **W2JJO**, was once again a mainstay of CCNR activity. **K2YJC/2** turned up in 8-A with the second highest score, one of the few groups totalling over 2000 QSOs.



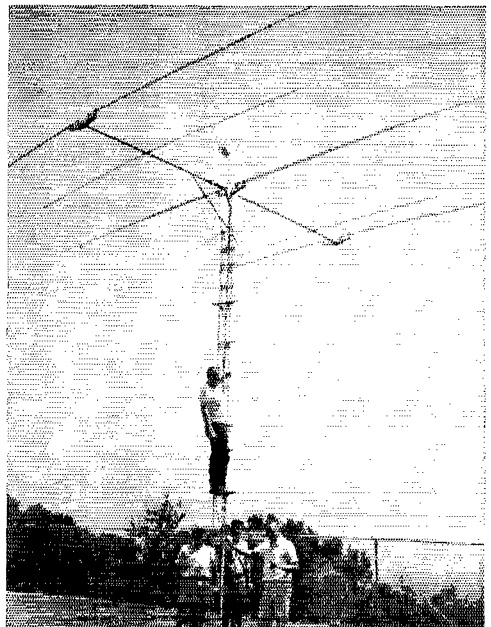
## CLASS B

Grouped in this listing are the scores of portable stations manned by one or two operators. Where two persons participated, the call of the other operator (if known) is given below that of the amateur whose call was used. Figures following the calls indicate number of contacts, power and final score.

One Transmitter							
W6RW/6	.....831-A-11556	W5OVX/5	.....227-AB-2336	W48DGE/8	...214- B-1284	K3ZYT/3	....420- B- 908
W6BENX/	.....	W45M8N	.....	W48EUC	.....	W42KZV	.....
W2J8Q/2	....440- A-6548	K9QV/4	....342-AB-2139	W45LNI/5	....141- A-1269	K6ZQB/4	....120- B- 870
W2PBA	.....	W49CVI	.....	W45NXL	....190- B-1161	W6VOD/6	....145- B- 870
K2LAF/2	....383- A-5508	K2BHF/1	....152- A-2052	K2ZUW/2	....100- B-1125	W6VEX/3	....131- B- 786
W2UXY	.....	VE2HOW/2	....197- A-1908	VE2AZQ/1	....121- A-1089	VE3FOF	.....
W8HIG/8	....510- A-4815	VE2HPH	.....	W4IDPW/1	....136-A-B-1089	K7UOT/7	....257- A- 771
K8ALFO	.....	W3TOM/3	....141- A-1904	W4IDPX	.....	K8APY/8	....30- A- 720
K2P1I/2	....320- A-4320	K3HJI	.....	W2KOV/2	.....	K8RAB	.....
K2BMI	.....	K0EMN/0	....279- B-1824	W4BPN	.....	W8BNIH/6	....332- B- 714
W47ABW/7	....293- A-4293	W3PWK	.....	VE7BJK/W2	....120- A-1080	K7ZRG/7	....51- A- 680
W47AQD	.....					K7YJZ/7	....111- B- 666
K5FAB/5	....688- B-4278					W47GTA	.....
K5LJF/5	....396- A-3789					K3SOM/Z	....111- B- 660
KILOM/1	....354- A-3758					K3FEO	.....
W1MEH	.....					W42QZG/2	....110- B- 680
W9DHG/9	....400- B-3600					W4JGB/8	....108- B- 648
W49GCK	.....					W42KOS/2	....105- B- 630
W8GKB/0	....386- A-3474					W42KOC	.....
K0BUU/0	....572- B-3432					K7YJAI/7	....103- B- 618
K7LZG	.....					K7YJO	.....
K38PX/3	....214- A-3294					W45MAH/5	....43- A- 581
W43APH	.....					W8BNO/6	....288- B- 576
W8WV/8	....251- A-3285					W43AJL/3	....17- A- 567
K8NGQ	.....					K3ZKX/3	....99- B- 534
K38QO/3	....238- A-3213					W43CBN	.....
W3PAG	.....					W49CWO/9	....80- B- 480
W9ZAR/9	....225- A-3038					W8UKYS	.....
W9ZMS	.....					W45JH/5	....53- A- 477
K4VHC/4	....295- A-2880					K49CK/4	....235- B- 470
K5RPC/5	....170- B-2820					W44FNZ	.....
W45JPA	.....					W4KA/0	....78- B- 468
K4RAD/4	....365-AB-2706					W40AHL/0	....74- B- 444
K4HBI	.....					W7LNG/7	....69-AB-441
W8KCY/8	....151- B-2706					K3UTN/3	....70- B- 420
W8JQL	.....					W48OH/8	....68- B- 408
W45DFR/5	....139-AB-2658					W4RHYL	.....
W45EOB	.....					W48NNR/8	....27- A- 365
VE7BCL/7	....157- A-2457					W48KYK	.....
VE7BRE	.....					W42EPX/2	....58- B- 348
K7PBO/7	....408- B-2448					W42PO/0	....24- A- 324
W7GCO	.....					WNTFO/7	....53- B- 318
K8HIV/W/4	....217- A-2448					W45EID/5	....27- B- 312
W86OEN/6	....382- B-2442					W45EBI	.....
K6QMQ	.....					K3AFW/9	....154- B- 308
W0RHS/0	....264- A-2376					W48NCA/9	....23- B- 282
K0UCQ	.....					VE1EK/1	....84- A- 267
VE3TM/3	....396- B-2376					W8KXN/2	....29- A- 261
VE3FLW	.....					W82LKB	.....
K7RAJ/7	....368- B-2358					W30FT/3	....12- B- 252
K7VYY	.....					W3CAH	.....
						W1HJP/1	....41- B- 246



Power engineers for the Houston Amateur Radio Club, W5DPA/5, (left) in the 5th call area in the 5-transmitter group, are (left) K5VQY and K5BCV. Will the real generator please re-putt for action.



Posing nicely for a winning-type photo are crew members of the Santa Clara County RACES Group, W6VZT/6, top W6 and third-high scorer in 1-A with 5580 points.

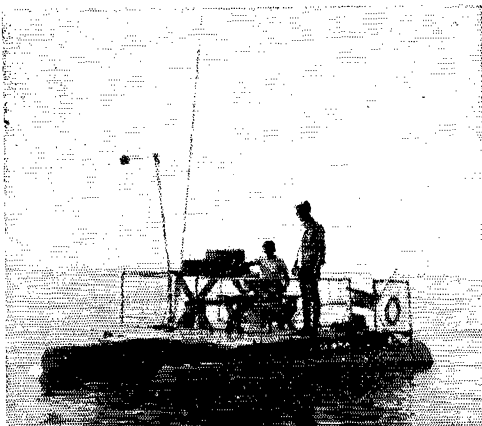


**1966 FIELD DAY  
JUNE 25-26**

W9UYB/9 } .....26- A- 234	K9MMS/9 } ...322- B-2082
W9TRF	K9GZS
K6BGM/6 .....24- A- 216	WA4DQM/4 } .197- A-1998
WA4JSA/4 .....106- B- 212	W4ZYQ
VE2BQQ/8 .....15- A- 203	W6PVF/7 } ...282-AB-1891
W4GKSZ/9 .....13- A- 176	W7MTM
K9FHP	WA21JA/2 } ...209- A-1881
W0UVX/0 } .....28- B- 168	WB2PHD
K0BNW	K9WFC/KL7 } .183- A-1872
WA3BDR/3 } .....55- A- 165	K1LQI
W93DJO	WA4NKY/4 } .167-AB-1208
K9ZJU/8 .....67-AB- 157	WA4LYO
W9ZGQ/9 .....24- H- 144	WA4RPH/4 } ...199-AB-1200
WN2SCK/2 .....14- A- 126	W4OIF
WA9KAY/9 .....9- A- 122	K9OKO/9 } ...190- B-1140
W1EAW/1 } .....96- C- 121	WA9DKO
W1JJB	K3LSB/3 } .....10- A- 963
WB2PNT/2 } .....37- A- 111	WN3CZA } .....107- A- 963
WB2NOK/2 } .....16- B- 96	WA4AWG/4 } .141-AB- 933
WA1DNO	W4ZOD
WA4VSU/4 .....41- B- 82	WA3AJU/3 } ...122-AB- 930
WB6HTM/6 .....15- A- 63	WA3ARC
W8DSX/KF4 .....10- H- 60	WA9AKT/9 .....76- A- 909
Y3EFQH/3 .....5- H- 10	WA8CO

*Two Transmitters*

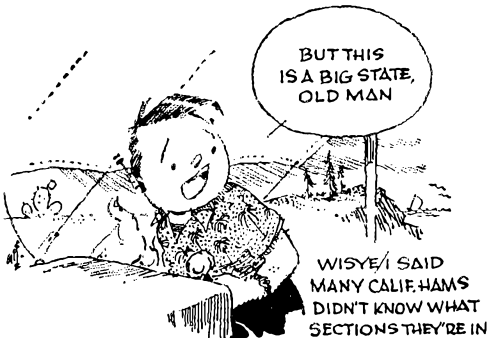
WA2UOO/2 } .....787- A-7308	WA5DGI/5 } ...299- H- 598
WA2SRQ	WA5CKM
WA4FAT/4 } .....547- A-5148	K3ZYK/3 } ...207- B- 414
WA4EDY	WA3CH
WA91YU/9 .....796- B-4776	WA5EXD/5 } ...186- B- 372
WA9OYK	WB2HCY/2 } ...42-AB- 315
W8IBX/8 } .....431- A-4104	WB2HCV
WARMFZ	WN8OBS/8 } ...38- B- 228
W8HAM/8 } .....409- A-3906	WN8QJ
WB6CWD	WA9BST/9 } ...39- C- 216
WA4WIP/4 } .....518- B-3108	W9EGT
WA41ZT	WA8AMH/8 } ...15- B- 90
WB6JKQ/6 } .....380- B-2280	WA8AHZ
WB6KIJ	



K3ZXG/3 operated 1-B with WA3CBN at this interesting water-cooled site, aboard "Annie's Ark" in Maryland's Chesapeake Bay.

**CLUB AGGREGATE MOBILE SCORES**

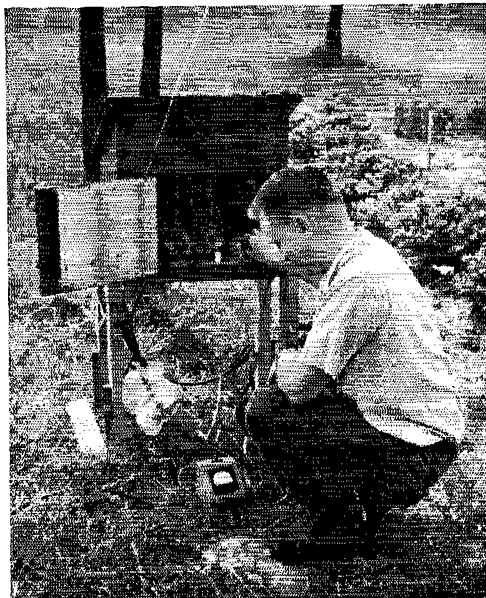
Phil-Mont Mobile Radio Club (Pa.).....	73,114
Radio Amateur Mobile Society (Calif.).....	39,111
Argonne Radio Club (Ill.).....	3377
South Bend Mobile Amateur Radio Club (Ind.).....	3037
Hayward Radio Club (Calif.).....	2493
Palomar Radio Club (Calif.).....	2169
Rodeo City Amateur Radio Club (Wash.).....	1449
Chiburban Radio Mobileers (Ill.).....	338
Southeastern Michigan Amateur Radio Assn. ....	230



**CLASS C**

W6QHP/6 .....219- A-3913	W3FTZ/3 .....9- A-1782
W3RCZ/3 .....119- A- 3510	K3HIE/3 .....9- A-1782
WA6CQT/6 .....263- B-3024	W3YJM/3 .....5- A-1782
WB8DFO/6 .....138- A-2822	K3NYN/3 .....4- A-1789
W3AES/3 .....67- A-2565	W3QQH/3 .....4- A-1769
W3LNQ/3 .....49- A-2376	K2LTC/6 .....129- A-1742
W3MHR/3 .....53- A-2376	K3OJA/3 .....4- A-1715
W3WPD/3 .....18- A-2363	WB8YJ/6 .....100-A B-1683
W3NIP/3 .....66-AB-2358	WB6AOL/6 .....63-AB-1656
W3PWG/3 .....14- A-2295	WB8IAW/6 .....50- A-1580
WA6THI/6 .....109-AB-2259	WA6UNL/6 .....50- A-1580
K3HIJ/3 .....12- A-2228	W6QYS/6 .....48- A-1553
WA6HGH/6 .....109-AB-2228	K6VYV/6 .....35- A-1499
W3WUX/3 .....38- A-2201	W8BYV/3 .....39- A-1476
W3GFR/3 .....30- A-2174	K3WQQ/3 .....8- A-1458
WB8LL/6 .....216- B-2169	W9GQY/9 .....161- B-1449
K3CEE/3 .....30- A-2106	K6GUB/6 .....37- A-1404
W3TKQ/3 .....31- A-2106	WB8ONB/6 .....37- A-1404
W3SRU/3 .....42- A-2086	WA6WNA/6 .....36- A-1391
W3HQJ/3 .....29- A-2052	WN6OX/6 .....35- A-1377
W3YHV .....46-AC-2034	WA8IV/6 .....25- A-1175
W3VVS/3 .....18- A-1958	K6GUQ/6 .....52-AB-1161
W6CXD/6 .....78- A-1958	WBCW/3 .....54- A-1067
K3GNM/3 .....12- A-1877	W3FOG/3 .....3- A-1053
W3BBB/3 .....11- A-1863	K8ATU/6 .....39-AB-1026
WA2RDC/3 .....11- A-1863	WB6JT/6 .....37- B- 972
W3OEC/3 .....1- A-1850	K3EZT/3 .....69-AB- 968
W3AWH/3 .....0- A-1836	K3YBL/8 .....295- C- 885
W3AJQ/3 .....10- A-1823	W8IIF/6 .....97- B- 873
W3CDY/3 .....12- A-1823	K3HXW/3 .....35- A- 810
K3UOW/3 .....12- A-1823	W6HIR/6 .....20- B- 783

(Continued on page 162)



W8YPT adjusts the antenna coupler for the Chippewa Amateur Radio Club ("B" Group), operating Class 1-A at W8YPT/8.

# All the QSLs in the World?

BY WILLIAM T. CAMPBELL,\* W6ELW

THE average ham is excited over receiving his first QSL; treasures the "rare" ones which may, at first, be only a contact from another State; and his interest in QSLs often decreases in direct proportion to the number of contacts made or to the extent of his DX. Lloyd Colvin, W6KG, and Iris Colvin, KL7DTB/6, are an exception. Their QSL collection may not contain all the QSLs in the world, but it does have 60,000 of the most prized cards to be found anywhere, and they continue to take delight in each card received. Filed alphabetically



Here are Lloyd and Iris with their 60,000 QSL cards.

in steel cabinets, QSL cards resulting from approximately 120,000 QSOs are immediately available and used to identify the sender. A particular card may be from any one of 332 different countries, any of the States of the U.S., or from most any one of the Counties of the United States. The card may represent a contact from any one of the many countries from which the Colvins have operated.<sup>1</sup>

Having already traveled in 96 different countries, the Colvins have many tales to tell about visiting a foreign ham, with a QSL in hand that has traveled around the world. The most em-

barrassing incident occurred in a visit to Amsterdam. The PA0 ham had invited the Colvins to his home, and was, at the time, engaged in teaching radio theory to a group of young students. He held a position with the Netherlands Government similar to an FCC Inspector in the United States. The Colvins arrived and presented a QSL card representing a QSO with the PA0 from their station in Japan. The group of prospective hams gathered around with great interest to look at the card. Suddenly, they became very excited, and all began talking at once — in Dutch. The PA0 ham turned white as a ghost and then red as a fire engine. The Colvins didn't know whether the ham was about to faint or blow-up, and were kept in suspense until someone, who spoke English, finally explained. The QSL card clearly showed his power at 500 watts; the legal power in PA land was, at that time, 50 watts. The poor ham was in somewhat the same situation as if an FCC inspector in the U.S. had been discovered running a power input of 10,000 watts!

Most of the memories, however, appear to be of a happier nature: of the times that they have waited in a railroad station or a public square with a QSL, either their own or that of the ham to be visited, pinned on a lapel for identification; of the warm welcome from radio hams everywhere who open their hearts and homes to a stranger at their door who is carrying a QSL confirming an earlier contact from some distant land.

Besides identifying the sender, or giving information of a radio contact, QSLs are often very unusual in themselves. Out of the Colvin Collection, the following were picked as being particularly outstanding:

*The Most Distinguished:* K6USA — with a message from the President of USA.

*The Largest:* KH6VF — (1½ feet x 2 feet) on a map of Hawaii.

*The Smallest:* CN8BV (1½ inches x 2½ inches).

*The Longest Name:* W9QXO (look him up in the call book!)

*The Brightest:* W7ORM — all letters made of phosphorescent material.

*The Neatest:* K4WMA — photo of his beautiful station, in color.

*The Most Religious:* VP7NQ — sends sermon along with QSL.

*The most crowded:* WA9BX1 — picture containing everything from pork & beans to radio key.

*Doctor's QSLs:* WA4EFX — his picture in doctor's uniform, using stethoscope to receive radio signals.

\* 1609-90th Avenue, Oakland 3, California.

<sup>1</sup> FA8JD, W6ANS, DL4ZB, W6IPF, K7KG, JA2KG, W6KFD, K2CC, J2AHI, W2USA, K4WAB, W7YA, DL4ZBD, J2USA, W6AHI, W7KG, JA2US, W4KE, DL4ZC, KL7KG, WA6DFR, KL7USA, K6WAP, W6BWS/KG6, and W4ZEW.

*The most elegant:* WASCMMH — on silver paper.  
KITUB — on velvet paper.

*The greatest old timer:* W1NF — ham since 1903.

*Most unusual call sign:* W8APB — with call printed in reverse. W8IUJ — with call in International Morse Code.

*Most unusual format:* W8FRB — in form of certificate. W8DHG — in form of announcement.

*Most low-power dx:* VK3NL — DXCC with six-watt transmitter and 2-tube receiver.

*Most funny:* WB2CVF — Help stamp out QRM — tear up your license. K4BVD — with pictures of BVDs. W2BO — with picture of Life Buoy soap.

In 1956 when the Colvin QSL Collection numbered only 25,000<sup>2</sup>, a detailed study was made and published of the *percentage* of QSLs received from amateurs worked in various countries and USA call areas. At that time, and still today, the best QSLers in the World, according to the Colvins, are the OK hams, with 89% QSLing, and the worst are XE hams with a low of 50% QSLing.

Lloyd and Iris Colvin have just started on a DXpedition to various remote portions of the world.<sup>3</sup> News of this venture has increased the QSL collection even more. A letter received from a W5 may explain why: "Just heard you and

the XYL are going to operate from some rare spots. In checking, it seems that possibly I didn't QSL to you when you were JA2KG in 1949, so am sending along a QSL for that QSO now \_\_\_\_."

Lloyd and Iris have applied for permission to operate in all rare and semi-rare, countries of the world. Since most of the travel will be by commercial airlines, baggage and radio gear have been reduced to a minimum. Carrying the QSL collection presented somewhat of a problem. As shown in the photo, the 60,000 QSLs in their steel file cases weigh nearly a ton. To carry this weight around by airplane is obviously not very practical. The solution to the problem was to microfilm them. The 60,000 QSLs were transferred to four small rolls of film, weighing only one pound. A small viewer allows any QSL to be looked at easily during their travels. So if you are one of the 60,000 hams who have sent a card to the Colvins, your QSL, on microfilm, will accompany them on the world-wide DX-pedition.

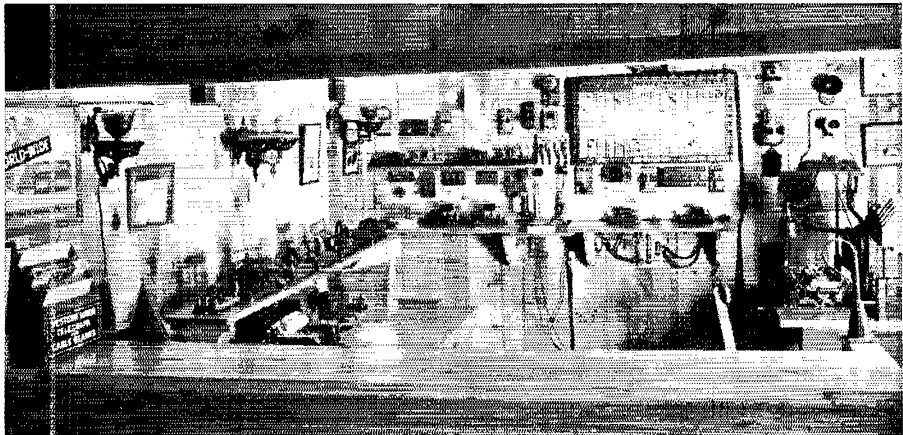
Lloyd and Iris made this parting suggestion to hams: "Please QSL! If you can't QSL everyone worked, at least answer all QSLs received. A QSL is the final courtesy of a QSO and may be of great value to qualify for an award, to decorate a ham's wall, or just to remember you and amateur radio by."

**QST**

<sup>2</sup> *CQ*, "25,000 QSLs," September 1956.

<sup>3</sup> Sponsored by The YASME Foundation — P.O. Box 2025, Castro Valley, California.

## Strays



The Morse Telegraph Club, Inc., is a non-profit, social, and historical club with members who have been or are now Morse telegraphers. One of the members of the club, Mr. E. Stuart Davis, K2OBJ/W4ZC, has assembled an authentic National Telegraph Office of the early nineteenth hundreds. The photograph shows a view of the main telegraph office. On the left is the quadruplex table; in the center is the repeater table and patchboard; on the right is the concentrator unit. Morse-Box converters and modern tape recorders are in an adjoining room to the left of this photograph. With the tape recorders going, all units are operating and the room sounds exactly like a very busy telegraph office of 50 or more years ago! Those who are interested in the club can obtain information from Mr. J. Ralph Graham, W4RJX, 5927 Dryden Drive, McLean, Virginia 22101.

# BOSTON OR BUST!

## *The 1966 National Convention — A Preview*

In 1966, for the first time, New England will host an ARRL National Convention. The new multi-million dollar Prudential Center in Boston, built last year on the site of the old Boston and Albany Railroad yards, includes a beautiful new hotel, the Sheraton-Boston. The hotel represents the culmination of a dream of Sheraton President Ernest Henderson, W1UDY, to build an ultra-modern hotel right in the heart of "old Boston," where the now world-wide Sheraton chain had its beginnings. Mr. Henderson, active himself on s.s.b., is especially happy to be able to great fellow hams personally during the convention, which will take place on April 22-24.

The 1966 National will be unusual in many respects. Boston has many traditional features sought out by tourists. The swan boats, the famous "exclusive shops" near old Beacon Street, the quaint foreign-style restaurants and historical sites so much a part of our American heritage, will be within walking distance of the convention.

For hotel registrants, parking will be free in cavernous parking areas built underground at the Prudential Center; space will be available to others at normal fees. Many local people will use public transportation. In any event, cars will not be a problem; the hotel is located at the next-to-last exit off the Massachusetts Turnpike.

This National is being run by the Federation of Eastern Massachusetts Amateur Radio Associations, the same gang who have sponsored seven successful New England conventions at Swampscott. The program is now being assembled and will approximate the following schedule.

*Friday Afternoon:* Informal get-togethers, registration.



*Friday Evening:* Cocktail parties for special interest groups and an informal party just for good fellowship.

*Saturday Morning:* Registration, opening of exhibits.

*Saturday Noon and Afternoon:* Special-interest luncheons, meetings, demonstrations and contests.

*Saturday Night:* The big banquet, followed by dancing in the luxurious grand ballroom. At around 10 P.M., professional entertainers (only the best, carefully screened from New York and Hollywood by the entertainment committee) will appear on stage, to be followed by dancing again until midnight.

*Sunday Morning:* Sleepy conventioners will awaken to a new day of exhibits, top speakers on amateur radio, net meetings and contests, while the XYL is busy taking one of many scenic tours throughout the Boston area.

Tours for the ham are in the works, too, including open house at one of the country's leading television stations—technicians at which are hams, of course.

*Sunday Afternoon:* Convention activities will conclude with the traditional awards and presentations, starting at 5 P.M.

The complete Saturday night program, including the dinner, dancing and entertainment, will cost \$8.60 for early-birds, \$9 at the door, including gratuities. Registration is separate, but there is a package deal: \$11.60 early-bird, \$13 at the door. These prices include admission to all meetings, registration, banquet, etc. Special interest luncheons or cocktail parties will admit anyone registered, but food and drink will be optional extras. Since the monetary savings are considerable, to take advantage of the early-bird package deal, reservations should be sent AT ONCE to the ticket chairmen, John & Bertha McCormick, Radio Convention, RFD #1, Berkeley Street, Taunton 1, Mass. Please make checks payable to: FEMARA.

*(Continued on page 170)*

Contract-signing for the National Convention: Co-chairmen W1VRK, W1HKG and W1EYZ, standing; Frank Hignett, convention manager for the Sheraton-Boston Hotel, seated.

# Antennas

Possible "Out" for Restricted Areas

BY THEODORE JAY GORDON,\* W6RVQ

SEVERAL months ago I moved into a very fancy neighborhood. All utilities were underground, and there was hardly an antenna to be seen spoiling the virgin purity of the old colonial brick chimneys, and the charming shake-shingle roofed gables of the California modern cottages. "No overhead power lines, quiet locations, no local QRM, ideal QTH," I thought. When I looked at our chimney I saw more than its subtle architectural grace; I saw an ideal mount for my new vertical antenna.

Before the moving men had deposited the last big pasteboard box, I was on the roof delicately balancing 33 feet of telescoped aluminum tubing. I should note here that this was no mean trick, because I first had to convince the XYI, that erecting the antenna was more important than unloading the boxes. Next came the radials. Luckily I knew just where my coil of No. 12 copper wire had been packed, so it was only a matter of a few hours until I had four husky radials running from the base of the antenna, which was level with the top of the chimney, to the four corners of the roof.

I was twisting the wire around the last insulator when one of my new neighbors leaned over the fence.

"See you're a ham," he said ominously.

"Well, uh," I replied with some firmness, shuffling one foot in the gravel on the roof. "Yes, I am." Nobody could bully me.

"You know there's an ordinance about antennas here," he said.

No, I didn't know, and this was a heck of a time to tell me, after I had spent the day stringing radials. Too late now, I figured.

"Well," I said a little sheepishly, "I think I'll just leave it up and see if anybody complains."

He smiled, said, "OK," and went back home.

"Glad to have met you, fellow," I shouted after him.

Fade-in a couple of weeks later. The boxes were almost unpacked, and things had settled down to a routine. But whenever I glanced up at the vertical I had an uneasy feeling, a sense of impending doom. I could see the vigilante committee, axes in hand, storming down the street, bent on wringing my straight and true vertical from its delicate perch on top of the chimney. Something like that can get to a guy. I began hearing noises on the roof at night. "Who's

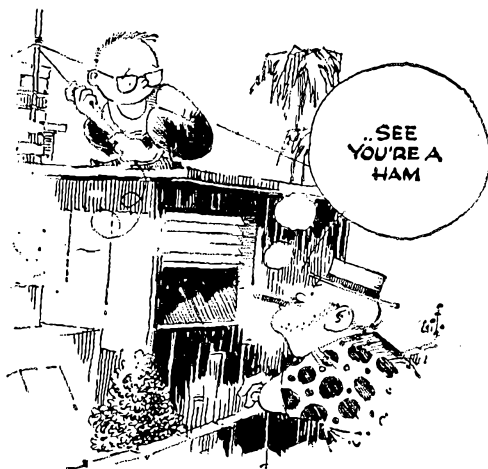
there," I'd shout some nights, scaring half the cats and dogs within the distance of one city block. Clearly something had to be done.

Mobile? Car was too small. Take them to court? I could, I guess, but nobody had complained yet. It was all in my mind. Then I hit on the solution, which I offer here in humanitarian good will to other hams who may be fighting the battle of unsightly wires with neighbors, vigilantes, or recalcitrant XYLs.

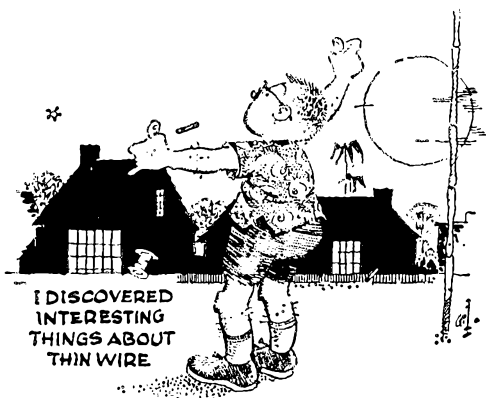
I began to experiment with invisible wire.<sup>1</sup> Not really invisible, but thin enough to be invisible from a distance of a few feet. That first weekend I replaced the radials with some lengths of No. 36 plain enameled wire. Let me hasten to point out that the antenna was supported by a TV chimney mount and the radials did not carry any structural load. I discovered several interesting things about using thin wire. First, it's very cheap. A quarter-pound roll of No. 36 wire has over 3000 feet and costs only about 70 cents. It simply cannot be seen at distances greater than 15 feet under normal conditions, even by someone with 20/20 vision. When sunlight reflects from it, an inch or two becomes miraculously visible, a pleasant and short copper glint against the blue sky. It also breaks very easily.

One of the most difficult aspects of using this wire was remembering where I had anchored it.

<sup>1</sup>Scotten. "The Invisible Antenna," *QST*, February, 1949.



\* 1501 Eton Place, Newport Beach, California.



Several times during the installation of this first set of radials, I walked into and broke elements that I had just fastened to the roof. Once in, the vertical worked as well as before with no detectable difference in s.w.r. or signal levels. The neighbors didn't report in, but I felt I had licked the problem without firing a shot.

Then I discovered that the elements didn't last very long. Something was breaking them. It certainly wasn't the wind, because their wind resistance was very low. I haven't yet found definite proof, but I suspect that the wires were as invisible to birds as to humans.

Following this theory, I decided to go to slightly larger wire. As in all engineering problems, the factors involved delicately balanced each other. I had to go to wire large enough for the birds to see, yet small enough to remain essentially invisible to neighbors. I tried No. 28. Perfect results. Again the wire is very cheap. A half-pound reel has over 1000 feet of wire and

costs 85 cents. The wire comes with either of two colors of insulation: clear, so that the wire is actually a bright copper, and dark mahogany. Both seem to be invisible under normal lighting conditions at distances greater than 25 feet. The lighter-colored wire is good for use against a sky background and the darker wire against a roof background. I haven't lost an element yet to the birds. The neighbors are still uncomplaining.

Egg insulators cannot be used with thin wire. The insulators are too heavy, and are very visible. I used  $\frac{1}{4}$ -inch Plexiglas rod, cut to a length of about  $\frac{3}{4}$  inch, with  $\frac{1}{32}$ -inch holes drilled in each end to accept the wire.

The use of thin wire in antenna systems need not be confined to radials for vertical antennas. Since my first experiments I've tried dipoles, inverted Vs, and phased arrays. All of these antennas were supported at the feed point, since the elements will not carry the weight of the feed line. At this QTH I used an aluminum pole supported on the chimney to carry the feed line and center insulator. Except for this mast, all parts of all of the antennas have been invisible.

As with any antenna, pruning the element lengths may be necessary after installation. One thing is different when you use invisible wire, however. If you over-prune (and who hasn't) you can stretch the element back to the proper length. In tests, I found that No. 28 wire could be lengthened  $1\frac{1}{2}$  inches per foot without danger of breakage. While this characteristic is obviously of advantage in setting up the antenna, it can cause undesired lengthening if the center support moves appreciably in the wind. For this reason the support pole should be rigid, or the elements should be left a little slack when installed.

**QST**

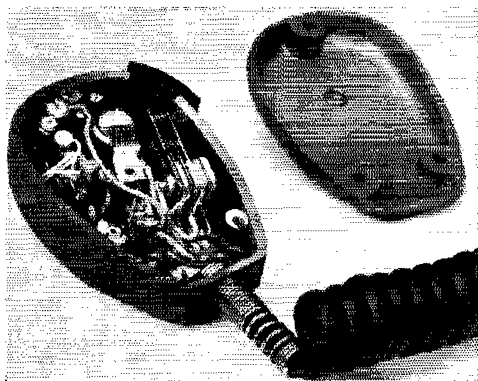
## • New Apparatus

### American D-501 Microphone

It was bound to happen! Thanks to advances in miniature components and transistors, American Microphone Company has been able to pack a dynamic microphone cartridge, a transistor speech clipper/amplifier and a mercury battery all into a standard microphone case. The amplifier/clipper unit is operative only when the transmit button is depressed, giving several months' use on a single 1.35-volt mercury cell. Two models are available — the D-501H which has high-impedance output, and the D-501L for low-impedance applications. Both units have a miniature control inside the case to adjust the output of the microphone.

The D-501 is housed in a sturdy aluminum case which will easily take the abuse of mobile service. The output cable contains four leads plus a shield. Three of these leads are connected to a double-throw push-to-talk switch; amateurs could use the extra contacts for receiver silencing as well as keying the

transmitter. The American Microphone Co., an Electro-Voice subsidiary, is in Buchanan, Michigan. The price class of the D-501 is \$30.00 — *W1KLK*

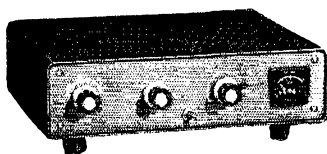


## • Recent Equipment —

### The Heathkit HW-14

### Sideband Linear

### Amplifier Kit



WOULD you believe it? A kilowatt amplifier less than  $\frac{1}{4}$  of a cubic foot in volume! This is an amplifier that covers the five amateur bands, 80 through 10 meters, with 1000 watts p.e.p. input (with rated third-order distortion —30 db. or better), a.l.c. provisions, tuned-input circuit, built-in antenna changeover relay, built-in s.w.r. circuit and indicator, and accessory power supplies that operate from either the a.c. mains or 12 volts d.c. All of this doesn't describe a fictional amplifier; it's the Heathkit "KW Kompact," the model HA-14 sideband linear amplifier. Although designed primarily for sideband mobile operation, the amplifier can be used with any exciter or transmitter capable of delivering 100 watts or more.

One secret to the small size of the amplifier is the use of parallel-connected carbon anode zero-bias 572-B triode tubes<sup>1</sup> which are operated Class B grounded grid. The "bottles" are mounted horizontally in a manner similar to that used in the Kompact's big brother, the Heathkit SB-200 linear amplifier.<sup>2</sup> A glance at the photograph shows the relative positions of the tubes, the input circuit, and the plate tank circuit.

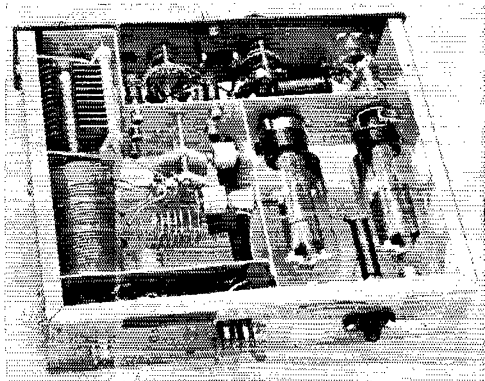
Power from the exciter is coupled to the tubes, which are cathode driven, by a broad-band network (52 ohms unbalanced input) and a bifilar-wound filament choke. The input network does not require any tuning by the operator when

band switching; the correct constants for the input network (as well as for the output tank circuit taps) are selected by a panel BAND switch.

A pi network couples the tube output to the load, which can be anything between 50 and 75 ohms unbalanced, s.w.r. not to exceed 2:1. There is a panel TUNE control for resonating the output tank.

An a.l.c. circuit in the HA-14 provides a control voltage for application back to the exciter. A capacitive voltage divider in the grid circuit of the amplifier tubes samples the audio voltage. The voltage is rectified by a semiconductor diode, which is reverse biased by a fixed threshold voltage, and the negative control voltage is made available at a connector at the rear apron for use back at the a.l.c. input of the exciter/transmitter. This system has a definite advantage over the conventional a.l.c. circuits used in AB<sub>1</sub> amplifiers that work only when the tubes go into grid current, since the threshold can be selected without depending on abrupt changes in tube operating conditions.

As mentioned earlier, the HA-14 contains its own built-in antenna change-over relay and s.w.r. bridge. Designed to be actuated by the VOX relay contacts in the exciter, the antenna relay closes during transmission and connects the exciter's output to the amplifier's input circuit and the amplifier output to the antenna connector. In addition, cutoff bias is removed from



This bottom view of the HA-14 was taken with the perforated steel cabinet removed. At the right are the two carbon-anode 572B amplifier tubes. Just visible in the compartment at the top of the photograph are the bifilar-wound filament choke (right) and the input-circuit coils and band switch. Final-amplifier tank-circuit components and band switch are in the lower front area of the photograph. Rear apron connectors shown are (l. to r.): r.f. output (SO-239), r.f. input (phono connector), power and control plug, and high-voltage connector.

the amplifier tubes (resting current is approximately 90 ma.). During reception, or when the amplifier's power ON-OFF switch is placed in OFF, the antenna relay connects the exciter output directly to the antenna for "barefoot" operation. Cutoff bias is applied to the amplifier tubes in this condition. Since the 572-B tubes have directly-heated filaments, there is no waiting when going from low power to high power. Just flip the amplifier switch to ON and the amplifier is immediately and automatically ready for use.

The s.w.r. circuit is a kind of Monimatch<sup>3</sup> and, with its panel indicator, measures relative power output and s.w.r. (0-6 relative power, 1:1 to 3:1 s.w.r.). A concentric control on the front panel allows for switching between forward and reverse power (outer large knob) and for controlling meter sensitivity (inner small knob). Since the s.w.r. bridge is connected in series with the antenna output connector, the circuit also can be used for relative power and s.w.r. measurements when only the exciter is in operation.

The HA-14 is called a kilowatt *sideband* linear amplifier and the manufacturer does not give any c.w. ratings for it. However, the tubes are husky enough for a c.w. kilowatt, and the a.c. power supply (HP-24) is rated for 500 ma. on c.w. with a 30-percent duty cycle.

Since the amplifier was designed primarily for mobile operation and as a companion for the HW series of exciters,<sup>4</sup> suggestions are included in the instruction manual for mounting and connecting the amplifier to this equipment in the mobile or fixed station. Because of its top-to-bottom measurement of slightly over three inches, it can be neatly tucked in almost anywhere.

The HA-14 amplifier described here was supplied to us by Heath already wired. However, a skim through the instruction manual and a glance at the finished product indicates that the entire assembly would probably be no more than a week-end project.

Our amplifier performed well, too. A few checks in the ARRL lab confirmed that the little amplifier handles its advertised power, although it was difficult to maintain a nominal 13 volts d.c. at close to 50 amps. maximum during the d.c. power-supply test!

<sup>3</sup> McCov. "Monimatch, Mark II," *QST*, February 1957.

<sup>4</sup> "Recent Equipment," *QST*, January 1964.

#### Heathkit HA-14 Linear Amplifier

Height: 3 $\frac{3}{8}$  inches.

Width: 12 $\frac{3}{8}$  inches.

Depth: 10 inches.

Weight: 7 pounds.

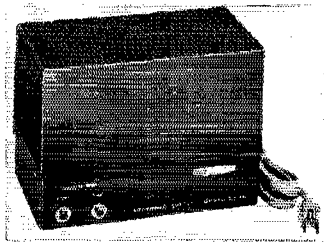
Power Requirements: 2,000 v.d.c., 500 ma. peak; -120 v.d.c. at 60 ma.; and 12.6 a.c. or v.d.c. at about 1 amp.

Price Class: \$100

Manufacturer: Heath Company, Benton Harbor, Michigan.

#### Model HP-24 A.C. Power Supply

The a.c. power supply for the HA-14 is almost as much of a surprise as the amplifier. This kilowatt supply isn't much larger than a shoe box! A voltage doubler circuit, it has a string of semiconductor rectifiers and series-connected electrolytic capacitors, and develops about 2500 volts d.c. with no load. It has an effective output ca-



pacitance of about 20  $\mu$ f. and the supply has a rated ripple of less than 1 per cent at 500 ma.

There are other windings on the transformer for providing bias voltage (-180 volts no load), a.l.c. threshold voltage (about 6 volts d.c.) and filament voltage (12.6 volts a.c. at 4 amps.).

The primary of the power transformer is actually two windings which may be connected in series for 230 volts or in parallel for 115 volts. Although designed for 60-cycle operation, we have had reports from foreign operators who have successfully used the supply and amplifier with 50-cycle current. The primary windings are protected by two push-to-reset circuit breakers. On-off control of the power supply is accomplished remotely from the panel-power ON-OFF switch on the HA-14 amplifier.

#### Heathkit HP-24 Power Supply

Height: 6 $\frac{3}{4}$  inches.

Width: 9 inches.

Depth: 13 $\frac{1}{2}$  inches.

Weight: 18 $\frac{1}{2}$  pounds.

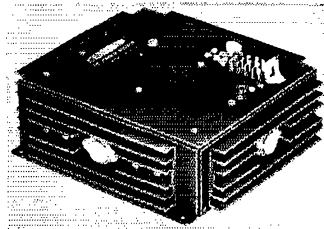
Power Requirements: 120 v.a.c., 60 cycles, 16 amps. max.; 240 v.a.c., 60 cycles, 8 amps. max.

Price Class: \$50

Manufacturer: Heath Company, Benton Harbor, Michigan.

#### Model HP-14 Transistorized Mobile Power Supply

This d.c. power supply will operate only from negative-ground systems. Four transistors in a





push-pull parallel switching circuit oscillate at approximately 1500 c.p.s. High voltage output is 2300 volts, no load. Bias and a.l.c. threshold voltages are also provided. Heath rates the allowable ambient temperature for operating the supply at  $-10$  to  $+122$  degrees Fahrenheit. The input current rating for the supply under load is rather staggering but cars with alternators should be able to keep up with it . . . at least with no other electrical accessories turned on! A thermal circuit breaker protects the supply from overloads. — *WICUT*

### Heathkit HP-14 Mobile Power Supply

Height: 2 $\frac{3}{8}$  inches.

Width: 8 $\frac{3}{8}$  inches.

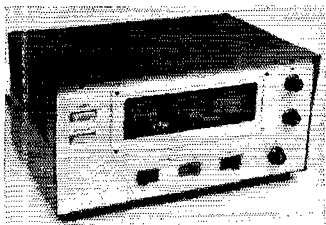
Depth: 7 $\frac{3}{4}$  inches.

Weight: 8 pounds.

Power Requirements: 12 to 14.5 v.d.c. (negative ground), 25 amps. average, 50 amps. peak.

Price Class: \$90

Manufacturer: Heath Company, Benton Harbor, Michigan.



## The Clegg Apollo Six Linear Amplifier

THE Clegg Apollo Six is a linear amplifier designed for use with the maker's Venus 6-meter sideband transceiver. It is styled to match the Venus physically as well, but it will work with any other 50-Mc. transmitter in the 2-to-50-watt power range, whether it be for sideband, a.m., c.w., or all three. Insofar as possible, the Apollo is a complete package, requiring few external accessories other than an exciter and an antenna. Power input is 675 watts peak d.c. Output is up to 325 watts, depending on driving power available and the mode of operation.

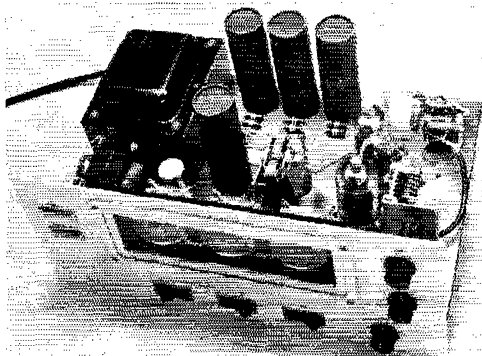
### Design Features

Operating any linear amplifier is a touchy business, but the Apollo's designers have done everything they can to make this one foolproof yet flexible. If the user follows the adjustment procedure and checks the results with an oscilloscope he should obtain optimum results with minimum difficulty. Use of almost any oscilloscope is made easy by the inclusion of a "detected output" jack in the output-metering circuit. Separate illuminated meters are provided for indicating grid current, plate current and relative output. This is much better than a single switched meter, as simultaneous monitoring of these factors is a must for optimum results with a linear amplifier.

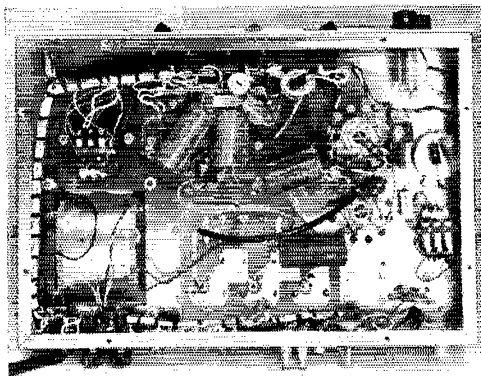
The amplifier uses two 8236s in parallel. These high-perveance graphite-anode tetrodes tend to show little distortion, even when run into the grid-current region slightly. The husky power supply has a Hypersil transformer,  $T_1$  (physically small size for its power rating), and an all-solid-state bridge-rectifier system. The transformer has a separate winding for the screen supply, the output of which is regulated by an OAB. A second transformer, supplies heater and bias-supply voltages.

The input and output circuits are pi networks. Driving power may be fed either into the amplifier or directly through to the antenna, permitting instantaneous switching from full-power operation with the Apollo to use of the Venus at its normal power-output level. Reduction of power when conditions permit is required by law, and is especially desirable in v.h.f. work, where a few watts is often all that is needed for entirely satisfactory communication. Relay sequencing is used to make this change while in communication, by manipulating the front-panel switches for "high voltage on" or "high voltage off."

Several other features contribute to the flexibility of the Venus-Apollo combination, and make the Apollo useful with a wide variety of drivers. The input line is broken and provided with two coaxial fittings, on the back of the Apollo, for insertion of an attenuator for exciters giving more



Interior of the Clegg Apollo Six Linear Amplifier. The two paralleled amplifier tubes are at the right. Three meters give simultaneous monitoring of grid current, relative output and plate current, an important feature in assuring proper operation in the linear mode.



Bottom of the Apollo, with amplifier tube sockets visible at the right. Printed circuit board, lower center, is for power supply circuits.

than the required driving power. A coaxial jumper cable connects these two jacks otherwise. An accessory socket on the back wall supplies the a.c. power for the driver if one-switch control is desired. The a.c. switch on the amplifier then serves for the driver as well.

Extensive precautions are taken to assure safe operation of the amplifier, even in the hands of an inexperienced operator. The plate current meter is connected in the negative side of the high-voltage supply, and it is protected by an overload relay, set to open at 600 ma. A nonlinear (Globar) resistor, in the lead between the diode rectifier system and the filter, prevents excessively-high initial charging current. It presents a high resistance at high currents, dropping to under 10 ohms at normal drains of 100 to 400 ma.

Amplifier tubes occasionally act as noise generators. This prevented by one section of the bias and input switching relay, which increases the bias on the amplifier from the normal operating level to minus 150 volts during standby periods. This relay and the antenna changeover relay are

operated on d.c., obtained from a rectifier on the 12-volt winding on the bias and heater transformer. This eliminates the chance of noisy relay operation, occasionally encountered with a.c. relays used for r.f. power switching.

The Apollo instruction book spells out installation and adjustment procedure in fine detail, giving the Clegg Venus and 99-er as examples of setting up for typical sideband and a.m. drivers. The information given should enable anyone who wishes to do so to make use of the amplifier with any available 50-Mc. transmitter of up to 50-watts power level. Full power output from the Apollo requires an exciter output of about 8 watts, but the amplifier works well with lower-powered drivers, producing up to 16-db. gain regardless of driver power level below the maximum needed. A 2-watt driver would be capable of pushing the Apollo to about 80 watts output, for example.

Where there is excessive driver power on sideband, an attenuator should be used, rather than merely keeping the speech gain down to limit the peak output. The latter approach tends to result in a poor carrier-suppression ratio and increased output of other unwanted components. The instruction book gives details of suitable attenuators, and the manufacturer even offers to make specific recommendations for use of the Apollo with units of other make, provided that the owner will supply a copy of the instruction manual for his intended driver. — *W1HDQ*

#### Clegg Apollo Six Linear Amplifier

Height: 7 inches.

Width: 15 inches.

Depth: 10½ inches.

Weight: 35 pounds.

Power Requirement: 115 volts, 60 cycles, 500 v.a.

Price Class: \$257, with Venus cable.

Manufacturer: Squires-Sanders, Inc., Millington, New Jersey.

## NEW BOOKS

**Practical Oscilloscope Handbook**, by Rufus P. Turner. Vols. 1 and 2 in one set. Published by John F. Rider Publisher, Inc., Div. Hayden Publishing Company, Inc., 850 Third Ave., New York 22, N.Y. Cat. No. 339. 225 pages complete, illustrated, 6 by 9 inches, paper covers. Price, \$5.90 set.

The oscilloscope is certainly within amateur budgets today, and many have purchased this valuable instrument. It is a shame that after looking at a few modulation patterns, most hams let their scopes lie unused because of lack of understanding what the instrument will do. In two editions author Turner has compiled the uses of the scope and explained carefully each test procedure. The first volume features an introduction on how the scope works, and covers basic tests and measurements. The principles of

scope operation are analyzed, and the reader is shown how to run a scope properly. The measurement of current, voltage, phase, and frequency are explained, each with step-by-step directions for testing. Specialized applications of interest to amateurs, such as the testing of audio amplifiers, receivers, and transmitters, are given, together with patterns of the results to be expected.

The second volume is intended for the laboratory technician, and some of the tests shown will require more complex oscilloscopes than those normally found in ham shacks. Checking physical quantities such as time, pulse characteristics, transients, noise, vibration, speed, inductance, and capacitance are explained. Other tests described include checking components (such as relays, vibrators, microphones, diodes, and transistors) computer testing, and verifying the performance of pulse circuits. A chapter is given to the more advanced oscilloscopes, such as the storage types, and photographing scope traces. The two books represent a valuable addition to any experimenter's library.

# AIDS FOR TRAFFIC MEN

## *How To Make Your Traffic Net Run More Smoothly*

BY GEORGE W. HIPPISELY,\* KIWJD

WHEN running a net, five major categories of operating aids can be used. The first is a container of beer or a soft drink, 12-ounce size for Section or Region nets, 16-ounce size or larger for one-hour Area nets. The second little helper is Operating Aid 9A (available from ARRL upon request), which lists all the QN signals. This should be kept very close because the print is small. (Besides which, in the longer net sessions, one tends to get bleary-eyed from the first-mentioned "aid.")

### *Maps and Charts*

The third aid is a map of the geographical area being covered. Generally, for most effective use, the map should cover a somewhat larger area than that of the net concerned. For example, on EAN, which covers the eastern third of the U.S.A. and Canada, one would use a map of the entire U.S.A. and Southern Canada, but on a Section net (such as the Eastern Mass. C.W. Net) a map of New England would suffice. In conjunction with the map, another set of information having to do with how to route traffic for locations outside the immediate area is useful, such as lists of Eastern and Western Massachusetts towns and cities, to determine which net any message for an unknown community should be aimed at. A routing list of communities in the section and the best routing for each, in terms of the known traffic-handlers in the Section is also helpful.

On EAN, I use a modified ARRL Worked-All-States check-off card (Op Aid #8) to tell in which Region and Area each of the states and the Canadian provinces is located. My map of the U.S.A. is also marked with boundary lines depicting this information. Occasionally, when a reliable relay to some of the foreign countries with which we have third-party agreements turns up, this info is added to the card. Many hams put these aids on their desk top under a glass covering, but glass has a bad habit of breaking (I broke mine by standing on it to set my clock to WWV); others tape the various aids to whatever blank surfaces can be found.

Besides this there's a set of four maps around the walls of the room, most of them large enough to be used for extracting required information without glasses on, a drawerful of New England maps and Massachusetts cities and town lists, etc., and little bits of paper tacked here, stapled there and taped everywhere else. Not really the unified scene an interior decorator would go for, but functional.

### *The Written Record*

The fifth aid is the written record that the traffic man uses to help him perform efficiently as net control. This necessarily is part log (because to have to perform logging operations separately would decrease efficiency) and part

\* 20 Oakridge Ave., Natick, Mass.

A photo in April, 1965, *QST* (p. 100) showing the author NCSing the Eastern Area Net generated so much interest in the log form and associated technique he uses that a general discussion of aids for traffic men seems in order. Not all traffickers aspire to be net controls, of course, so the latter half of this article will deal with aids for the non-NCS participant.

visual aid (because the ordinary log form was not designed to help one run a traffic net).

Those of you who have read the article in Nov. 1963 *QST* about running a net session may recall that it was concerned in part with guaranteeing that the net run as efficiently as is reasonably possible. If you agree that this is a valid aim, then you must also believe in visual or other aids to help out in a net of all but the smallest size. Prior to adopting the present NCS sheet, most of my experiences had been with Section and Region net sessions. Now Section nets usually don't have a heck of a lot of traffic, nor do they run at a fast pace (compared to an Area net), so the lack of a good aid was no drawback. The Region net had such a small number of Section representatives checking in that again the usefulness of a visual aid such as that about

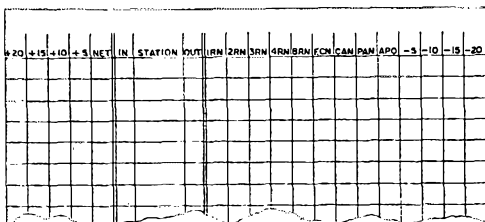


Fig. 1—K1WJD's net-control sheet for Eastern Area Net, before any entries are made on it. See text.

to be described might be considered doubtful. But a few times NCSing the Area net had shown a need for some system of keeping the stations and traffic straight. Thus, when the March and May issues of *QST* for 1959 described this NCS sheet in the Traffic Topix column in Operating News, it was tried and found to be darned near ideal.

Fig. 1 is a portion of such a sheet, before any entries for the evening have been made on it. Stations checking into the Area net are listed one under another with their traffic for each of the Regions and other Area nets: these destinations are arranged in an orderly matrix to the right. In addition, if a station is a representative (let's call them reps) for a Region net or TCC function, the square corresponding to his call letters and his Region is blackened. The columns labeled NET, UP 5, 10, 15, 20, DWN 5, 10, 15, 20 (they could be labeled with specific frequencies instead) help keep track of where everybody is, much like a panadapter with tags for all the "blips" on the screen.

During the net, the system works as follows: As each station checks in, enter the number of messages he has for each Region or Area in the

appropriate square. In addition, place an 8-32 hex nut (or similar, non-rolling object) opposite his call in the NET column. As the stations continue to check in, keep your eyes open for traffic in the same column as a filled-in square. When such an intersection occurs, send the two stations involved to an unoccupied frequency while simultaneously moving the hex nuts corresponding to these two stations. Then cross off (with a single diagonal line) the item(s) of traffic being cleared. (In Fig. 2, WINJM and W4DVT are DWN 5, clearing PAN traffic, while WB2AEJ and K8NJW are UP 5 taking care of 2RN messages.) When they return to the net frequency after successfully clearing the traffic, it is only necessary to return the hex nuts to the NET column and they're ready to pass traffic with other stations in the NET column. If they were unable to finish (or even start) clearing the traffic, circle the crossed-off number and wait for more propitious circumstances. (In Fig. 2 again, WINJM and K2SIL had gone off frequency earlier, to clear PAN, but perhaps because of long skip had been unable to do so.) They may have failed, for instance, because of QRM up 10, in which case NCS might send them down 10; they may have been unable to copy each other because of plain weak signals, in which case NCS might send them off again as soon as a "QNB" (relay) station is available; and so on. Assuming the traffic is successfully cleared on the second attempt, draw an "X" through that box to show that the problem has been overcome. (Thus we see that W4DVT and K1YKT,

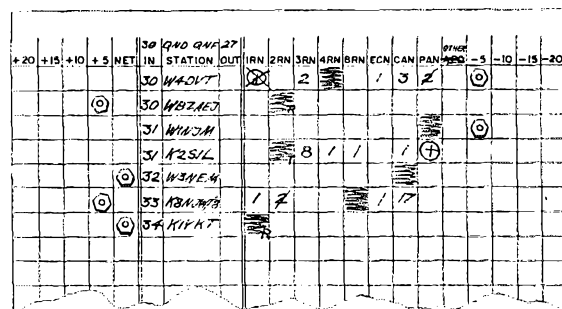


Fig. 2—The net-control sheet in use in a typical EAN session. The hex nut is on the NET column when the station is standing by on the net frequency, in one of the + or - columns when handling traffic off the net frequency. The IN column shows what time each station reports into the net, the OUT column what time it is excused. The 1RN, 2RN, etc., columns show how much traffic each station has for other Regions in the Area. See text for detailed explanation.

who had trouble clearing DVT's 1RN traffic, have apparently ultimately succeeded.)

A failed-message-handling is circled because it is preferable not to erase during the rush of a net session (in panic, you may erase the wrong box, or more likely, knock the eraser under the desk) and also because the circle serves as a reminder that other methods will be needed to handle the traffic successfully.

Besides the obvious advantages of this form, if you are interested in maximum efficiency you can usually, but not always, attain it by trying to get as many pairs of stations off-frequency as possible. Thus, an important corollary is: Minimize the number of nuts on the net frequency at any given time. (By the way, one sure way to keep the nuts off the NET column is to forget to tape down the form before starting the net. This not only keeps them off the NET column, it keeps them off *all* columns and puts them under transmitters, receivers and desks.)

The author takes no credit (or blame) for this NCS sheet. This version and many other versions appeared in *QST* six years ago, and at that time K6HLR was credited with the idea. Some of the other versions submitted by traffic men included a magnetic plate beneath the paper to keep the nuts from wandering all over, use of a bulletin-board-type surface and map tacks or similar stick-em-in gadgets, etc. Some of the EAN net controls use the same form as I do but make light pencil marks in the various frequency columns. When stations return to the net frequency, the two pencil marks are erased or crossed out.

This type of form seems to have maximum usefulness for nets having between five and twenty representational subdivisions. In small Region nets it is probably of limited usefulness, particularly when the traffic load is light. In nets much larger than EAN it, too, may fall by the wayside, but I know of no better form for such a situation. Although it was specifically intended for nets in which the subdivisions are well-defined (in the case of EAN, the subdivisions are the Regions in the eastern Area of NTS and the TCC assignments reporting to EAN each night), it could probably be used to good advantage in the larger Section nets, particularly those with a fair number of metropolitan areas such as the NYS CW Net, which covers the W.N.Y. and E.N.Y. Sections. In this case the columns might be ruled ALBANY/SCHENECTADY, SYRACUSE, ROCHESTER, BUFFALO, etc. See Fig. 3 for a rough idea. Most traffic into a Section net is of course for metropolitan areas, but the NCS usually spends a fair amount of his time clearing the traffic going to towns which average only a few messages per year. These he would insert in the blank squares between the "metropolitan" squares, roughly according to east-west geographical distribution.

#### Use of Maps

Although maps are recommended for *all* nets, the exact manner in which they are used changes

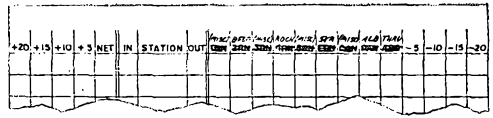


Fig. 3—The net-control sheet modified for use on a section net. The New York State Net (NYS) is used as an example. See text.

from level to level of NTS. Normally, in a Section net, a map is used to determine where a given community is, or which of two stations is closer to the destination of the message. At Area level, however, you do not need a map to tell you how to route traffic, because routing has nothing to do with the exact location of the stations involved, only with the functions they are performing.

The biggest use of a map on EAN comes during the long-skip season. As each net session proceeds and stations begin reporting back to the net with uncleared traffic because the skip is too long, the NCS should be formulating some opinion of the severity of the skip, whether it's lengthening or shortening, and the approximate minimum skip distance. For this he may or may not use the map, but once he has determined what the skip situation is for the evening, he knows whether to try to clear short-haul stuff first or wait until near the end of the net; he knows what minimum distance *most* (we're dealing with probabilities here, not absolute rules) stations will have to maintain to rapidly clear their traffic. With this info in hand, he turns to the map to determine, in conjunction with his NCS sheet, whom to send off frequency with whom, and when. When selecting a station to QNB (relay), the map helps him pick one far enough from both the receive (RX) and transmit (TX) stations having difficulty. Often the QNB station will be from outside the geographical area being served by the net in question, which is one reason for always using a map of an area larger than you think you are concerned with.

#### Non-NCS Aids

For the traffic man concerned with aids for non-NCS activities, maps, Q signal lists, etc., are still useful and desirable adjuncts. The NCS isn't the *only* one who is supposed to know the Q signals or how to route traffic.

A copy of the ARRL Net Directory is a must. The time comes when you want to set up a sked with a fellow traffic man in another Section, Region or Area, and you only know that he can be reached through his nets; or, you find you forgot to ask for a fill on a message you received from another station, and now you want to know if there are any nets of his you might be able to QNI to complete the message handling; or, you may suddenly be handed an EMERGENCY message. There are many possibilities which make the directory an absolute requirement.

Since the traffic man is primarily concerned with relaying messages, the actual process of

receiving, recording, routing, transmitting and filing each message should be as efficient as possible. Let's examine a few procedures which will help efficiency:

1) Use regular plain white note pads or ARRL forms and put one message on each sheet. File cards can be used, but they are of thicker stock and take up far more room in storage. Besides, pads are cheaper. Fig. 4 shows a sample message. Each message page, in addition to having the actual message written on it, contains information telling from whom the message was received, to whom it was passed (in this case, it was telephone directly), and data necessary for quick totalling of traffic-handling points at the end of the month. This message was received and delivered (R & D), thus two points appear under the month handled (April '65).

2) The "fun" part of the system, however, is the routing of traffic. For example, if you are on EAN as a 1RN rep, you know that you will receive traffic for New England only. You also know that you'll be checking into the early session of 1RN the next evening to unload the traffic to the various Section net reps, except for traffic for your own Section. Therefore, as you receive each message, you know which net it's going to, and the net designator can be written near the right hand edge of the paper (see Fig. 4).

An aside: It is best not to use prepared forms at this point. Start with blank pieces of paper and write in all this other information that goes with the message as you are copying, if your experience and skill permits. Some operators copy "five to the line" to make checking the word count quickly possible. As time from copying

Fig. 4—In place of ARRL blanks the author uses pad-size paper for use in his station for most messages. Servicing notations show the month and count at upper left, the categories at the top, and station and delivery data at the bottom. See text.

permits or after receipting for the message, record certain handling data on your message. This would normally be the station, date-time received for, and any other operator notations. One way to be sure of your count (if not five to the line) is to insert slant bars in the text every five words to count the check. In this manner, by the time you have finished receiving the message it is ready to be sent along its way. The completed message is then either dumped into an unsorted

pile, left on the pad, or immediately filed in the proper slot.

3) Resourceful hams have made good use of two tissue boxes, one cut up into rectangles to be inserted in the other, forming drawers or shelves, either horizontally or vertically (see

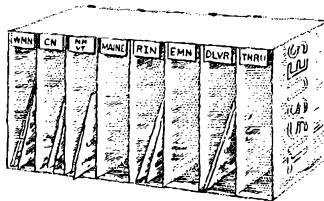


Fig. 5—It's easy to make up a simple filing system for messages "on the hook." The author used an empty facial-tissue box.

Fig. 5). If you are a rep from EMN (East Mass. Net) to 1RN, for example, you'll want shelves marked THRU, WMN, CN, NII/VT, ME and RIN. For the return path, you might be able to label a few shelves with some of the bigger metropolitan areas in your Section, but in general you'll have to lump all Section traffic together. If additionally you are a rep to the Eastern Area Net, you would want shelves labeled 2RN, 3RN, 4RN, 5RN, 6RN, 7RN, 8RN and PAN. (And no matter how many shelves you have, you always need one more, called OTTIER!) As you pick up messages on one net for distribution in another net, you'll want to count the contents of each shelf before QNLing the second net, so you can promptly and efficiently report the number of messages for each destination, rather than fumble around and waste the net's time.

4) Many traffic men use a mill or typewriter. This makes the above procedure difficult because you can't easily skip around with the mill. If you're the type that does most of your traffic handling with a small number of stations from each of whom you receive large quantities of traffic, then probably the typewriter pays off. Another objection to the typewriter is that the noise it makes may be distracting to the point of making you miss copy.

#### Moral

Every story has to end with a moral, and the moral of this one is simply that all the aids in the world won't really make a better traffic man out of you. Nothing described herein helps your fist, your signal or your ear. It may make you get more fun and enlightenment out of traffic handling, but in the end it's the nut holding the key that counts. QST

**SWITCH  
TO SAFETY!**



**QST for**

# YL news and views

CONDUCTED BY JEAN PEACOR,\* K11JV

## George Did It

We're all familiar with the saying, "Let George do it!" Radio amateurs in the Bangalore, India area are more familiar with "Let George Victor do it!" And he does. G. V. Sulu, VU2GV, is the editor of Bangalore's Amateur Radio Club magazine, *SIRAN* (South India Radio Amateurs Newsreel). Mr. Sulu recently devoted an entire issue of *SIRAN* to YLs, which could easily have a skyrocketing effect on the YL ham population in their country.

There were no YLs in their amateur ranks until after World War II when Mrs. B. M. Chakravarti became the first and held the call VU2YL. She and her OM, VU2BU, were very active until 1951 when a move made it necessary to curtail operations for a few years. It is everyone's hope that she will resume her radio activities in the near future.

India now has four licensed YLs; the present VU2YL, Mrs. Audrey King; VU2QFZ, Miss Sipra Banerji; VU2LA, Miss S. Lalitha; and VU2EV, Miss K. R. Shantha, the YL Editor for *SIRAN*.

In March, 1964, several YLs had a get together meeting at the QTH of Miss Lalitha where plans were made to have YL meetings once a month. This group has become the first YL Club in India. With the hope of assisting many YLs in obtaining their amateur radio li-

\* YL Editor, *QST*. Please send all news notes to K11JV's home address: 139 Cooley St., Springfield, Mass.

censes, Miss Lalitha agreed to start by teaching code classes three nights a week. All YLs agreed too, at the meeting, to give full support to Mr. Sulu's suggested special YL issue of *SIRAN*.

New interest has already begun to show among the YLs of India. The latest report stated that the XYL of VU2RX had passed her Grade II test and they will become the second YL/OM team as soon as her ticket arrives (the first being

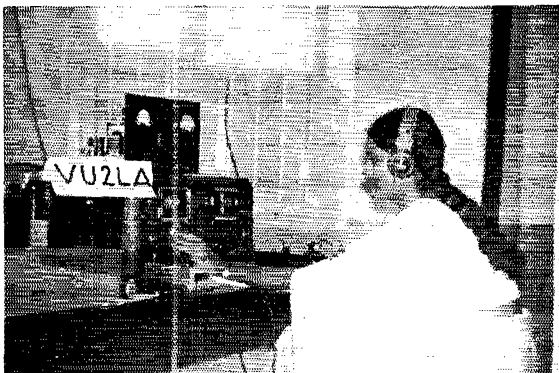


Kayla Bloom, W0HJL, is the newly elected President of YLRL for 1966.

VU2AK and VU2YL). Five other YLs are also waiting for their tickets, which take up to eighteen months to receive after all the formalities, and five more were completing exam preparations which would enable them to take the exam.

Grade II in India means a Novice license, issued since 1960, to encourage more interest in hamming. It requires 5 w.p.m. c.w. ability and a one-hour theory exam. Grade II licenses have a 'Z' suffix which is dropped when the Grade I exam is passed, usually within three years. Grade II licensees are permitted operation in the 7 and 14 Mc. bands only, with power restricted to 25 watts. All beginners must operate c.w. for the first year. For Grade I, the code speed exam is 12 w.p.m. with a higher standard one-hour theory exam, which enables them to use 100 watts on all h.f. bands and 25 watts on v.h.f. frequencies.

The new YL club of India boasts twenty members in a late report. YLs from all over the world contributed articles to the *SIRAN* YL Special



VU2LA, Miss S. Lalitha, was adjudged the Bangalore Ham of the Year in 1964 and is leader of the first YL Group in India. She is the first Indian ham to talk on All India Radio; her topic being "ITU and Radio Amateurs." She operates regularly on 7 mc. c.w.



During their European vacation trip, the Barbers of Bloomfield, Conn., visited a number of radio amateurs in many different countries. Spending Bastille Day with Ginette and Bernard Falmet and Marceau in France was an added pleasure. Shown at Marceau's radio shack are (seated l. to r.) F3MW, F9WY, W1PRT; (standing) F9WK and K11IF.

with the express purpose of creating more YL interest in their country. It should be noted that this was done in the true spirit of 1965, which is the International Year of Cooperation.

If your 40- or 20-meter antenna isn't functioning properly, or you've never contacted a VU2 YL, be forewarned! All reports point toward an upward surge of YL activity from India which will be a boon to all of hamdom. Whoever said "Let George Victor do it," had foresight!

#### YLRL Election Results

YLRL (Young Ladies Radio League) is the largest YL organization in the world and membership is open to all licensed YLs. In 1939, a handful of YLs had a dream which resulted in its birth. Since then, YLRL (which sponsors the YLAP and YL/OM contests and YLCC, WAS/YL, WAC/YL and DX/YL certificates) has steadily grown.

One goal of the new officers is to build on the initial dream until at least one-half of the women amateurs of the world are members. You can help in making this possible. Any questions you may have pertaining to YLRL will be gladly answered by any of the following new officers. Congratulations and best wishes to all.

- President — W0HJL — Kayla Bloom  
 Vice President — K1EKO — Edie McCracken  
 Secretary — WA6AOE — Maxine Hanbery  
 Receiving Treasurer — K1OLM — Joyce Garlick  
 Disbursing Treasurer — K5YIB — Barbie Houston  
 District Chairmen:  
 1st District — W1YPH — Leona Peacor  
 2nd District — WB2PYI — Camille Hedges  
 3rd District — W3CDQ — Elizabeth Zandoniui  
 4th District — W4BAV — Cathy Seeds  
 5th District — K5OPT — Ruth Jank  
 6th District — K6UTO — Betty Kuegman  
 7th District — K7PEE — Edith Bennett  
 8th District — W8ARJ — Roberta Lemon  
 9th District — K9ZLB — Mildred Bovee  
 10th District — W0UMO — Alice Hanney  
 KH6 District — KH6BTX — Gladys Stickle  
 KL7 District — no nominations  
 VE District — VE7BBB — Eva Green

#### A Field Day for the Gaylarks

Spring Creek Park near Romball, Texas was the Field Day site chosen by the Gaylarks, Gulf Area Young Ladies Amateur Radio Klub, this year. June 26 and 27 proved to be an excitement packed weekend and great fun for many of their members who participated.

If you contacted K5SKF that weekend, you had the good fortune to contact the only YL club who reported having organized as a group for the occasion. Throughout the rest of the year, Gaylark members' radio activities may vary with some preferring nets, some ragchewing, some only operating on one favorite band; but, come Field Day, all join forces for the best show of contacts and a good time.

Plans for the event were arranged by the President of the Gaylarks, K5DJS, Mary Jo Turner; Field Day Chairman, WA5FVH, Sue Hutton; Asst. Chairman, K5JKV, Annie Smith; Food Chairmen, K5BJU, Harriet Woehst, and K5JGC, Bea Boycott; Equipment Chairmen, K5YTT, Grace Tracy, and K5PPF, Audrey Beyer. All of these YLs also operated and were joined by K5MIZ and WN5MPM.

With their site all chosen, the OMs pitched in to help with antennas and starting the generator. There were a few anxious moments at the outset, which always add to the fervor of Field Day. 2100 GMT on June 26 arrived and the generator refused to generate. However, even though it seemed like an eternity at the time, the OMs rose to the challenge and had the club on the air in five minutes.

Working in one hour shifts of logging, then operating and then resting, the Gaylarks racked up a total of 400 contacts in 50 sections. The majority of contacts was made on 40 meters where they also contacted their largest number of sections. They also operated on 80 and 20 meters.

Lack of sleep appeared to be their only hardship, as the OMs saw to it that all were well fed. All who attended agreed that much was gained and agreed that there are few weekends that can compare with Field Day weekend each year.

#### It's All in the Family

So much can be gained from the spirit of some fine healthy competition. From the time you're old enough to understand the meaning of a contest,



The Gaylarks operating on 40 meters during FD were K5JGC and K5DJS at the mike.



whether you win or lose, something is always gained from every one that is entered. The shiny new bike or new car that are sometimes offered as first prizes, aren't necessarily the greatest thing that may result, as you'll see in reading about the Mercer family.

Dick and Laura Mercer of Los Gatos, California are the parents of Evelyn, who is now 18, and Bill, who is 16. Little did they realize when Bill was Cub Scout age and entered an SWL contest, the great pleasure the entire family would later receive as a result of his competitive spirit. Whether Bill won the contest is not known, but that he did manage to log all call areas using an SX28 receiver certainly aroused great enthusiasm around the Mercer household.

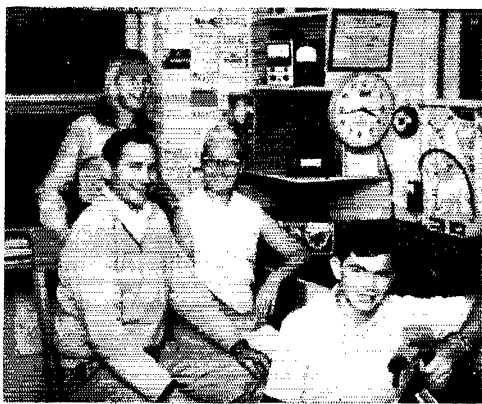
When the West Valley Amateur Radio Club sponsored a novice class a few years later, all of the Mercers enrolled. This resulted in the all-ham family now recognized on the bands as Dick, WB6OTB; Laura, WB6FCX; Evelyn, WB6MHA; and Bill, WB6FEH.

That the Mercers are an asset to amateur radio, they have shown through their long list of activities. They all participated in the June VHF QSO Party, the Armed Forces Day amateur program at Skagz Island U. S. Naval Communications Station NPG, operating on 80-meter c.w., and with the Santa Cruz County Amateur Radio Club during Field Day, when the family manned the 40-meter phone station and completed 175 contacts in the 24-hour period.

Dick is on the Board of Directors of the Santa Cruz County Amateur Radio Club, to which the family belongs. His call, WB6OTB, can often be heard on 20-meter c.w. where he enjoys DXing.

Laura, WB6FCX, is also a c.w. fan and likes 40 meters during the day. This is where you will find Evelyn too, when time permits as she is now majoring in Education at the University of California.

Bill, WB6FEH, is active on 2 meters and is a regular member of several 75-meter traffic nets, sometimes acting as NCS on the Northern Calif. Traffic Net. Other nets include the San Joaquin Traffic Net, the Skits Net, and the Calif. Weather Net. His fine contest spirit was recently demonstrated again during a QSL card designing contest sponsored by the Santa Cruz County Amateur Radio Club. The club recently acquired the call of the late John Reinartz, K6BJ, who was a club



The Mercers of Los Gatos, Calif. would enjoy corresponding with other all-ham families.

Photo courtesy of WA6UDE.

member. Bill's winning design featured the schematic drawing of the basic Reinartz tuner.

Their family station includes a TR3 for mobile and home with an all-band dipole. The standby station is a T-60 with a Drake 2-B receiver, a 20-meter homebrewed quad and a 15-meter homebrewed beam; also, assorted longwires and dipoles in the redwoods.

A contest's first prize to some might be that shiny bike or car, but there are few prizes finer than what have resulted from Bill's contest spirit for the Mercer family.

### Special Requests

From a 13-year old General Class license holder — "Are there any 13-year old YL hams? If so, where?" — WB6MTB, Mark Donnell

From a spokesman for several 14- to 16-year old OMs —

"The absence of 14- to 16-year old YLs on 80 meters has been noticed by several OMs. With the hope that the situation can be corrected, we'll be standing by on 3640 kc. for a call." — WB2SRN, Edward Johnson

### YL Club and Net News

A new YL c.w. net, sponsored by VE3 YLs, meets on Saturdays at 1900 GMT on 3650 kcs. NCS rotates. All YLs are welcome.

1965/1966 new officers for LARK have been announced as follows: Pres., K9IWR; V. Pres., K9EMP; Secy., K9FHM; Treas., WA9CCP; Pub., K9ZVV; Novice Rep., WA9ABG; Editor, K9TGK.

The Colo. YLs announce their new officers as follows: Pres., W0UTO; V. Pres., WA0EXX; Secy., W0HWL; Treas., WA0BBR; Editor, K0WZN; Pub., W0ESD; Historian, K0BTV. Layre announces the following new officers: Pres., K6ELO; V. Pres., WA6ISY; Treas., WA6LWE; R. Secy., WA6LKP; Car. Secy., WA6OAZ.

### Coming Events

YLAP — for all YLs. Phone portion Nov. 3 and 4. See September QST for complete rules.

LARK Fall Festival, November 13, 1965, Saturday, at Austin YMCA, 501 N. Central Ave., Chicago, Ill. At 6 p.m., \$2.50 admission and dinner, at 7 p.m., \$1.00 admission only. Tickets available from K9IWR or at door.

Q57



K5JKV and K5YTT began FD operations on 20 meters using an SR150.

# The World Above 50 Mc.

1215-1300

2300-2450

3300-3500

5650-5925

10,000-10,500

21,000-22,000

30,000-9

CONDUCTED BY SAM HARRIS,\* W1FZJ

## Meteor Scatter on 144 Mc.

SINCE the pioneering of W4HHK and W2UK in the early 1950s the use of m.s. techniques to increase the number of states worked on the 144 Mc. band has become standard procedure. It isn't that you can work farther on m.s. than on a tropo opening. It's just that meteors are always there. You can predict that a given path will yield some signals if the stations are suitably equipped. How much signal will depend somewhat on how you define "suitably equipped."

I guess it's safe to say that anyone who has worked 30 or more states is probably running a kilowatt. (For our purposes we will define a kilowatt as anything in excess of 500 watts output.) Now whether "suitably equipped" means a kw. transmitter is something else again.

I am indebted to W4ZXI for stirring up my interest in 144 Mc. m.s. Russ spent an afternoon at my place in August. Among other things we set up a tentative m.s. sked on 144 Mc. Due to this prodding by Russ, I was all set up for skeds when I received a note from K4IXC. John has been eyeing the Florida to Puerto Rico path for some time but couldn't get any takers on this end. I was hot to trot and replied with sked details. Unfortunately my primary frequency control decided to give up and I was forced to transmit on a different frequency than I had anticipated. Now one other part of "suitably equipped" means that you know what frequency you are on and also what frequency you are listening on. I knew where I was listening for John but he didn't know where I was transmitting. As a result I had the better part of a week of just listening to John's signal with no hope of him hearing me. This gave me time to set up my automatic ping counter, my length-of-time-above-the-noise recorder, and my peak signal above the noise recorder. The data taken with this equipment were very informative. First a few ground rules. John is running a kw. and some sort of quad yagis which ought to have at least 17 db. gain. The path from his QTH to mine is about 1150 miles. My receiving antenna has 32 elements and being a store-bought device (pair of Finney 6 and 2s) has maybe 15 db. gain. Receiver has 2 db. noise figure and recording equipment has 100 c.p.s. bandwidth. Both antennas see the ocean for a horizon. John transmitted the first and third 15-second periods of each minute giving me a total of 30 seconds per

minute listening time. The listening periods started at 0500 and continued until 0530 GMT. Data were taken for the first three weeks of September. As near as I could tell John was sending about 30 words per minute which gives an information rate of 2.5 letters per second. A ping is defined as anything shorter than one letter character. A burst is anything containing a complete letter and for our purpose we have divided the bursts into 1 second, 2.5 seconds and 10 seconds.

The three-week average yielded the following: 1 ping per minute listening; average signal-to-noise 10 db. or less; 1 burst of 1-second duration per 5-minute listening time; signal-to-noise plus 15 db. 1 2.5-second burst per 15 minutes; signal-to-noise plus 15 db. or more. 1 10-second-or-more burst per 30-minute listening, signal-to-noise 25 db. or more. Not included in the data is one 72-second burst on September 9, during which the first Florida to Puerto Rico m.s.-144 Mc. contact was established by K4IXC and W1FZJ/KP4.

The important thing to note is the strength of the signals. If John had dropped his power from 600 watts out to 60 watts out (10 db.) I would have missed the friendly little pings every minute or so but we still would have had our contact! The bursts would still have been there and the longer more usable ones would have been well above the noise level. The real problem isn't how much power but how fast can you transmit the intelligence. At 30 w.p.m. it takes 10 seconds to send K4IXC de W1FZJ/KP4. At 60 w.p.m. we would have time to give our calls both ways in a 10-second burst. On s.s.b. we would have time to exchange calls, reports and rogers in a 10-second burst. Of course the signal-to-noise would be less due to the increased receiver bandwidth but all the 2-second or longer bursts would have been readable, assuming that the listening station has a receiver designed to receive s.s.b. and an operator who knows how to tune s.s.b. This is of paramount importance. Anyone can read s.s.b. if it is properly tuned in. An s.s.b. operator, like a good c.w. operator, can read it just as well whether it is tuned in or not. The difference is that he can read it at five times the information rate and on m.s. it is the information rate that counts.

Speaking of information, etc., we note that W8PT is leaving the Michigan v.h.f. scene to try his luck in a warmer clime. Greenville, South Carolina, is his target area. Jack leaves an enviable record of 41 states on 144 Mc., 10

\* P.O. Box 1738, Arecibo, Puerto Rico 00613.

states on 220 Mc., and 11 states on 432 Mc. He proposes to go full bore on all three bands from the new location and will be looking for skeds.

### WA6LET Moonbounce Results

The combined moonbounce efforts of the Stanford Research Institute Amateur Radio Club and the U.H.F. Radio Club, W6GD, resulted in 11 complete and 2 partial 432-Mc. QSOs. Calls worked by WA6LET included K2MWA/2, W3SDZ, W9HGE, W2CCY, G3LTF, K2CBA, K2LYC/2, W2FZY/2, W21MU/2, W1ZIG, and W1HIV. Partial contacts were made with W9GAB and HB9RG.

All contacts were made on c.w. Some trouble was encountered with error in tracking the moon with the 150-foot dish, but when the aiming was "on" signals were as strong as 569. The installation is capable of reception of the station's own echo on 432-Mc. s.s.b.

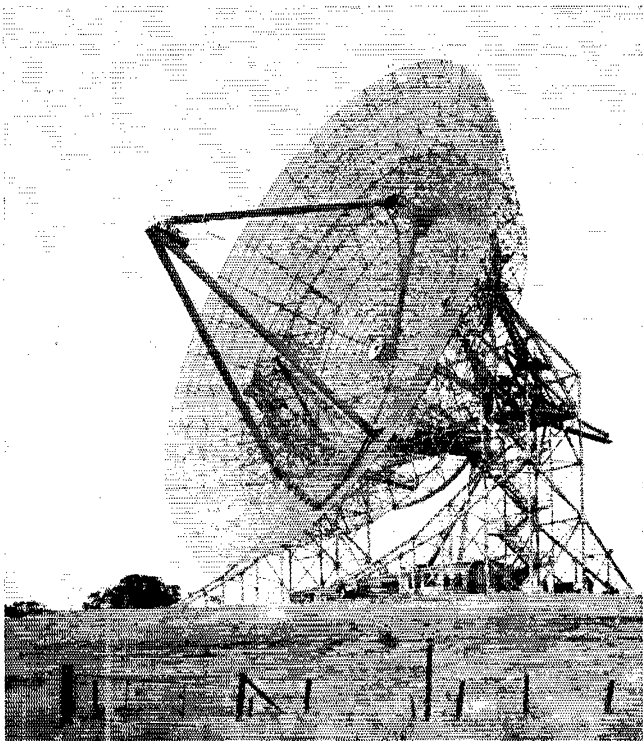
The SRI Radio Club was active in another way over the Sept. 25 weekend. WA6KKK/6, Mt. Hamilton, worked WB6JZY/6, Yosemite National Park, on 5650 Mc., extending the record on that band to 120 miles.

### 144 Mc. and Up

The boys from 2 land are in there doing their share on 432 Mc. W7PUA/2 writes that he's been spending most of his time on that band and is now running 600 watts to a vapor-phase-cooled 4CN15A. Bob sez it puts out 300 watts to a pair of 13-clement yagis at 70 feet. Receiver is a 2N2857 preamp that is working very well. He's looking for 432-Mc. skeds

particularly to the north, northwest and northeast, his best directions. Anyone interested can write him at 3 Oakdale Road, Denville, New Jersey. From New York K2ACQ, K2CBA and K2YCO all send 432-Mc. reports. Doug, K2ACQ, writes that on August 11 he worked Wisconsin and Illinois making a total of six states and four call areas now worked on 432 Mc. with 10 watts input. A new transistor preamp for 432 has been completed by K2CBA using 2 RCA2N3478 transistors. Jud sez: "It is at least 1 db. better in noise figure than the best 416B I've seen and is considerably more burnout proof." (Add this item to your "Good to know" file.) Other projects in the works at Jud's QTH are construction of an all-transistor converter for 432 and erection of the 85-foot rotating tower so he can use his new 10-foot-square 432-Mc. array. 220-Mc. news from that location is that K1UGQ was worked on August 1 during miserable weather conditions. Chuck, K2YCO sez that "432 has been a dream for several years of logical progression and a goal now reached in a modest way. Underway is an el-az mast for 432 with a 10-foot square frame." Although new to the band operation on 432 Mc., August 11, 12 and 14 brought Chuck's states worked to four. Equipment is a basic exciter HX-30 driving a homebrew-amp-transmitting converter, 50 through 432 Mc. at 100-watt input level. 829s are used on 50 and 144 and 5894s on 220 and 432 Mc. A 6360 mixer-buffer is used on 220 and 6939s are used on 432. This in turn drives kw. PAs. Power output on 432 is about 400 watts c.w., 300 watts s.s.b., and 250 watts a.m. From Salisbury, North Carolina, K4Q1F seems to be busy on 432, 220 and 144 Mc. Rusty tells us that on August 31 he heard S2 signals from W3RUE on 432 Mc. but no QSO. However, on the 30th he had already "shot his wad" by working W4TKH in Kentucky

for state number 4 on that band. He's also been working W4VHH (180 miles) regularly with signals always S9. "I have a new final for 432 and am running about 600 watts to a 4CX250. Plate circuit is a resonant cavity. I am getting a measured 425 watts output. Receiving gear on 432 Mc. is a paramp. Will take all the skeds I can get on 432 Mc." So sez Rusty. He bemoans the fact that although he was heard S2 by K8AXU, no contact was made due to radar (S9) at the North Carolina end. "We have an occasional S9 radar on 220 that has knocked me out of more new states than I care to think about." Concerning two meters, he tells us that August 31 produced a nice tropo to the north and northwest, when he worked W8SDJ, W8KAY, K8AXU, W3RUE and W4ZCM. Although he



150-foot dish (44 db. gain) used at WA6LET in Stanford, California for tests with KP4BPZ, etc., on 432 Mc. during July and on September 25 for further moonbounce work.

can work all of these fellows under normal conditions they don't have S9 signals as they did on the 31st. W8YIO in Michigan was also worked the same night (525 miles) with an S5 signal report.

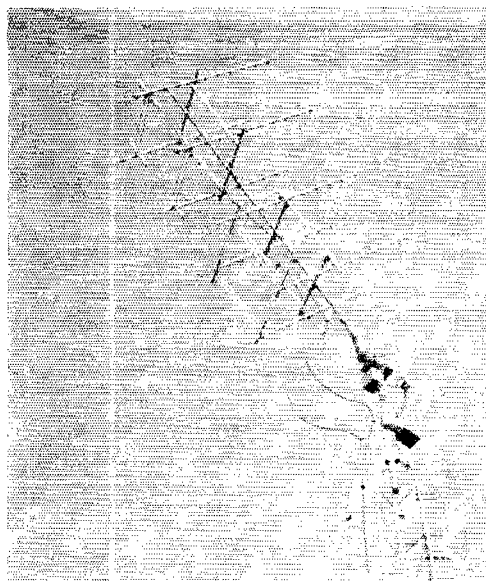
The September V.h.f. Party was the occasion of the first known 432-Mc. contact between Oregon and California. K7AUO/7, the Tektronics Amateur Radio Club group at Paulina Peak, near Bend, Ore., worked W6GDO, Rio Lina, Calif., some 350 miles over rough terrain much of the way. W6GDO reports high activity on 432 regularly. One interesting contact is with WA6KKK, Palo Alto, a distance of about 100 miles. Though WA6KKK runs only a few watts, he is a steady S9 at W6GDO, presumably the result of knife-edge effect from Mt. Diablo, directly between the two stations.

The Mount Mitchell, North Carolina expedition made by W4MVB, et al. was almost but not quite a flop. The boys were about to call it quits with no contacts when they did manage to work stations in Jacksonville, Florida and St. Simons Island, Georgia. The second bright spot was the contact with Tom, W4HJQ in Kentucky which gave him a new state on 432 Mc. Jess (W4MVB) sez it apparently was a comedy of errors of some sort. It was found out upon returning home that they were hearing stations that didn't hear them, and a number of other stations were hearing and calling the mountain-toppers. "It was a disappointing trip but we hope to try it again next year with better results. We appreciate all those who showed an interest in our activities and hope we can do better by them next year." That's the old v.h.f. spirit! Jess! If you don't succeed, try, try again! From 6 land WB6IOM sez: "1296 Mc. normal." Pete is continuing skeds with W6UID on 1296 s.s.b. with S9 reports on two weekends, and he also worked W6HPH in Palm Springs, about 60 miles. On the construction end of the band a new amplifier has been completed. It is all sheetmetal and requires no machining; uses two pieces. A 2C39B delivers 100 watts p.e.p. output with about 10 watts drive at 350 watts input. The amplifier will drive a 7650 final. At El Monte, California, W6EUZ celebrated July 4 by transmitting pictures of the local fireworks. Nice going! From Watervliet, Michigan (boy, how many of us will miss that town on the v.h.f.), W8PT kept skeds on 220 Mc. during the Perseids with W0EYE and K5TQP. "All stations heard, but only one ping from K5TQP during our one time only hour sked. Meteor scatter contacts are possible on 220 Mc. but as far as I know no one has made one." Jack also kept skeds on 144 Mc. with K1MTJ, K1OYB, K1UGQ and K7NII and worked K1UGQ for state number 41 on two meters. Congratulations, Jack! That sure puts you right up there!

Remember all those v.h.f. reports from WA0DZH? Start looking for them in the future from WA9NKT at Freeport, Illinois instead. Lon has changed locations and presently is operating 432.018 Mc. exclusively, running 485 watts input with an 8122 in the final. Receiver is a Parks 2P preamp followed by an 8058 converter to a 75S1. Antenna is a 48-element colinear up 55 feet. To date Lon has worked four states and hopes for three more soon. He's open for skeds and QTH is 1235 Hillcrest Lane, Freeport, Illinois. Norm, WA9HUV, writes that on August 11 the New Yorkers were heard at his QTH "loud and clear, especially K2YCO". with VE3AIB also heard on 432 Mc. Norm's 500 watts of s.s.b. can be heard on 432.044 Mc. Mondays, Tuesdays and Thursdays regularly or c.w. (700 watts) when the going is tough. W0PHD sez: "At the present time we are biding our time waiting for

someone to come forth with 432-Mc. station capabilities that we can work. One such station is VE4RE who will soon be active on the band from Brandon, Manitoba. (Eureka!) This is an air line distance of 185 miles and over a path which seems to be good as judged by reception of f.m. signals. We also hope to make arrangements with W0BJV for similar tests over this 225 mile path which we can make consistently on two meters. WB2JVO and WA8DXW are both working with 440-Mc. TV. John (WA8DXW) sez he's built a u.h.f. converter and power supply for 440 Mc. TV which converts from 440 down to channel 6. "Now I need a signal to test it out!" O.K., you other fellows in the area, give him that signal. WA2UDT writes that he has had several contacts with WB2KLD on 5650 Mc. during August.

A very fine report received from W1AZK concerning not only his own two meter work but that of a number of New Englanders. It's good to have news from that area once again. Thanks, Don! Sez he: "Activity was way up during the Perseids shower and at least ten new stations that we know of were pinging away. K1MTJ, K1OYB and K1UGQ all in Maine worked into 4 and 8 lands, with K1ABR (Rhode Island) and W1MEH (Connecticut) doing likewise. It sure was good to hear those Maine stations hooking up with Florida, they fill a long-needed want." Actually I've misquoted Don's letter so to set the story right: K1UGQ worked W4WNII (Kentucky), K4IXC (Florida) and W8PT (Michigan). K1MTJ worked W4WNII (Kentucky), W4JFU (Virginia), K3OBU (Delaware), K3WQB (Maryland), VE3ETO (Mountain, Ontario). K1OYB worked W4MINT in Florida. Marty (K1OYB) sez that a good time was had by all of the Maine boys and they are all open for skeds, six meters through 432 Mc. Back to Don, W1AZK, who sez that both W1JSM in Massachusetts and himself in New Hampshire found it rough going on their skeds to the west and failed to make it. Although Don did have a contact with W4AWS in Florida it was a new state for Art but not for W1AZK. K1ABR writes that after a too long absence from two meters he became interested in m.s. via the influence of K1MTJ and W1JSM. The influence and advice were good! On August 12 contact was made with W4AWS in Florida and on the 13th contacts were made with W4MMT in Florida and W4WNH in Kentucky. Dick sez: "Orionids, Leonids, Geminids; I'll be at 144.175 Mc. and will be glad to sked stations in states already worked as well as new ones." From Monroe, Connecticut, K1WHS writes that conditions on two meters were unusual on the night of September 7. "K1WHT and I first noticed conditions when we heard K4BRK in western Virginia calling us. We swung the antenna to the west and heard W8SKP in Ohio. We then worked K3QOY in western Maryland followed by K3BBO/3 in western Pennsylvania. K8EJU was then contacted in Maumee, Ohio. After working Larry, we disconnected our high level modulator and went to s.s.b. Other stations worked were W8MVE on a.m., WA8GKK on n.b.f.m., and WA8HXS who was on c.w. and running two watts from Toledo, Ohio. Antennas here were 8 over 8 yags at 90 feet, RG-14 feedline, homebrew 7788 converter into a military receiver. Transmitters run a.m., c.w., or s.s.b. and the two meter rig is a pair of 4CX250Bs of our own design." Sounds great, Dave! Thanks for the information. W7PUA/2 at Denville, New Jersey writes that his one and only sked during the Perseids worked out on the fourth try when he and W0CUC at Sioux Falls, South Dakota made a go of it. This



Moonbounce antenna used by K9UIF on July 3 and 23.

makes 24 states for Bob on 144 Mc. He's looking for skeds with Minnesota, Tennessee, Arkansas, Alabama and South Carolina, plus anyone else who'd like to volunteer. WB2FXB worked W8WEN in Ohio during the Perseids for state number 15. Rob (WB2FXB) is now off to school and will be unable to keep skeds except during holiday season. From New Jersey WA2UDT noted above average conditions on 144 Mc. on August 8 and 15. Bill sez he's been operating c.w. most of the summer and finds that activity is not bad having worked ten states via that mode during the past month. States worked for WA2UDT stands at 13 on 144 Mc. with Vermont still needed to complete New England.

In answer to our "gripe" that readers don't keep us informed, WA2IPC has written of his doings for the last two months since getting on the v.h.f. bands. Mal has completed the 6-and 2-meter transmitter he's been working on for two years and is running about ten watts. He's using a homebrew Big Wheel for the antenna and finds it works nicely. The receiving gear is a 6-and 2-meter converter taken from the *V.H.F. Manual* with one of W1HDQ's nuvistor preamplifiers on the two meter section. "This preamp works so well that I can hear stations that are unable to hear me." (That means you need either more power or a bigger antenna!) Two projects are in the works at the QTH of WA2ZPD, an 8 over 8 homebrew-skeleton slot array and an 829B linear amplifier with an input over 100 watts. Ray sez that August has been a good month for him on two meters with stations worked in New Jersey and Pennsylvania and others heard in Virginia, Delaware, Tennessee and Maryland. "I could have worked many more than I did if I had more power and a good v.f.o. or if the heard stations tuned higher in the band." The two meter boys in Delaware are surely in there trying to give Delaware to those who need it on 144 Mc. W3BIP writes of his activities during August: "August 8 worked K1HTV in Connecticut on c.w.; August 10 heard VE3RPR on c.w. but he did not answer my call (shame on you, Rae!); August 14 worked VE3DSE on c.w.; August 25 worked W1AZK in

New Hampshire and W1JSM in Massachusetts on c.w.; August 26 worked W1MEH in Connecticut on c.w.; August 10 through 14 kept m.s. sked with K4SJF in Atlanta, Georgia and although he copied me on tropo scatter the first morning I never copied enough of Andy to identify him for sure." Bet you'll make it during the next shower, Sam! K3OBU, also in Wilmington, Delaware, writes that he worked stations in Connecticut, Maine, New Hampshire and Massachusetts during the month of August on 144 Mc., and his Perseids sked with W0DQY in Missouri paid off with a contact making 20 states for Joe on two meters. He sez that W0DQY was solid Q5 for four minutes and come the next showers he (K3OBU) will be on s.s.b. Nightly skeds are being kept on c.w. with K9UIF at 2300 EDT. Joe also wrote us about the "terrific band opening between the east coast, Ohio and Michigan on the night of September 7. It was by far the most spectacular opening to the west that I've heard in my six years on 144 Mc. It all started when I heard WA2LTM frantically calling W8GZE on a.m. I quickly turned my beam west and heard W8GZE, also on a.m., coming in with a Q4 signal. I heard K8ZES calling CQ on a.m. with a Q5 S6 signal, gave him a call and made the contact. Right after that, K8PBA on s.s.b. called me with even better signals. I could hardly believe it when he said 'QTH 30 miles north of Detroit'. I heard a number of 8s coming in both on s.s.b. and a.m. all with good readable signals and practically no QSB. Funny thing was that they were all in the 100 kc. just above 145 Mc. and the low end seemed completely devoid of all signals except a few 2s. The opening moved northeast as time progressed with K1UHU and K1WHS working several stations that weren't even heard by WA2LTM or K3OBU." Thanks much for all the information, Joe. Wish we could use the complete letter but space prevents.

On August 13, W4HHK worked W0EYE at Boulder, Colorado on 144 Mc. Paul, W4HHK, was using the 12-year-old antenna originally used to make the first (anywhere) two-meter m.s. contact with W2UK almost 12 years ago. Congratulations, Paul! Very nice to know that you're sticking with it. W4MNT worked W5JWL in the Aquarids shower and K1ABR and K1OYB during the Perseids to bring his states worked up to 30 on two meters. George would like skeds with stations in Vermont, Oklahoma, Nebraska, South Dakota and Kansas. At Lake Worth, Florida, WA4BMC now has a 32-element co-linear up at 75 feet making a big difference in both receiving and transmitting. Big Mike is mainly interested in Nets and Traffic. From Louisiana K5HFI sez that conditions have been good to the north recently for contacts with W5AKI and W5WDG; and W5ZIO writes of unusual conditions on July 13 on 144Mc. "W5GIX contacted K0IOV in Missouri on 145.3 Mc. with signals (Gonsets at both ends) 5 x 7 fading after about 20 minutes. This appeared to be a case of unusual propagation due to a small patch of sporadic-E layer ionization and it would be interesting to learn whether other contacts were made from this cloud." We haven't heard of any, Jim. Perseids QSOs completed by K5TQP were those with: WA6FDY, K6GCD, K7ICW, W9AAG and W9MAL. The contacts took anywhere from one minute and 15 seconds to a full hour plus one minute for completion. "The shower seemed better than usual this year," sez Fred. Another convert to meteor shower work is W5UGO. Larry tells us that during July he worked K0CER (South Dakota), W9AAG (Illinois) and W0IDY (Iowa). Then came the Perseids in August when he

worked K4IXC for a new state on both ends of the contact. Anyone need Oklahoma? Larry's caught the fever and is ready and willing and even anxious for skeds. The California stations are gaining on that states worked box for 144 Mc. and K6HMS is one of the gainers. Skip recently worked K5WXXZ for number 9 and is looking for "c.w.-m.s. types to sked in Oregon, Idaho, Oklahoma and Wyoming particularly." WB6EST writes that while he's working on a 13 x 13 slot antenna for two meters he's using a 6-element yagi and the omnidirectional colinear array from the Handbook. Larry sez that most of the two-meter activity in the L. A. area is via the two repeaters K6MYK (146.98 in and 145.22 out) and WA6TDD (145.424 in and 146.385 out). "The repeaters are vertical in polarization as is all two-meter activity out here." Really!! We're happy to receive word of the two-meter doings in Montana via W7TYN. Joe writes that there is a lot of two-meter activity in that state mostly low power and a.m. 144.450 Mc. is the common state frequency for both a.m. and c.w. and the boys are trying to get an f.m. frequency set up also. "The most common method of DX type work in the state of Montana is using these mountains about us as passive reflectors. The method is one in which you set up a path between stations using the most prominent peaks as passive reflectors." It's being done more and more often recently with good results. Do let us know how you boys continue to make out in Montana. Out in Michigan, W8IBB sez that by whirling both the dial of the receiver and the rotator he can copy W8KAY and K9UIF on their skeds almost 100 per cent. John has been copying a W9 station quite frequently who calls "CQ West" at 144.086 Mc. and then fades out before he signs his call. K8AQA noted good conditions several times during August on 144 Mc. to southern Michigan, Ohio and Wisconsin. W9AAG has worked K5TQP for New Mexico. Dallas, W9AAG, tells us that Fred called first "and was in here a full 30 seconds solid, then two sets of calls and preps of S3 from myself, rogers both ways and it was all over. That may not be a record for brevity for a scatter sked but it should tie it. Fred's signals had the sound of tropo scatter and that's probably what it was with the meteor shower responsible for helping the path." He goes on to say that that week (August 8) was quite good for tropo work with VE3s, 2s, 4s and 8s coming through. The best DX heard to the east was W2AMJ on the 11th when he was in and out of the noise for some time. W9RSV and WA9BYF are now on f.m. on 146.88 Mc. and Don is also on RTTY. The main activities at K9UIF's QTH are trying to work K7ICW, K7NII and W7MFP on m.s.; getting a permanent tower for moonbounce on 144 and 432 Mc.; working nightly skeds on 144 Mc.; and getting more power and antenna on 432 Mc. Walt ran a sked with W7MFP (Utah!) during the Perseids but no luck. Out in South Dakota K0CER worked VE3DIR on July 29 and W2AZL and W3BYF during the Perseids. States total now is 17. Bill tells us that W9ENC also worked two new ones but his were in California and Minnesota; and W0CUC worked New York, New Jersey and Ohio. Guess we'll have to start watching these fellows in South Dakota more closely. W0PHD at Warren, Minnesota, sez: "During the month of August this station had a chance to try meteor scatter tests with K2RCH and a contact was made on August 12. From this test we learned the following: this shower was not as strong as some of the lesser showers, QRM was a problem one reason being the hot-band conditions during this period that gave 300-mile stations signals

like locals and secondly there seems to be a pre-dominance of m.s. skeds at Oscar III frequency of 144.100 Mc." We've had this same comment from several other stations. Doc tells us that there is a great increase in two-meter activity in the Red River Valley of the North which includes western Minnesota and northeastern North Dakota.

### 50 Mc.

It's a little late to report this but on 50 Mc. you never can tell what'll happen and some of you fellows just might make this same contact. We just received word that on June 17, 1965, WA4QLZ at Miami, Florida, worked WA4QKG/H18 in the Dominican Republic. "Bill (WA4QKG/H18) was running f.m. and I used the standard A3. Bill says that he will QSL all contacts made and United States amateurs should QSL to his home QTH at 230 Sunset Avenue, Fayetteville, North Carolina." Sorry we didn't have this interesting news earlier in the skip season but maybe some of you fellows made the grade without the information.

Band openings on 50 Mc. are dwindling but we're still receiving a few reports. WB2HZY in New York noted openings on August 1, 17 and 28 but didn't mention who or what area. WA4STJ sez that the band has been fairly quiet during August with only a few openings observed and worked, but nothing fantastic. Jim has heard RTTY at 50.111 Mc. several times from the north and is wondering who it is. From Miami WA4QLZ sez that the band has closed down for everything except local QSOs. Only one five-minute opening on August 23 to WA3ANB. In Tennessee, K4KYL caught openings on August 1, 2, 3, and 15, and W2UZN/4 in Virginia caught one into Indiana, Kansas, Michigan, Ohio, Missouri, Wisconsin, Oklahoma and Minnesota. I'd say that was a pretty good Sporadic-E swan song. From 5 land and Louisiana, WA5JVL observed skip conditions on August 2, 3 and 4 into Ohio, Virginia, Indiana and Michigan. Out in California K6LDM and WB6BBH both report no skip activity during August although Jerry did mention hearing some scatter signals. K8WVZ and W8MBH each caught one opening during August on 50 Mc. Reg (W8MBH) mentions that on August 7 a number of stations in Arkansas, Florida, Louisiana, New York and Texas were heard working 8s in Michigan and Mike (K8WVZ) heard Maine, New Hampshire, Massachusetts and Connecticut and Nova Scotia working into his area on August 1. Mike is presently using a Marauder and 2B at his QTH and is once again active on 50-Mc. mobile. A contact on July 20 with K5KPC in Texas is the big one that WA8KPN will remember for quite a while. That was Ralph's longest two-way RTTY contact on 50 Mc. "Received my QSL from W7CNK in Washington for state number 39. Had my 5,000th QSO on six on July 6. All this within the last three years." So sez Jim, WA9FIH. As someone once said to me (W1HOY): "My! But you do talk a lot, don't you." An opening on September 6 led W9DID to send us his news. Bob managed to work stations in Ohio, Michigan, Indiana, Pennsylvania, New York and Canada and says that K2MNB in New York was the outstanding signal of the day. Many Ohio stations worked their first Illinois and Iowa contacts during the opening. Out in Cicero, Illinois, WA9FIH either had more time than most of the gang or was more alert to the 50-Mc. band, but he did catch openings of one sort or another on eight different days during August with fifteen states being heard plus VE3 and VP7 lands. In Wisconsin K9FPM

(Continued on page 168)



CONDUCTED BY ROD NEWKIRK,\* W9BRD

**When:**

We had brief but interesting word from AP8B and the Lahore Amateur Radio Society last month concerning the state of the art out Pakistan way. This reminded us of an intriguing article on India's ham history in a past ARSI *Ham Bulletin*.

Almost every region has had an H.P. Maxim, its "father of amateur radio." India's technical trailblazer appears to have been the late Sir Jagadish Chandra Bose. This pioneer, according to *SIRAN*, organ of the Amateur Radio Club of Bangalore, independently improved the sensitivity and recovery of coherer detectors in the early 1900s, publishing many papers on this and other Hertzian matters. Sir J. C.'s favorite field, however, was investigation of the effects of radio waves on plant life. In this he was working with microwaves a quarter century before v.h.f. was harnessed for radar.

Continuing with excerpts from the ARSI account, one Shri A. C. Gooptu was assigned the station call 2JK in 1921, thus probably becoming India's first amateur per se. . . . Then came public ham-style experiments in the temple chambers, Calcutta, to demonstrate communication with a cruiser lying in the Hoogly about a mile away. . . . Musical entertainment attempts by amateurs cluttered up our own U.S. airwaves for a brief period in the art's dawn. Likewise in India where it is recorded that 2CR used a Marconi transmitter at home for similar activity, a short-lived 1925 broadcasting enterprise. . . . Things really began to roll the following year as world-wide use of short waves accelerated. Mr. Mukul Bose became 2HQ. He's now VU2HP. . . . 'Tis understood that young Mickey Mazoomder, later to become renowned as VU2CQ, was smitten by the DX bug as a youngster in the Calcutta shack of 2HQ. . . . Young blood was a feature of 1928 when 16-year-old S. N. Kalra qualified for his license as 2DF. The *Bulletin* records, "He still vividly remembers the anxious months that went by between the date of his application and the day the license arrived." . . . Around this same time Dr. S. K. Mitra opened one of the earliest Indian school stations, 2BZG at the University College of Science, Calcutta. . . . Radio Club of Bengal appeared on the scene, too, as 2BZF. . . . QSLs from Indian stations before the 1932 Madrid Convention carried the informal "ai" prefix (Asia-India). Thereafter the VU prefix became official and the modern DX era was under way. . . . Catching VU2CQ and other VUs on ten

meters was a fresh and popular W/VE pursuit in the later 1930s.

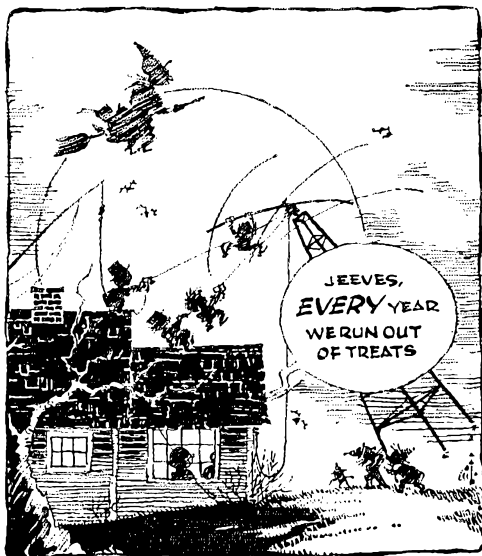
\* \* \*

The evergreen of amateur radio flourishes in soils of peace and good will. It thrives poorly on such disturbing news as that lately coming out of the far east. But when storms abate, as we know they surely must, the hardy roots of hamdom sprout and bloom anew.

**What:**

Well, we're nearing the payoff portion of another operating season. Nights grow long and deliciously quiet for the lower-frequency gang, and the daylight bounce beefs up for higher-frequency sport. So far, as early returns roll in, our DX bands seem considerably snappier than they were last year at this time. Could be just wishful imagination — what's *your* verdict?

**160** will be watched with particular interest. Will I.8-Mc. long-haul performance deteriorate rapidly as the sunspot count starts upward or can we count on another hot year or two? Conclusive indications may be provided by the 160-meter Transatlantic and World-Wide DX Tests, a series of activities promulgated by WIBB and associates since 'way back in '32. Reminiscent of pioneering transatlantic crossings by Deloy, Schnell, Reinartz, Godley and others in 1921, the Tests will be held this 1965-'66 season on the following Sunday mornings — December 5th and 19th, January 2nd and 16th, February 6th and 20th, 0500-0730 GMT. W/K/VEs are urged to call CQ DX TEST for the first five minutes of the hour, listen the next five minutes, call again during the third 5-minute period, etc., until contacts are made. WIBB exhorts, "Set your clocks accurately! Generally speaking, eastern U.S.A. stations will be found from 1800 to 1825 kc., and westerners from 1975 to 2000 kc. Most Europeans will use 1825-1830 kc., VKs like 1800-1860 kc., ZLs prefer 1875-1900, JAs stick close to 1880 kc., and other DX usually concentrates between 1800 and 1830 kc. Working DX on 160 is challenging and extremely interesting. The obstacles of QRN, BC harmonics, QRM, Ioran, QSB, etc., all require great patience, a topnotch station and careful operating techniques. Remember, these Tests are not meant to be contests." WIBB



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





G2RO has been hitting the hot spots for years, lately concentrating on the mid-East. Here Bob hobnobs with a local who racks up lots of desert DX. (Photo via W1YYM)

will appreciate frequent and regular reports on your 1.8-Mc. DX results and observations to be evaluated, tabulated and passed along to "How's" and other editorial relay points. FCC-licensed amateurs brand new to 160 should ascertain what frequency segments and maximum power inputs prevail at their locations; p. 60, July 1963 QST, gives a rundown. W1BB and many of the OT 1.8-Mc. mob think it would be a great idea to give newcomers to this band a DX break. At 0500-0730 GMT, January 9th and March 7th, it is therefore recommended that the big-signal transatlantic W/K/VE regulars simmer down and clear the deck for "first-timers." European and African first-timers will be given the same courtesy December 19th and February 6th. Happy huntin'!

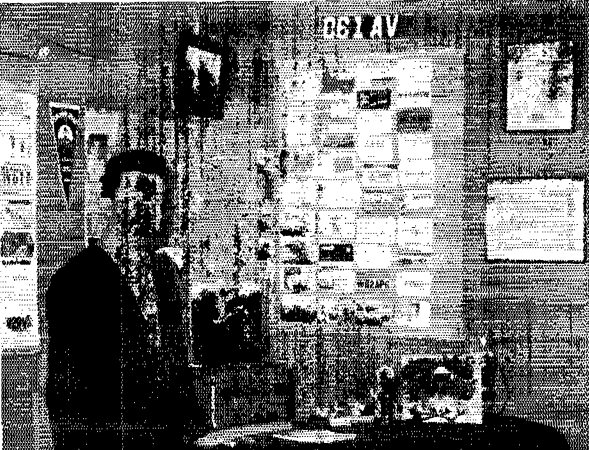
**15** phone played 'possum all summer and then stepped on the gas. Ws 3HNK 8YGR, WAs 2FUL 3BTA 4PSA 4RPK 9BGK 9GZH 9IBT, Wbs 2DZZ 2MJD 2OAE 6CUI/5 and listener W. P. Kilroy netted CEs 1BI 2CO 3GA 3GM\* 3CL 3GS 3QB\* 3QW 3RC\* 3UT\* 3YU 4BX 4HK 4HL 4HP, COs 2DL 8CG, CP8AM, CRs 4AD 4AG 4AJ 4AY 4BC 8SP\* (21,392) 2100-2800 GMT, 6AT 6BC 6BK 6C\* (607) 2401, 12, 6DR 6DS 6HF 6IH 6JL 6JM 7BAI 7FM (205) 18, Cts 1CL 1IE 3AO 3AQ, Cxs 2CN 2TD 3FB 4BL, Es 4AI 8BQ 9EN, Hs 2AV 9S, EL20\* (405) 18, Fs 2TW 2ZL 5FP/FC (230) 13, 9BA, plenty of 6s, GMs 3BTV 5NW, HCs 1EL 1JR 1KV 100\* (430) 23, 2OC (380) 23, 2EH\* (433) 23, loads of HKs including 0AL 0QA\* HPs 1AP 1PV\* 5FG, HRs 1CP 1RP\* 2ABC\* 3AC 9EB, JAs 3AK 3GUP 0BLU, K0HGM/KS6\*, KC4-1SP\* KG4AA\* (410) 18, KH6s BGS\* FNV\* (420) 2, KP4s ATY AZJ\* (435) 19, CKY\* (420) 3, KS6BQ\* (434) 2-3, KV4CX\* (400) 19, KX6BU\*, KZ5s AB\* (405) 23, 1W\* AX\* BE BI\* 20, BT JW\* (380) 1, SS, LUs galore, LX1K, OAs 1K 6AM\* (401) 22, OE7GB, OD5s AX\* HU RZ\*, ON4EN, PJ3CD\* (400) 23, plenty of Pys, PX1YR, PZ1s AX\* (370) 23, BA BL O, Tcs 4AA\* 7SS 3IA 8RH 0AA\* (415) 23, TIs 3JZ 8AB 8BJH, TN8s Aa BK, TR8AD, Tu2s Ae AP 18, UD6KAK, VK6s LG QL, VO1HR, VPs 1WY 2AX 22, 2GAZ 2GW 2KD 2LS 2SV 3AA\* 4LE 4LF 4LR 23, 4RS 4VT 6AQ (267) 15, 7CL\* 7DI1\* 9R\* (430) 21, VR4CN, a dozen XEs, that YJ8BG feller, YNs 1J0E\* LLC 1MAN\* (400), 4CWH 4JAB 4TM 6HH, YS1s FSE\* IGM JAI, YU6CB, YVs in quantity, ZB2AJ, ZC4MO, ZDs 7GP\* 13, 8HL\* (390) 15, 8TV\* 8WZ\* (415) 17, ZEs 1BP\* 4JS, ZLs 1CA 2AX

2UD, ZP3s AB AL, ZSs 1VAI 1XX 6BFU\* 6JS\* GUR\* 9C 18, 4X4s 1M MC, 5H3s JJ\* JR\* (431) 19, 5N2RFB, 5X5s IU\* (407), KRL (220) 15, 5Z4s AA\* (353) 17-18, 1A, 6O6BW\* (408), 6W8CZ, 6Y5LT, 7Q7s PRD\* PW\*, 9G1s FF FL\* (280) 17, FR FS RH (288), 9H1s AG R, 9J2s DT WR\*, 9L1s JW\* (395) 16, NJ\* WN, 9O5s AA AB DL GG (223) 15, KC\* (388), NT (318) 18, PL (220), QR\* (313) 19, RB UW BV, 9U5s BB 1B KU MV, 9X5s AV RZ and VF, the asterisks representing single-sideband signals, a mode still heavily outgunned by straight-a.m. armament on 21 Mc.

**15** c.w. interest builds up in proportion to saturation of the 21-Mc. phone subband so it, too, is beginning to painitate. WIBDI, K3s FOP TEM, WAs 2WJ 3BTA 4QBX 4YDR 7BOA 7BOB 9BGK, WNs 2OAE 4ANI 6NXX and 11ER traded code with CN8GB, CP5AQ, CRs 4AE 4BB (10-25) 10, 6AL 6CN 6DA 6EG 6DX (31) 8, 6FW 6HG 6HH 6LV 7IZ 7LU, Cx6 10P 3DN, DUGPP, EL8X, Fs 2PO 5GV, FO8BI (75) 21, HGs 1WG (40) 21, 2SB, HKs 3APT (90) 23, 3HY (90) 21, 4RCA (40) 15, HP116, JAs 1CYV 3CZ7H (45) 23, KGs 4AM 6AA\*, KP4s BCL BFF, KZ5SN, OA4s AO (50) 23, NQ PY (60) 22, PF U (49) 23, OD5LX, OE5CA, ONs 4DO 5DG, OY7X, lots of Pys, PJ2s AA CZ, PX1YR, PZ1s BH GM (50) 21, TIZLA, UD6AM, UIRLE, UJ8KA, UL7IB, VKs 3CP 3RJ 4TY, VPs 2AX 9BY 9FT (51) 23, VRs 2DK 6TC, WBPXZ-VP, WI6s FMS FON (130) 3, FOO (150) 3, WS6BR (150) 4, XEs 1SS (140) 3, 2IN (150) 2, YU3AT, YVs 1AB 5BMY (148) 20, 7BZA, ZC4TX (71) 19, ZDs 7IP 13, 7TV, ZEs 2IJ 2KL, ZLs 1AFZ 1HW 3IS (30) 3, 3JO (170) 22, 3VB, ZS10s (10) 4, 4S7DA, 4X4LL, 5A3TX, 5H3J (92) 17, 5R8s AB 32), C/B, 6W8BF, 7G1A (49), 9J2s DT FK (46) 8, 1E WR (49) 15, 9L1T (71) 19, 9Ms 2OV 4LP (17) 9, 9O5s AR (56) 20, PA (9), PN (18), QR (46) 15, TJ and US 21, ... 15 Novice sportsmen WNs 5KHM and 6NWV shot down CP8AM, EL2AD, G3MP, HI3AGs, HK3RG, KP4s CMK OC, KS6BN, KZ5SN, LU6DJX, OA4NN, PJ2s 2BZD 5ASN 5WO, PZ1CM, SM6CTY/minn, TG9WT, VO2NA, VP2GL, WBPXZ-VP, WP4CN, XEs 1DQ 2IN, YN1LI, ZL1HW and 6Y5AK as late-summer 21-Mc. oldtrums fied the scene.

**40** c.w. fans Ws 1YNE 3UNK 7DJU 8FEM, Ks 3FKU 4TWJ, WAs 4CZM 5EID 8OPH 9BGK 9MYS, Wbs 2DZZ 2NLH 6ITM 6KVA 6MEQ and 7EBR pick off CO2s BO FA (9) 5, FC 11, CP5EZ, CRs 4BB 6AI 6GS (6) 5, EL2s AD AE, DU1RB, DMs 2BEK 4, 3SBM 3ZQO 6YAO, GISUR (6) 5, HA8 5KFR 8KCI (5) 3, H18RV, HKs 3ASV 3IR 7UL 7YB, HM1DH, ITIAGA, JA8 1BX 1CBK 1FAF 1GLS 1GUC 1HHX 1HVS 1IBX 1JWM 1KGT 1KKZ 1KPG 1KQX 1KYV 1LPG 1LQC 1LSY 1LWI 1MDD 1MCO 1MIN 1MJA 1MMR 1MYR 1MZL 1NOG 1NUH 1PVK 1QEG 1QJM 1QZC 1RYA 1RZD 1TBA 1TGT 1TNS 1TYZ 1YL 1YNA 2ARN 2BUR 2DFY 2DOW 2EBA 2FNL 2G5W 2JZ 3AAL 3BFJ 3DHH 3EGR 3FGC 3GFR 3HGL 3ICS 3IGE 4B1Y 4CBO 4CY 5ADW 5ALA 5AUO 5AVE 5AZT 6AD 6DUN 6KX 6YB 7AKQ 7AZL 7BQZ 7BVA 7BWT 7CDY 7GLD 7CRF 7CWA 7DVA 7DSV 7SR/1 8AKQ 8BKO 8BFE 8BTJ 8QA 8UX 8YA 8YR 9AQE 9BGW 9AIF 9BBB 9BBV 9BCO 9CCE 9DR 9RY 9SL, KH6s 1WJ FKV 1U, KL7AIZ, KP4s RJU COY, KV4CI (2) 23, LZ1s KDZ KEL, MP4s BBA (60) 20, BFA (60) 21, OA4PF, OE1ELW, ON5FM, PYS 1IP 7QAC, UA6s AG EE FR FY KZ1LZ NC, UB5s KBA KJA KS XU, UD6BF, UG6BV UH8BZ UR21U UT5LN, VESNO, two dozen Vks, VPs 1PV 5GC 6BW 10, W8QOH/KP4, XE2CJ, YOs 3AAJ 5YJ 9AFY 9KPD, YUs 1BCD 1EFG 3AAN 3AR 3IE 4JOP, YVs 4FR 5BMY 5CET ZB2AP O, a mitful of ZLs, 4X4RQ, 9H1R, 9J2WR (70) 21, 9Ms 2OV (70) 22, 2RI 4MT 6DH 6JW and 9O5RB, ... 40 Novice WNs 4WWT and 5KHM grappled with PY1BXT, XEs 1NNN 2EM, WH6FMS and WL7FFG among the SWBC splatter.

**40** phone puts out a juicy autumnal display—DLs 1FN\* 2VI\* 4SD 0EU\*, DJs 1FN\* 2ST 6HJ\* 6QT 7VA\* 7YR\* 9FV\*, DU2MY, EP3HS, F8PK\* 5JY\*, GD3JDT (70) 21, HB9s AB\* JZ\*, HK1FI, HSIWL (60) 20, 1Is ADDR\* ZEG, KC4s USK 8-9, USN (220) 11, KH6s FIF/KS6 (200) 9, HP 9, SP 10, KJ6BZ 9, MP4BBA (70) 20-21, OAMIX, OH4NI, OK3CDR, OX3MN, OY7S (60) 0, OZ7FD, PJ2s AA (70) 21-22, MI 10, PYS 1XW 7AOT, SP6PW\*, TF2WJF, TG9EP, TIEJIC (218) 7-8, UO2KFG, a dozen Vks including 9DT, VPs 2LS 23, 2SK 6KL, W6P5V/KS6 9, XEs 1IE 1OH 2WU, YS1AG 7-8, YU2ANS\*, YVs 3KV 5BRQ 9, ZLs 1AGO 8, 2BCG 2WS 9, 3UY 4HJ 8, ZP5KT, ZSs 1KJ 1RA 1TP 1XX 1ZM 5GU 5JA 5JY, 4U1UT (50) 20, 4W2AA (48) 21, 5Z4s AA JW (58) 21, 7Q7PBD (38) 21, 7X2AH, 9J2WR, 9Ms 2OV (70) 21, 4LP and 4LX (45) 20. We can expect some diminution of SWBC noise on 40 as the o.u.f. (opti-



CE1AV of Antofagasta gives first-Chile QSOs to many an eager North American these days. Orlando usually concentrates on 14-Mc. c.w. (Photo via W1BGD)

QST for



mm usable frequency) figures move upward again. Unfortunately, 7-Mc. DX propensities will likewise decline. (Here \* = plain a.m.)

**80** c.w. is still worth a go, according to W7DJU and DL5JJ who specify CR4BB, E18H, G130QR, HK3LR, JA8 1CBF 1CJQ 1DSW 1ELX 1GKP 1DUJ 1JUQ 1KAU 1KX 1PCG 1YFF 5A1B 5TX 7NX 8BHK, KG4AM, KV4CI, LU8 1DZK 8DQ, OH0VY 23, OK1KGT, OY1F 23, PA8VB, UA1KA, UD6BD, UI8LB (19) 0, VK8 3ACW 3SR 3XY 5TD, YV1DP, ZL8 2PY 3AAV 3ABV 3JD 3TM 4BO and 4BA. . . . 75 phone is coming around nicely, aided by DL1FI, EA4GZ, GB3RN (a.m.), GD8 3ENK 6LA, GW3NW, HC1EW, HK4EB, KR6QJ, OA4KY, PA8HO, SM7AB, VO18 BR FX, YV88 BPJ CEY, ZP58 KT OG, 4U1TU and 7Q7PBD. Better prepare to stick with this band for those extra phone multipliers in next spring's ARRL DX joust.



PIISZR, retired engineer-operator of the Royal Dutch Pilot Service, operates from a cadet training ship or from his home in Rotterdam. (Photo via W3MDJ)

**10** phone isn't running a fever yet, but W5BRV, WA4RPK and W6ZCN, plus club sources, report 2R-Mc. luck with CR6 6ACB 6AR 61HF 7IZ. CT1s LN OF TX, CX8 21T (600) 12, 4CS 6BC, DJ8 6RL/m 8KY 9EZ 0FY, DL6 1TV\* 2MN, EA3NS, F8 2SI 3OX 9BE, G8 2FKK 5TN, HA8CF, H8 AHW FRE PAJ TAJ VJT YJ, KZ25 BT LM, LA1K, LU8 2DED 3DCU 4DM 8D5P\*, OE3s ARW PZW SBW, OKI4AD, PY2BR, PZ1AX\*, SM5 4LJ 5BDQ, SV8WBB\*, TI2JH\*, TN8AD, UO2s HD KBC KIC, UT5DU, VS9s ADJ\* ARO\*, XE18 CCW\* KKV\* (601) 0, YU3OV, YV8 3KX 5BIG, ZG4s GT TX, ZD8HL\* (600) 17, ZE2JA, ZL2WS\* (610) 1, ZS8 6AD\* 9G, 5H3s JI JR\*, 5N2\* AAC\* KOB, 5X5IU\*, 5Z4AA\*, 9I2s DT\* GJ WR\*, 9Q5s AA\* AI and DO, the stars blinking for s.s.b. efforts. . . . 11ER keeps 10 c.w. under scrutiny because of CR7IZ, G5 2BUJ, 3RRU, GB3LER's 29,005-ke. beacon 18, DJ5OG, UA3KQV, UT5KTF, TT2RK and XE1AX (40) 17. How's ten where you are?

Next month we mean to let W8 1BDI 3HKK 7DJU 7VRO 8CAG 8TRN 8YGR 8ZCQ 9LCC, Ks 3CUI 4TWJ 5EQA, WAs 3WJ 3BTA 4CZM 4PSA 4QBX 4YDR 5EQA 7BOA 7B0B 8MAT 8ZPH, WBs 2CON 2NLH 6ITM 6MEQ 6NHF, plus reporters now filing, tell us all about 20 c.w. matters, while W8 3HKK 8YGR 8ZCQ, Ks 3FOP 4TWJ, WAs 3BTA 4PSA 4QBX, WBs 2CON 6NHF 6NXK, Mr. Kilroy and others deal with 20 phone. Now thin out your rotor oil, OMs — 's gettin' cool outside.

### Where:

**H**EREBABOUTS — Greenland-based W5JGX informs ARRL Assistant Secretary W1ECH, "Due to a new agreement between the Danish government and the U.S.A. all ham operation under KG1 call signs ceased as of August 10, 1965. OX4FR is the new call for Sondrestrom Airbase, OX5BX for Thule. W/Ks can QSL OX1 stations c/o MARS Director, APO, New York, N.Y., 09121; non-W/Ks should use the address OX4FR Amateur Radio Station, Arctic Hotel, Sondrestrom Fjord, Greenland. QSLs for OX5 stations go to MARS Director, APO, New York, N.Y., 09023." Remember, multiplier stations are the rule, so include the operator's name on your QSL. All replies come via bureaus unless self-addressed stamped envelopes are provided. XP calls, another Danish block, also are in use up there. . . . W3AYD tells WA4CZM he hasn't had logs from VP2DA since 1962. . . . K2YFR's

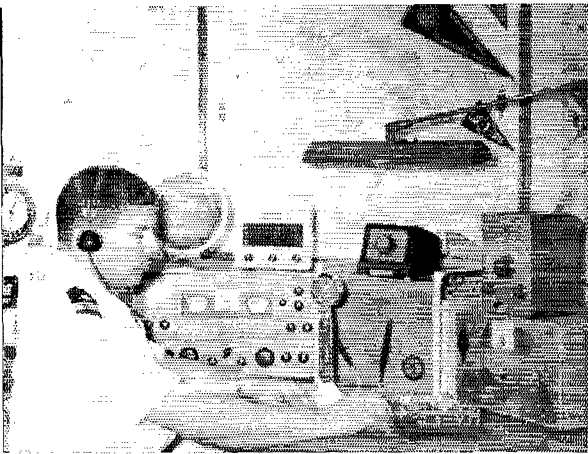
term as FG7XX QSL chargé starts with September, 1965, contacts. . . . WB6MEQ secured a VP6BW confirmation by sending him a kindly-sign-here blank. . . . K9DKU wonders if he's alone in not having much luck with OX3 and KR6 QSLs. . . . W3WUH has some not-too-old *Callbooks* for overseas DX ops in need. . . . WA4KXC is receiving entirely too many G3O1Y, HP7BG and PZ1BE QSL applications without the customary s.a.s.e. No sticky, no tickle, lads. . . . W7QJL/KV4, from his Illinois address, will confirm his St. Thomas contacts direct if s.a.s.e. are supplied. . . . K2BUT's FP8DR call, issued out of the normal alphabetical St. Pierre sequence (his initials for suffix) was a concession to his status with Franciscan Fathers. "I QSL 100 per cent for sure," Fr. Dave declares. . . . WA7s BOA and BOB vote OA4FW's card their most unusual QSL of the month. . . . Regarding VP2LS, ISWL's *Monitor* emphasizes that only QSLs for QSOs on January 17-25, 1965, are tended by K1IMP. Others should go direct to the Castries QTI. . . . VP2AO QSLing commenced in mid-September, according to W2GHLK. . . . This month's "QSLers of the Month" are CE0XA, CX2CO, FG7XL, FP8CK, G6RJ, GA8CHX, HC6GM, HK1s JF ZU, HP1IE, HR2GK, IS7AI, IT1AGA, KA2NA, KG6s AAY AIG, KM6BI, KP4CKV, KV4AA, KZ5JW, LU6DJX, OK3EA, OZ2RL, PY8 2SO 5ASN, SM8 6FB 7BWZ, SP9UH, TF2-WIO, TI2CRC, UJ8KAA, UR2IP, VE3CVL/SU, VK9s GC SAI, VPs 1HB 2MIN 6AQ 7TA 9FT, VR8 18 2DK 4ED, WH6s FMS FON, XE2RZ, YN1SL, YV8s BIG BMY, ZL8 1HW 2AR and 2PM, plus QSL tenders Ws 2CTN 4VPD 6BCE 6FET and K7ADL, all nominated for prompt and precise pasteboard production. Our election committee includes Ws 7VRO 8TRN, Ks 4YLS 8QYQ 9FPC, WAs 3BTA 4CZM 4QBX 4ZMH 7BOA 7B0B 8LVT 8MAT, WBs 2CON 2NLH 2PCT 2TBV 6MEQ and 6NXX. Any deserving swifties we overlooked?

*Halp!* The following italicized correspondents need tips on obtaining QSLs from reluctants listed: W3AFN, EA8CT '61, HR1AIM '60, YN1MW '61, W3YGR, JT1s AG KAA, K4HEP, KC6s AY BK '62, K4YVL, 15AF '60, IS1ZUI '61, LU1ZC '64, VP2GAQ '59, VP8HK '64, VR3I '61, YV0AA '62, 7G1A '60, K9DKU, EA8DM '63, HC8LS '63, KM6CI '63, KX6BU '62, VP4RL '62, 5B4LB '62, 5R8BX '63, W44QBX, ZD5D, F18AC, W45JDR, VRA40 '64, W47B0B, G13PGD, W49VT, F57RE, W49FW, KC4RQ, W52LDX, UA2BZ, UQ2AXX, W56NXX, WS6BR, K7DEM (now WA7EBR) FABRJ '62, KC6s JB KR '60, VS6EC '61 and ZK1AK '60. Any good word for this hungry herd? . . . DX stations requiring Stateside QSL aides are invited to consult with volunteers W3ZUH, Ks 5MWG 6IAJ, WAs 4YDR 8MIAN, WBs 2ALE 2LDX 2LOK and 6ITM. . . . WA7EBR signed K7DEM from May, 1959, to June, '62, then entered the service. "Tried to QSL 100 per cent but didn't make it. I still have all my Alaska logs and will stand by for QSL inquiries bearing s.a.s.e." His current address appears in the list to follow.

**E**UROPE — Ex-DL5QS (K4UBR) 1965. "I've been acting as QSL agent for DL4Q and DL5Q (Berlin) call signs. I'm now returning to the States, so DL5QB will take over these duties. Very little luck in forwarding QSLs to ex-DL4Q-DL5Q personnel. Caris are still on hand for DL4s QG QI QN QM QT, DL5s QG QG QI QN QO QQ QT and QZ. An s.a.s.e. to Sgt. L. J. Allen, Jr., DL5QB, USAH (BB) APO, New York, N.Y., 09712, will get them out of the drawer. Jerry will be happy to reshipe DL5QS cards to those whose initial QSLs failed to arrive. His Mississippi address appears in the roster to follow. . . . QSLing for EA8OT's August 7th-8th EA6AG QSOs commenced in late September, says W2GHLK of Hammarlund. . . . Ambilingual K3CUI offers, "I'm always glad to help with Russian QTHs, QSL routing hints, and translations, s.a.s.e. appreciated." . . . IT1AGA tells K4YLS that QSLs overdue from WA4s AYM and SSP would fill crucial gaps in his Tennessee collection. C'mon, lads. . . . NNRC's organ records that WH1UE had to resign as SV1AB's Stateside QSL manager. No logs from Athens.

**O**CEANIA — KG6IF's QSL aide for QSOs after September 9, 1965, is W6ANB. "I also handle QSLs for KR6IL and have logs dating from June 22, 1965." . . . Larry. . . . The formal QSL address for roving W9W 1A (5W1AD, Y78WV, W9WNV/813, etc.) according to W4ECT's assignments to NNRC, is World Radio Propagation Study Association, 3101 Fourth Av. So., Birmingham, Ala., 35233.

**A**SIA — "I have 4X4SK's W/K logs as of August 20, 1965," states W2IWP, "and will return Dan's QSLs to all entries sending me their QSLs with s.a.s.e. 4X4SK will forward logs monthly." W2IWP also indicates he assists similarly for QSOs with 4X4s QI, SO, UL and VL dating after August, 1965. . . . W2GHLK & Co. report 9N1MIM QSLing completed as of September so far as operator Gus is concerned. . . . VERON's *D.A. press* stresses that W4BPD's QSOs as 4X0TP, QSLable through Hammarlund, are logged separately from 4X0TP contacts made



by operator Tsvi. The latter may be confirmed through VE3ACD. . . . K5YYP claims he's erroneously listed as a QSL source for current YA1AW QSOs. "I was active from Kandahar on 20 c.w. and s.s.b. only from January through April, 1963. Incidentally, I suggest that no reference to amateur radio be made on envelopes, nor should QSLs be sent unenclosed, in mail direct to that area. This QSL business gets a bit involved at times, for I still occasionally receive requests for cards to confirm contacts I made while signing KB6BA, 1952-'56." The present preferred YA1AW address appears in the list to follow. . . . K7SGX/7 recommends the QTH S. W. Huddleston, Portland, Ore., 37219, as a possible aid to obtaining HM1DE pasteboards. On the other hand, W5VA tells Newark News Radio Club's *Bulletin* sources he no longer supplies HM15BF QSL help. No logs from Pusan.

**AFRICA** — From VE10X: "Smitty, W8HMI, has asked me to look after all QSLs for him. He will send me copies of his logs for JY1AU, TU2AU, TU2AU/5U7, 5U7AU and 601AU. Those not receiving cards in due course can get theirs by sending me QSO details along with s.a.s.e." And W/Ks should remember not to glue down U.S. postage sent to VE10X and other VE QSL agents. . . . SARK of South Africa, usually well informed on ham activity in such regions, tells WB2DXM that Z1D9MW is unknown. . . . "EA8DM's QSL came through the bureau after a two-year wait," cheers WA4CZM. "Patience, boys! . . . Time to slap the mailbag for a sprinkling of suggested specific postal routings. Be mindful that each recommendation is necessarily neither "official", complete nor accurate:

- AP2AB, P.O. Box 91, Mudtan, W. Pakistan
- BY4SK (via W4BCD)
- CRs 3GF 5GF, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
- CR4BB, M. T. Dias, Ilha de Santiago, Cape Verde Islands
- D12DR (phone via DL6XP, c.w. via DJ2KS)
- DJ2KS/PY0 (to DJ2KS)
- DJ0IR/mm (to K7AEJ)
- DL5QB (see preceding text)
- ex-DL5QS, M/Sgt J. Green, K4UBR-5, 2052nd Comm. Sq., (AF) Keesler AFB, Miss., 39534
- DL0ITU (via DJ7SW)
- ex-EL2AD (to W4FOA)
- ex-EL2AM (to WA4THC)
- ex-ET3RP (to K9CGD)
- FG7XX (via K2VFR)
- FK8AU, R. Thomas, B.P. 637, Noumea, New Caledonia
- FP8CP (to K2KIB)
- FP8DR (to K2BUD)
- G30IZ (via WA4KXC)
- HP7BG (via WA4KXC)
- HR1FIN, % U.S. Embassy, Tegucigalpa, Honduras
- HS1F, Box 69, Korat, Thailand (or via DJ7LD)
- JY1AU-TU2AU-TU2AU/5U7-5U7AU-601AU (via VE10X)
- JY74, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
- K0HGM/KS6 (to K0HGM)
- K0G1F (see preceding text)
- KG6SZ, Yunque Foundation, P.O. Box 2025, Castro Valley, Calif.
- KH6DSE/VP9 (to KH6DSE)
- KH6FIF/KS6 (to KH6FIF)
- KL7DEM/7, D. Grant, WA7EBR, P.O. Box 55, Sacaton, Ariz.
- KM6DJ, % Page Engrs., Box 26, FPO, San Francisco, Calif., 96235
- KR6LL (see preceding text)
- LU4ZC (via LU4AA)
- LU8DSF, % U.S. Embassy, USAF, Buenos Aires, Argentina
- OA3T, F. Gleeson, 3124 Talisman, Louisville 20, Ky.

H18LC collects plenty of DX in Santo Domingo with a Valiant, HQ-180 and TA-33-jr. Luis ran up a respectable 38,000-point c.w. score in this year's ARRL DX Contest. (Photo via W1YYM)

- OH0VF (via OH5VD)
- ON8VB/m (to P7CR)
- OR4RK (via UBA of Belgium)
- OKs 4FR 5BX (see preceding text)
- PX1IE (to F9IE)
- PX1JS (to F9JS)
- PX1UX (via RLF)
- PY2BZD/PY0, P.O. Box 19094, Sao Paulo, Brazil (W/Ks via K2HLB)
- PZ1BE (via WA4KXC)
- PZ1CN, 3422 Delaware St., Kenner, La.
- SV0WDD (via WB6EFW)
- T12CRG, F. Caldas, P.O. Box 5153, San Jose, C.R.
- T12PPS, % U.S. Embassy, San Jose, C.R.
- UA9DA, P.O. Box 66, Sverdlovsk, U.S.S.R.
- UW9CL (via UA9DA)
- VE7BST, K. Farr, K6TWT, 613 Cedar St., Vallejo, Calif., 94593
- VE8NO (via WA4KXC)
- VE8PA, P.O. Box 942, Yellowknife, N.W.T., Canada
- VK9VG (via VK6RU)
- VK9WE, W/Ks via J. Hagen, 5031 Arroway Av., Covina, Calif.
- VK0TO, Box 1734, Sydney, N.S.W., Aus.
- VP2AP, P.O. Box 93, Antigua, B.W.I.
- VP2GR, M. Rocafort, P.O. Box 210, St. Georges, Grenada
- VP2KJ (via W48SI)
- VP2LT (via WB2HWH)
- VP5GC (via K4RC8)
- VQ9J (via K4LXC)



YS1RFE tickled that key for 1530 QSOs in the 1965 ARRL DX Test. Dick prefers c.w. on dependable 20. (Photo via W1YYM)

- VR4ED, J. Dow, 48 Palmerston Cresc., Melbourne, S.C. 5 Vic., Aus.
- W9TQI/KV4 (to W9TQI)
- W9WNV/8F3 (via W4BCD)
- WB6TFE/KS6, % ETV, Pago Pago, U.S. Samoa
- XE5EYB (to W6EYB)
- XPIAA, % MARS Dir., 1983rd Comm. Sq., APO, New York, N.Y., 09121
- XZ2TZ (via W4EC1)
- XW8AX, P.O. Box 46, Vientiane, Laos
- YA1AW, H. Hutcheson (WA600H), % U.S. Embassy, Kabul, Afghanistan, via State Dept. Mail Rm., Washington, D.C.
- YNIJLA, Philco Corp., Aptdo. P.O. 189, Managua, Nicaragua
- YSIAG (via CRAS)
- YV5BGH/6, H. Crocker, P.O. Box 73, Puerto Ordaz (Ciudad Guayana), Venezuela
- ZB2AM (via WHGT)
- ZL4JF (via ZL2GX)
- 4X4FQ (W/K/VEs via K2IRK)
- 4X4SK (via W2IWP)
- 4X4XL (via 4X4MZ)
- 4Xs 5VB 9HQ 0TP, Hammarlund DXpedition, Box 7388, GPO, New York, N.Y., 10001
- 5J3LR, LCRA, Box 584, Bogota, Colombia (or via W2CTN)
- 9M6AP, T. Parker, R.A.F. Labuan, BFPO 660, Singapore (or via RSGB)
- 9M6DH (via RSGB)
- 9X5VF, Rev. F. Florin, P.O. Box 81, Butare, Burundi

For the preceding catalog we all thank Ws 1BGD ITS 1UED 1WFO 1YYM 6OMR 7UVR 7VRO 8CAG 8YGR 8ZCQ, Ks 5YYP 6AJ 8QYG, WAs 1DGK 3BTA 4CZM 4PSA 4QBX 4WIP 5EQA 7BOA 7BOB 8MAT 9KWN, WBs 2CON 2PCF 6ITM 6MEQ 6NXX, HK3RQ, Columbus Amateur Radio Association (CARAscope (W8ZCQ)), DARC's DX-MB (DLs 3RK 9PF), DX Club of Puerto Rico DXer (KP4RK), Far East Auxiliary Radio League (M) News (KA2LL), Florida DX Club DX Report (W4-LVY), International Short Wave League Monitor (12 Gladwell R.I., London N.8, England), Japan DX Radio Club Bulletin (JA1DM), Long Island DX Association DX Bulletin (WB2HXD), Newark News Radio Club Bulletin (L. Waite, 39 Hannum St., Ballston Spa, N.Y.), North Eastern DX Association DX Bulletin (K1IMP), Northern California DX Club DXer (Box 608, Menlo Park, Calif.), Ontario DX Association (VE3KXR), Puerto Rico Amateur Radio Club Ground Wave (KP4DV), VERON's DXpress (PA6s FX LOU VDV WWP TO) and West Gulf DX Club Bulletin (W5IGJ). Your turn, OM?



VS9ASP's operator Vince gets steamed up over DX at Steamer Point, Aden. His 50-watter makes a good showing in W/K/VE logs. (Photo via WA4CZM)

## Whereabouts:

**H**ereabouts — Like we said in September's opener, s.w.l.s are among the best of potential hams. Messrs. J. Stewart and J. Hall, frequent "How's" contributors in the past, are now two-waying as WN2s UHH and UHK. Happy huntin', OMs . . . . . Old-time ham receivers as functional shack ornaments are now very "in", you know. Same type of fad as spinning around in a Pierce-Arrow or Essex on Sunday afternoons. W9LCG does his fun-listening on a trusty old CR-88, and W9PDD enjoys stroking his well-preserved RME-69. Jeeves & Co. occasionally touch up a venerable no-bandsread NC-100X with a pencil-ender eraser. Anybody out there having a ball with a favorite oldie in signal condition? . . . . . W9NN is back at his knobs after a summer respite. Bob's 221-country 40-meter total is approached by few 7-Mc. hounds . . . . . Mr. 110, W1BB, enjoyed vernal visits by DX roamer K1KSH and famed Brazilian s.w.l. Rolf Rasp . . . . . K5JVF, WB6MEQ and others wonder why we don't run complete results of non-ARRL DX tests publicized through "How's". Well, space is the main culprit, known as r.i.p.p., reader interest per pica. There doesn't seem to be much use in listing several hundred OKs, SMs, UBs, etc., against a paltry two dozen or less W/K/VE entrants. Not here, anyway. You can probably obtain the complete tally with an s.a.s.e. inquiry to the sponsoring society . . . . . "This past year the XYL and I spent a year back in the more isolated regions of British Columbia," reports K6TWT. "We managed to keep in touch with the outside world through our station VE7BST. It's hard to imagine the true meaning of DXHPDS doings until you are mobbed by the DX gang, even as a lowly VE!" . . . . . In gripes of the month WA4CZM deploras v.f.o.-swishing and indiscriminate CQ'ing by many huge-signal boys, while WB2NLH is especially bugged by long and frequent CQ-1X-NO-W/K calls by the Caribbean crowd . . . . . W1YYM got

CT3AQ (CT1RX), a DX man since 1938, runs 100 watts to a long-wire and likes 20-meter c.w. Perhaps you worked Alaor previously as CR4AX or CT2AE. (Photo via K1SWG)

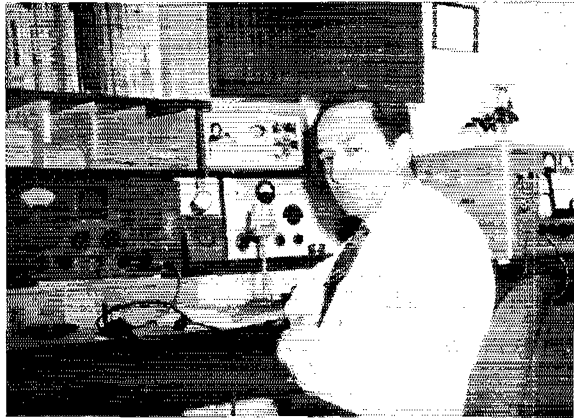
the rig put back together just in time to greet her OM, W1WPO, returning from a League jaunt out west. Ellen fears Bob would have screamed "Foul!" if a blown 811-A had prevented his quickly raising YJ8WW . . . . . W1MRQ reports VP2SJ whooping it up on 20 with a new SB-400 . . . . . "Operated for five days from the V.I. with excellent 7-Mc. results," remarks W9TQL. Bill and son Tom tried for the Caymans on their summertime journeys but couldn't clip all those red ribbons . . . . . "I used 14 Mc. exclusively this summer," comments FP81R (K2BUT). "It was fun while it lasted, and I hated to come home. On a future St. Pierre trip I hope to stay longer and enjoy more widespread activity." . . . . . DJ2KS/PY0's late-August St. Peter & Paul Rocks outburst tickled a few dozen sharp-eared brethren. Hans, with Gerhard, DL6XP, operators aboard research ship Meteor as DE2DR, may do a more DXtensive encore on the return leg of their south Atlantic swing.

**A**FRICA — "I am pleased to announce that a DXpedition around the world will soon start by way of the Comoros, Glorieuses, etc.," writes FR7ZI. Incidentally, contacts with two or more FR7s last month may have qualified you for the *Diplome du Tricentenaire de la Reunion*, a special RFF certification. (Check with FR7ZD . . . . . ET3USA's K1QHP (FL8AK) returns to New England, leaving Kagnev Station ET3s under the leadership of Club president K4YFE in Asmara. If you've been knocking off ET3s at a good clip this year you may be eligible for the ET3USA Achievement Award administered through custodian A. L. Kemmesia, K1QHP/1, USASATC&S, Ft. Devens, Mass. These data via W1ECH. A's old neighbor, ET3RP, repatriates to Illinois and K9CGD, stating, "Stations still available in Ethiopia are ET3s DR FW and ZU on s.s.b., ET3USA (9E3USA-9F3USA) on a.m. and c.w. Most operation there is on 14 Mc. although 7 and 21 Mc. are used under favoring conditions at 1300-2400 GMT." . . . . . With 15 getting hot W3HNK finds friend ZE4JS putting in lots of DX time around 21.405 kc. at 1700 GMT . . . . . That VQ9J feller turns out to be W6MHB of T19MHB-etc. DX fame . . . . . S.s.b. paraphernalia is said to be en route ZD9BC of Gough Isle.

**A**SIA — Effective the first of this month there are new requirements for the Eighth U.S. Army Amateur Radio Club's *Kimchi* certification. Specifically: QSOs with ten FL8s, QSLs to be shipped with application, return postage for same, and one International Reply Coupon to cover mailing of the sheepskin. For full details write Courtney M. Moorfield, sec'y., 5th U.S. Army Amateur Radio Club, APO, San Francisco, Calif., 96301 . . . . . It's more middle east for W4BPD, Gus-a-Gio-Cio, after his huddle with W2GHK and friends at the International Amateur Radio Convention, Geneva, in September. Gus and 4X4DK managed four kilo-QSOs as 4X1DK in early August . . . . . Ex-EL2AM (WA4THC) may soon head for Nepal and probable 9N1 action . . . . . 4W2AA (HB9AET) intended operational FL8 and/or VS9K visits last month or this.

**O**CEANIA — Labuan 9M6s AP and DH use the same Viceroy 150-watter, KW-77 receiver and dipole off the North Borneo coast. The former, Tony, likes 14,250-14,300-cc. sideband while Ted prefers 14,000-14,100-cc. c.w., mostly around 0600 GMT. This from W6OMR . . . . . Ex-VR4ED should be back in Melbourne by now after enjoying the sport with a potent little 9-watter. WB6MEQ says Jock will be a VK3 shortly . . . . . W7DJU salutes the late VK5JE whose QSLs will be adorning shack walls for years to come. VK5FO tells Dale that Ted started out in the game in '27 or so. One of the highlights of VK5JE's communications career was the receipt of a citation for undercover radio work as a prisoner of war in the early '40s. Tough loss for DXdom, this . . . . . W6ANB observes KR6IL assisting newly active VK9JO, Cocos, around 14,270-cc. s.s.b. where VK9VG is on tap there, too . . . . . "I enjoyed a little DXing from KH6-EQ while in the service," reminisces WA7EBR, formerly KL7DEM of Nome. "So far as DX goes, give me KH6-land or my old Alaska QTH over Arizona any day!"

(Continued on page 168)





# Operating News



F. E. HANDY, WIBDI, Communications Mgr.

LILLIAN M. SALTER, WIZJE, Administrative Aid • GEORGE HART, WINJM, National Emergency Coordinator  
ROBERT L. WHITE, W1WFO, DXCC Awards • ELLEN WHITE, W1YYM, Ass't. Communications Mgr.  
GERALD PINARD, Club Training Aids • UELER CHAMALIAN, W1BGD, Communications Asst.

**Hurricane Betsy.** "September 9th the full fury hit New Orleans with 120 m.p.h. winds. . . . 75% of the antennas were blown down and 90% of the city was without electricity. The plea was for generators, generators, generators. . . . K5A0E set up on the 8th floor of City Hall. W5FMO handled a great deal of traffic on 3905. . . . Our medical net operated on 3915 with outgoing traffic routed on 3930 kc. by a group of Texas hams with a mobile van. The FCC Engineer-in-Charge, W5DQB, and Washington declared a voluntary communications emergency. . . ." We can't begin to tell the detailed account of all that transpired. Jack Swanson, W5PM-SCM, is compiling the fullest report possible. To all amateurs who assisted in communications, our thanks and congratulations from ARRL. You have again upheld the traditions of the Amateur Service in this field of emergency and public service!

Director Spencer, W5LDH, met with K5USU, K5MEC and city officials to establish a local action plan for the on-the-spot requirements, calling for two-way mobiles over WDSU. Fifteen 2-way units were assigned, each with a doctor, to the different shelters, these having *thousands* of refugees and requiring constant contact for medical supplies and conditions arising at the time. Details will appear in *QST*, as soon as reports are in and can be analyzed.

**Lessons from Betsy.** (1) Individual amateurs and clubs cannot have *too many* emergency generators and other sources of power ready. Hundreds in the area who might have been on the air quickly were without power. *Gasoline* must be stored for those with generators. Without power, gas stations can pump no gas.

(2) Amateurs should stick to their specialty as *Amateurs*. Be sure that any reports of deaths, estimates of high water, statements of medical needs etc. are made and signed by *proper agencies and authority*, never sent by an amateur without authentication. (The October *CD Bulletin* speaks of the disservice to amateur radio in flood operations in California and Oregon floods from such things; W5LDH tells of one important similar matter for concern, during this Betsy operation.)

(3) To experienced ARPSC personnel outside the devastated area it appeared that many hard pressed stations needed relief operators, that the voice stations needed to know formal traffic handling procedures; also that v.h.f. was not being used enough for intercom purposes. These

are things that all amateur radio leaders throughout the nation can and should give attention to in *advance planning!*

(4) Every active amateur on the air in the U.S.A. and Canada should be advance-registered in the Amateur Radio Emergency Corps and should have available Operating Aids 9A (Message Form), OA 12 (the NCEF list) and OA 4. These and our registration Form 7 will be sent (gratis) on radiogram request.

(5) Emergency Coordinators, in addition to activating their groups in an October "Simulated Emergency Test", should have planning sessions, regular tests, critiques, network participation and representation, self-training meetings and never cease to stress the need for emergency power ready-to-go provisions.

**Training Aids.** Some new items will be available for loan-booking by ARRL Affiliated Clubs this season. There are some 51 film titles in the TA-21 list and additional tape and slide collections.

Additional:

F-48 Teletypewriter; General Principles, Operation and Maintenance.

F-49 Transistors; Servicing Techniques.

SC-7 120 YEARS OF BRASSPOUNDING (slides)

SC-8 THE WORLD ABOVE 50 MC (slides)

SC-3, a slide collection with accompanying tape, has been completely re-done. This will tell your members all about the Public Service Corps. We have three copies of this to facilitate and speed bookings. The title: Amateur Radio Public Service Corps.

Clubs starting a Code-and-Theory Class and *not* already having the data by William Welsh, WA6VTL are invited to state the date and period of their class and ask for the booklet LICENSING CLASSES. (One copy only will be provided. Give the date and details of the class together with the instructor's address.) All clubs should send requests for loan bookings of films, filmstrip or slides in early. Be sure to specify "alternate" listings from TA-21, since our copies of visual aids are limited in number against an expected heavy demand.

**Two- and Six Meter Nets Needed.** We have done well in the field of v.h.f. netting, if we judge merely by the known number of once a week nets, and include all those that have *only* a rag chew session or a roll call. But we have done *less* than well if we count the v.h.f. nets operating that give *ractical* coverage to a section or

county/area, meet a good number of nights a week, and work some traffic including regular planned inter-connection with other nets and modes. Such nets are the ones that are good nets, come a disaster or need for operators skilled in communications. Every ARRL section, we hope, may aim at having at least one such major coverage v.h.f. traffic net this fall! We invite registration of these in our Net Directory. (Send a radiogram or postcard to ask for the CD-85 registration form.) There's a true job or goal this fall, we think, for all net managers. PAMs, RMs and NCS of course will want to plan and implement along two lines: 1) to expand net coverage to specific points not now covered. (2) to recruit stations to permit more nights of the week to be "operational" as possible points in the state or county, without needing all the same stations every day at each city to cover the place. — F. E. H.

**Organization Moving Ahead.** We get hardly a trip report from SCMs and SECs this fall season that does not contain good news of operating organization progress from the many meetings held with netters, and with clubs and larger groups. As a matter of Operating News and general information we'll quote some SCM and other comments.

(1) SCM Howard Schonher, W4RZL (Ga.), had a meeting Aug. 20 with v.h.f. netters. Planning greater coverage of the most often threatened disaster areas was the main purpose of the meeting. "Conditions," he says, "dictate more reliance on the reliable and QRM-free v.h.f.'s. Seventy five operators and three EC areas will be served by a two meter net covering seven counties. Net operations started Labor Day. They will be in full effect for the SET . . ."

(2) "One thing we have tried to find in the Greater Boston Area is a way to swap traffic over from one net to another. Our problem is that so many hams are on only one band and can't get quickly on another. The traffic exchanges can be made by designating operators who are volunteers from each group to work the "other" band, net, or mode with collected traffic that goes to the outlets this other group is known to have." So write SCM Frank Baker, W1ALP. Traffickers also can transfer messages to those who can reach other nets either by telephone or in person. All VHF Phone Activities Managers, PAMs, and RMs in the course of their net managing should, of course, frequently exchange their lists and data on the current outlets and available stations.

(3) Here's one further news item from the Napa-Solano Amateur Radio Emergency Corps Bulletin (K6TFT-EC-OBS-OPS, WA6PYP-WB6CSD K6UJS Ass't ECs): "In the few months since inception of our ARPSC group 35 have joined AREC. If you know someone not yet identified with AREC take the time to ask if they are willing to belong . . . Two meters is the logical and necessary choice for our local work, since most members have this capability . . . For the time being our official channels and scene-of-disaster wave length will be 145.35\* and 145.9 for our regular netting. Keep in mind, however, that the National Calling and Emergency (NCEF) is 145.35 Mcs and all members must be watchful of this and have capability on this frequency . . . For the immediate objectives we must work on our MOBILE rigs and check over the correct procedures in message handling. We seek two members to volunteer as NTS Liaison from our net into the 80-meter c.w. Northern California Net." [\*N.B. This frequency is for traffic and emergency calling and answering only.]

ARRL is hopeful that many existing v.h.f. nets will expand operations to work more sessions a week and handle traffic. All nets with traffic or emergency capability in working the v.h.f.s or

other frequencies should be registered. Ask for CD-85 to register them for the Net Directory. The above reports spell out IMPORTANT TRENDS in operating that all ARRL leaders should work to bring to fulfillment in every one of the 50 ARRL Sections. — F. E. H.

WA9MYS of Villa Park, Illinois, suggests numbering log pages consecutively to assure that FCC log records are complete, with no missing pages (even if there are several days or weeks of non-operation). He also says that an index of dates or pages can be put into one's log at the beginning or end (or marker tabs) to help find special log sections quickly.

### BRASS POUNDERS LEAGUE

Winners of BPL Certificate for August Traffic:

Call.	Orig.	Recd.	Rel.	Del.	Total
W3CUL	348	2670	2318	298	5634
K6BPI	63	1939	1868	71	3941
K6MCA	112	1323	1308	8	2751
W7BA	12	1305	1216	85	2618
K6YV	11	1153	1099	8	2277
K0ONK	127	958	925	47	1957
K9IVG	14	924	877	11	1826
WB6HRH	6	780	770	10	1566
W1PEX	78	611	548	42	1279
K6VIR	5	607	594	13	1219
W4KCP	33	648	532	6	1219
WB6GQJ	1080	36	40	16	1172
W0OHJ	30	536	535	1	1102
W86BHO	42	348	694	2	1086
W7DZX	11	543	457	39	1050
W44SCK	18	509	501	8	1036
W3EML	27	553	434	4	1018
W6ZJB	20	486	480	6	992
K6EPT	125	426	305	121	977
W4FX	1	487	478	6	972
K7TCY	22	460	384	67	933
W6LGG	10	510	403	8	923
W44RQ/9	12	430	365	6	883
WA4BMC	456	139	149	27	718
WB6CRC	20	352	342	4	718
K2KBC	5	337	320	10	672
K7RBM/7	14	317	270	37	638
W50BD	15	319	299	1	634
W9JQZ	25	304	304	0	633
K7JHA	18	313	281	1	613
WB6JCH	23	288	242	46	599
W1CRX	41	278	251	27	597
K7TWD	4	292	219	73	588
K4YRN	78	247	242	3	570
W6VNO	22	259	246	13	570
W6WPF	15	275	232	43	565
K8QKY	28	269	239	20	556
WB6JFO	200	200	145	5	550
W62XM	57	254	222	14	547
W6YH	136	210	195	6	547
W42UFI	29	261	244	11	545
K4EHY/1	288	220	189	41	538
WB2MHT	30	253	241	8	532
W5GHP	71	228	169	59	527
W6EOT	0	259	256	1	516
W3VR	43	239	207	22	511
WB6GGL	4	283	251	2	510
W7APS	272	111	50	70	503
WA9GJU	282	116	73	32	503
Late Reports:					
WB2MHT (July)	79	221	213	3	516
VERBII (May)	20	470	10	10	510

BPL for 100 or more originations-plus-deliveries

#### More-Than-One-Operator Stations

W6IAB	512	1893	1536	317	4258
W6YDK	256	873	838	305	3502
W4LEV	43	1426	1369	53	2891
K6WAH	295	704	615	0	1614
WA8IMY 336	W2EW 136	WB6LH 112			
W6VZP 298	W1TXL 125	W9NZZ 110			
VE3BIL 161	W3TN 125	K9MIS 106			
W7HMA 155	WA4QLZ 117	WV7CFE 105			
W4RHZ 154	WB6GMM 117	W7DAE 105			
W6VFM 152	K1PQG 116	WB6APK 102			
W7BTB 145	K3ZRE 114	WA5KQN 101			
W2OE 137	WA1CFT 112	Late Reports:			
WA9JKT 137		K1PQG (July) 102			

#### More-Than-One-Operator Stations

KR6GF 147 KR6DI 138 K4NFP/4 135  
BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: K1VPJ, K4VRM.  
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 origination 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.

## Use Those NCEF's

If that second receiver is just gathering dust, why not put it on the NCEF in your favorite band? You and I can *make* the NCEF's a valuable asset to daily operating and in disaster situations, just through use! Suggested project, see "Inexpensive NCEF Monitoring" pages 51-52, Sept. 1965 *QST*. Utilized that old Conrad unit or an a.c.-d.c. receiver as a low-cost gimmick for NCEF work. Be like W6CIS and W6JN and keep a fully daily NCEF watch.

1. Keep an NCEF channel monitored.
2. Post an Operating Aid 12 or p. 64A, June *QST*.
3. Use those full-time NCEF's to send traffic lists to supplement net operation.
4. In the first 5 minutes of each hour make no calls.

5. Always be listening on 3.550, 7.100, 50.55, 145.35, 3.875, or 28.640 Mc., one of the "full-time" NCEF's.

## DXCC Notes

Announcement is hereby made of the addition to the ARRL Countries List of St. Peter & St. Paul Rocks. Located some 600 miles North East of Natal Brazil, St. Peter & St. Paul Rocks is territory belonging to Brazil. Acceptance of this territory is in accordance with point 2(a) of the criteria; see July, 1963 *QST* DXCC Note.

Confirmations for contacts with St. Peter & St. Paul Rocks may be submitted for DXCC credit starting January 1, 1966. Confirmations received for this listing before January 1, 1966 will be returned without credit.

# DX CENTURY

## Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date and time of receipt. All totals shown represent submissions received through August 31, 1965.

W8JIN . . . 315/339	W8KIA . . . 314/337	W0ELA . . . 312/334	W4PLL . . . 310/324	W6WWO . . . 308/324
W1JYH . . . 315/337	W0QVZ . . . 314/334	W5ARY . . . 312/328	W7UX . . . 310/323	W7AC . . . 308/331
W8POO . . . 315/331	W8HFB . . . 314/334	W0HFB . . . 312/329	1I1AMU . . . 310/328	W6HZE . . . 308/327
W3GHD . . . 315/338	W1GKK . . . 314/338	W2ZGB . . . 312/327	W8RNO . . . 310/327	W2TTH . . . 308/325
W9RBI . . . 315/339	W8MPW . . . 314/331	K2BZT . . . 312/328	D1ZBW . . . 310/326	W8NKM . . . 308/324
CX2CO . . . 315/335	W3GAU . . . 314/336	0E1FR . . . 312/333	K2OEA . . . 310/325	D13RK . . . 308/324
W1FH . . . 315/340	W2LPE . . . 314/334	W4TLM . . . 312/333	R2LWR . . . 310/322	W8NGO . . . 307/323
W7GUV . . . 315/337	W4OCW . . . 314/330	KV4AA . . . 311/334	W4OX . . . 310/333	0N4DM . . . 307/325
W8UAS . . . 315/335	W0DUU . . . 314/335	W2DFC . . . 311/326	W1HY . . . 310/329	W6PZP . . . 307/327
HB9J . . . 315/338	W2BXA . . . 314/337	W1ME . . . 311/333	W1ZW . . . 310/326	K5GGP . . . 307/319
W2AGW . . . 315/338	W9LNM . . . 314/336	K2DCA . . . 311/327	W2YR . . . 309/326	W6TZD . . . 307/327
W8EWS . . . 315/338	W8JBI . . . 314/332	5Z4AO . . . 311/328	W2SSC . . . 309/324	W3CGS . . . 307/325
W4DQH . . . 315/338	CE3AG . . . 314/337	VE7ZM . . . 311/334	PA0FX . . . 309/328	K2UVU . . . 307/319
W8HGW . . . 315/339	W5AFX . . . 313/337	W4OPM . . . 311/325	HB9MO . . . 309/325	W2DOD . . . 307/324
W2TQC . . . 315/333	W2SUC . . . 313/329	W4LYV . . . 311/330	W4MHR . . . 309/328	W8KHU . . . 307/324
W8BRA . . . 315/337	W5EBG . . . 313/337	G8KS . . . 311/328	W4CXB . . . 309/329	W4ZRZ . . . 307/312
W6CUO . . . 315/339	W7GBW . . . 313/336	W4YJ . . . 311/329	W0OGI . . . 309/324	W4BJ . . . 307/318
4X4DK . . . 315/332	W3LMA . . . 313/334	W2LAX . . . 311/327	W8IRN . . . 309/326	W1MV . . . 306/322
G2PL . . . 315/337	W8LKH . . . 313/332	W4VPD . . . 311/327	W3VGH . . . 309/323	C3AAE . . . 306/325
W3KT . . . 315/338	W8MMK . . . 313/333	W6GYV . . . 311/328	W2FXN . . . 309/322	W6KEV . . . 306/327
W1BHH . . . 315/338	D13LL . . . 313/328	W2OKM . . . 311/328	D16EN . . . 309/323	W5IGJ . . . 306/323
PY2CK . . . 314/335	W1CLX . . . 313/335	W0NTA . . . 311/330	W2SAW . . . 309/325	K4TJL . . . 306/314
W4GD . . . 314/334	W2BOK . . . 313/329	W2TP . . . 311/319	W2NUT . . . 309/324	W4LRN . . . 306/317
W7PHO . . . 314/331	W4ML . . . 313/332	K4LNM . . . 311/324	W2HTI . . . 309/323	W5OK . . . 306/316
K3UPJ . . . 314/337	L16DJX . . . 313/336	K6ENX . . . 311/327	W3JTC . . . 308/323	W9VHM . . . 306/321
W0YFV . . . 314/337	W5KC . . . 313/335	VE3CFG . . . 311/324	G3FXB . . . 308/320	K4RPK . . . 306/314
W2ZX . . . 314/332	W0AIV . . . 313/335	W1HZ . . . 311/328	W5OLG . . . 308/328	W2PJJ . . . 306/322
W4AIT . . . 314/336	W3JNN . . . 313/336	W9AMU . . . 311/327	D17BA . . . 308/324	W6OSU . . . 306/317
W6AM . . . 314/338	W2WZ . . . 313/335	W0DFE . . . 310/326	VK3KB . . . 308/330	W0AJU . . . 306/319
G3FKM . . . 314/330	G4CP . . . 312/335	W2UVE . . . 310/327	K4AIM . . . 308/321	W8KPL . . . 306/323
W2LV . . . 314/332	G3AAM . . . 312/335	W3FCR . . . 310/326	W8PUD . . . 308/324	W6PUY . . . 306/326
W9NDA . . . 314/337	W8DMD . . . 313/333	W2FZY . . . 310/322	W0PGI . . . 308/322	W2RDD . . . 306/319
W6YY . . . 314/333	D1BZ . . . 312/329	W8DAW . . . 310/333	WAZLS . . . 308/324	W2GLF . . . 306/319
W2JT . . . 314/332	W8KML . . . 312/332	W7ENW . . . 311/333	W9GIL . . . 308/324	W0YSK . . . 306/322
W9HUZ . . . 314/333	W5CKY . . . 312/330	K6EVR . . . 310/326	W2GUM . . . 308/329	K6EC . . . 306/319
	W6CPB . . . 312/332	W8SYK . . . 310/327	D1LIN . . . 308/323	

## Radiotelephone

CX2CO . . . 315/335	W4DOH . . . 314/335	W4JNN . . . 313/333	W8POO . . . 311/327	0N4DM . . . 307/325
W8HGW . . . 315/336	W8HFB . . . 314/334	5Z4ERR . . . 312/333	W2BXA . . . 311/332	W9NDA . . . 307/326
W8RIS . . . 315/339	W8GZ . . . 314/336	W1FH . . . 312/332	W6AM . . . 310/333	D13LL . . . 307/322
PY2CK . . . 314/336	4X4DK . . . 314/331	W0AIV . . . 312/332	1I1AMU . . . 309/327	T12HP . . . 307/328
W7PHO . . . 314/331	W9RBI . . . 313/335	W9JFF . . . 312/328	G2PL . . . 309/328	W3KT . . . 306/324
W2ZX . . . 314/332	W6YY . . . 313/332	W2JT . . . 312/325	G3FKM . . . 308/321	W3GHD . . . 306/325
	PY4TK . . . 313/329	W8KML . . . 311/331	W4OCW . . . 308/320	G8KS . . . 306/319

## New Members

From August 1, through August 31, 1965, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

W0Y7Q . . . 261	W6GWD . . . 134	K5TNB . . . 115	YU3AR . . . 108	W89NH . . . 103	K4KLR . . . 100
11RB . . . 251	W6GVD . . . 130	W2HL . . . 114	W2PLZ . . . 106	W0GQL . . . 103	W5EIL . . . 100
W1GTO . . . 235	H9ADD . . . 130	J4IBX . . . 114	W1GTO . . . 105	D1LEQ . . . 103	W9SKR . . . 100
W60Z . . . 212	W4ZOTJ . . . 127	SP9UH . . . 114	W4END . . . 105	W3UVE . . . 102	W0PJE . . . 100
W6CNA . . . 208	W0MPW . . . 125	W2CZZ . . . 110	K4THA . . . 105	K7OPB . . . 102	0K2KGE . . . 100
SM5RK . . . 172	W4DLA . . . 123	W6ADY . . . 109	SP9ACX . . . 105	VE3AVE . . . 102	SM2OZ . . . 100
1I4RS . . . 156	8V0VE . . . 122	W5CJL . . . 109	D1Q2A . . . 105	K9KXN . . . 102	UA9SK . . . 100
SP5AIB . . . 152	0Z7X . . . 120	SM2BYW . . . 109	K1EUW . . . 104	G1ZUPW . . . 101	UA9SH . . . 100
W4A1WC . . . 138	8M7CXH . . . 120	W6EUF . . . 108	K4QLO . . . 104	K1QPV . . . 100	YU2YG . . . 100
	4X4TP . . . 116	EL2S . . . 108	W7PKK . . . 104	W3AG . . . 100	

## A.R.R.L. ACTIVITIES CALENDAR

Nov. 5: CP Qualifying Run — W6OWP  
 Nov. 13-15, 20-22: Sweepstakes Contest  
 Nov. 16: CP Qualifying Run — W1AW  
 Dec. 2: CP Qualifying Run — W6OWP  
 Dec. 15: CP Qualifying Run — W1AW  
 Jan. 6: CP Qualifying Run — W6OWP  
 Jan. 8-9: V.H.F. Sweepstakes  
 Jan. 15-16: CD Party (c.w.)  
 Jan. 18: CP Qualifying Run — W1AW  
 Jan. 22-23: CD Party (phone)  
 Feb. 4: CP Qualifying Run — W6OWP  
 Feb. 5-20: Novice Roundup  
 Feb. 11: Frequency Measuring Test  
 Feb. 12-13: DX Competition (phone)  
 Feb. 16: CP Qualifying Run — W1AW  
 Feb. 26-27: DX Competition (c.w.)  
 Mar. 12-13: DX Competition (phone)

Mar. 26-27: DX Competition (c.w.)  
 June 11-12: V.H.F. QSO Party  
 June 25-26: Field Day

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Oct. 30-31, New Hampshire QSO Party, Concord Brassponds (p. 146, last month).

Oct. 30-31, Nov. 6-7: VU2/487 Contest, Amateur Radio Society of India (p. 111, last month).

Nov. 3-4: YLRL Anniversary Party, YLRL (p. 97, Sept. QST).

Dec. 4-5: New England QSO Party, Connecticut Wireless Assn. (p. 132, this month).

Dec. 18-19: Maine QSO Party (next month).

# CLUB AWARDS

### New Members Radiotelephone

K6YRA.....251	W3PN.....153	K4IMS.....119	K4AAB.....106	W8FWK.....104	WB2GSK.....100
W0VQ.....220	DJ3WE.....150	K4WMB.....115	K8EC.....105	DJ3BB.....103	K4RNS.....100
SM5RK.....163	K1RVV.....142	9N1DD.....112	K6JBG.....105	WB2HZ.....102	W7JWE.....100
DL7DE.....161	W0Y7Q.....131	K3UZV.....109	11GAS.....105	K1PYI.....101	K8KOM.....100
	F9VT.....122	DL1EG.....109	K4TKR.....104	WA1AGE.....100	KW6EJ.....100

### Endorsements

W2JVU.....320	K2ZKU.....290	K1HVV.....252	JA1BN.....216	I1R.....171	SM4CMG.....132
W5PGA.....320	W4NJF.....290	V87PU.....252	PA0VO.....216	SM7BHF.....169	W1PYM.....130
W9PKO.....320	W7UMJ.....290	W221V.....250	K0ZEC.....214	WA4JZU.....163	W4GTS.....130
DL7AA.....320	W2DXN.....288	K4ZKZ.....250	WA2HUV.....213	W2J8X.....161	K6ALE.....130
W46EYP.....312	W1YDO.....285	W91RH.....250	W2FV1.....211	K5GOT.....161	W8RAKZ.....130
W2BEC.....311	W1AXA.....281	K0EZH.....250	JA2DN.....211	W7QY.....161	W6PL8.....130
W4DGS.....311	W6WO.....281	K9BGM.....245	W1WQC.....210	CE5EF.....161	W9BGX.....130
W6NQA.....311	DL1JW.....281	W6PQT.....243	OZ7KY.....209	I1LZ.....161	PY2BKO.....130
W6RKF.....311	W21PM.....280	G2GM.....243	DJ5DA.....207	LA1L.....161	W0MVG.....129
W93F.....311	W6PBI.....280	W2VJN.....242	K4EZ.....204	W1PNI.....160	UC2AF.....128
K6LGF.....310	W0BPI.....280	K6BPR.....241	SM3AZI.....202	K3JLI.....160	KH6BHI.....127
W6BD.....310	G8JM.....280	K1IGD.....240	K3MINW.....201	W6FR.....160	W5RY.....126
W0A1H.....310	W4BPR.....275	WA2CBB.....240	K2LAF.....200	W9WGG.....160	MP4BEQ.....126
G2BOZ.....310	W8LY.....273	W5A1.....240	K8RDE.....200	WA4XP.....157	K2YTC.....125
W2IRV.....304	K2JKO.....273	W9AAG.....240	HK3RO.....200	G5DJ.....154	W1CSP.....124
DJ3KR.....303	W8EVZ.....271	W6UML.....240	W3PLY.....199	KH6ACC.....152	WA4QBX.....124
W2VMG.....302	K8VDV.....271	CR8A1.....237	SM1CXE.....199	WA2LMW.....151	9Q5TJ.....124
W4PA.....301	K3DCP.....270	VF3ADV.....236	W1DBM.....192	K7CAD.....151	W5KHP.....123
K7GCM.....301	W6PHF.....270	W20TR.....233	W0TV.....192	K4YVL.....150	WA2HLH.....122
SM5CO.....301	W9RKH.....270	W9QFC.....233	SM5NIC.....192	W7FUL.....150	K9ZXC.....122
SM7TQ.....301	DL7AF.....270	W2FXE.....232	W4JDN.....191	K8ZIP.....150	SM6CAW.....122
YV5AB.....301	W7AUS.....269	WA6KNE.....232	W8MFW.....191	W9QMS.....150	WB2CJZ.....120
W27QR.....300	SM5BPJ.....269	W2YCW.....231	W7DQM.....190	K0TYO.....150	WA4CJM.....120
W2ZVS.....300	W5QN.....267	WB2FMK.....230	W7MX.....190	LA7F.....150	WA4RAK.....120
K4ASU.....300	WA2RAU.....266	W7DIS.....227	SM5AM.....188	OE1JZ.....150	W4ZCX.....120
W6MVL.....300	W6ABA.....262	K8JWC.....225	W86CLY.....186	WA2EJN.....144	W6AMS.....120
W7A1I.....300	K9C6O.....262	WB2CK8.....224	W0DGH.....186	G3RFE.....142	6W8BF.....120
VE2BY.....300	DJ1K1.....262	W6JKJ.....224	WA6LHP.....183	SM4AWC.....142	WB2AMO.....119
G8A1Z.....300	K1MOD.....260	K8SOK.....224	VE3RHS.....181	W1BD1.....140	W9UC.....117
PY1HK.....297	W3YZI.....260	W9NN.....221	W7A1B.....180	WA6VAT.....140	W48SW.....112
SM6QJ.....296	K6OJF.....260	F9RM.....220	K8HCK.....180	W7VRO.....140	K6A.....111
K4HNA.....294	W9AVL.....260	WB2HXD.....219	W8RCM.....180	LA9TC.....140	HA5AV.....111
WA20JD.....294	W7ACD.....259	W9QQN.....220	DJ0KQ.....180	W9UTQ.....135	WA1ABW.....110
W5OQS.....291	YU1AG.....257	DJ5GG.....220	DL7DE.....179	WA6TK.....133	K1CEC.....110
DL3ZI.....291	W3DJZ.....253	Z1ZJO.....219	VK5KO.....179	K6TZX.....132	K1KCP.....110
K1SHN.....290	K1DIR.....252	Z82RM.....219	W2LJX.....176	WA8CZH.....132	K5HYB.....110
					W6CTZ.....110

### Radiotelephone

W2OKM.....320	WA6EYP.....287	W3DJZ.....250	W28NI.....210	W6TGB.....180	OE2EGL.....150
W9VHM.....320	W5LZV.....285	W1DQR.....245	W31CQ.....210	SM5IC.....180	OZ8BA.....150
W9YV.....320	Z86UR.....285	W2ZVJ.....242	K8VJY.....208	K8VJY.....176	W48MWG.....149
W2GLF.....318	W1JYH.....284	K6FRV.....242	W9QUU.....210	OZ38K.....176	Z1ZUV.....148
W9RNX.....315	W1YDO.....281	F2MO.....242	WB2CNA.....208	W8JPD.....174	W6ABA.....143
W1LFL.....314	KH6OR.....281	Z86BBP.....240	SM5BPJ.....208	K1IMP.....173	G5DJ.....142
W3MAC.....312	G8AIZ.....280	O44PD.....239	F9RM.....208	CN2GN.....172	K2RAP.....140
W5KBU.....311	W4NJE.....275	DL7AA.....237	HK4EB.....206	VE7HJ.....171	DJ2M1.....139
W8JAH.....311	W2HGF.....275	W2FSW.....230	V87PU.....202	W4E8S.....170	W6RNS.....130
W1JNG.....310	ON4DH.....272	VK2JZ.....230	W6WX.....200	W9JF.....170	WA5KBR.....130
W4ANE.....310	W4UWC.....271	W6NWZ.....223	W0NVZ.....197	VK5QR.....170	K1MOD.....126
W5AFX.....310	W1BHC.....270	W1DGI.....220	WB2HXD.....195	W4BPR.....166	K6BPR.....124
DL6EN.....310	W8JBI.....270	W8CUT.....217	W9JUJ.....195	W9QQN.....164	WA6OEF.....124
W4SKO.....304	ZP5ET.....270	W8NCG.....217	W1DBM.....192	W9WKK.....164	VE3BHS.....124
W4OM.....301	YV5BBU.....265	FL1LW.....217	W2J8X.....161	W2J8X.....161	SV0PM.....121
PA0HBO.....301	WA2RAU.....263	K6SOK.....216	K5GOT.....161	K5GOT.....161	VE2AJV.....120
W2BQM.....300	W4FRD.....260	W2PXE.....215	W2AEB.....190	K8AJK.....161	K3PCD.....119
W6RKP.....300	W4FP8.....257	W1FAB.....213	SM5ATN.....190	W1PNI.....160	W86GVV.....116
YV5AB.....300	W4SHP.....255	W1GOX.....213	W7DQM.....184	WB2EPG.....160	W2G8C.....114
W9LNM.....297	W6CIV.....252	DJ1K1.....213	UTU.....184	W8WUO.....160	K8RDE.....112
W2RW.....295	W7C1O.....251	K1DIP.....210	K6OHI.....191	WA6NE.....156	W6RNS.....121
W1ZW.....293	11RB.....251	W1WQC.....210	WA4JOS.....181	K3HHY.....151	E43KI.....111
K6EVR.....292	W2ODO.....250	K2OEA.....210	W1WKO.....180	DJ3WE.....150	W1FDL.....110
K9ECE.....290					W6WJL.....110



## C. D. ARTICLE CONTEST

A Communications Department article contest, a continuation of the very successful QST Article Contest during the 1964 anniversary year, needs your best ideas (in 800-1200 words) relating to League organization, clubs, training exercises, and operating techniques. Periodically, the best articles submitted for the "CD Contest" will be chosen to appear, with the winner electing to receive (a) a bound 1965 *Handbook* or (b) a QST binder, League emblem and the ARRL DX map. Our winner this month is Raymond E. Smolenski, K8KDE and his article appears below.

## ACHIEVING YOUR POTENTIAL

By Raymond E. Smolenski, K8RDE

WHAT IS more valuable than your transmitter, receiver, and "ticket" combined? Undoubtedly, in the field of amateur radio, it is that unique amalgamation of one's personal qualities called ability. Why is this of inestimable worth? Simply, it is because all of the previously mentioned equipment is interrelated to your license, which became obtainable only after you demonstrated a certain amount of skill, through personal practice, study, and patience. The operating permission you attained after passing the FCC examination should not have left you looking upon it as evidence of a peerless ability or even as a reward for achievement but rather as an *opportunity* to increase both station and operator capability. Since capability cannot be measured in inches and feet, let us devise a system of evaluation broad yet effective enough to include most of the amateur fraternity.

First, let us briefly examine your gear. Does your station have provisions for band-switching? Every station should be capable of communication on *at least* two bands, preferably more. This is vital not just for contest purposes but for genuine, over-all, operating efficiency. Assuming you hold a General class license (or equivalent), is your transmitter able to emit both phone (a.m. or s.s.b.) and c.w. signals? A great number of hams today seem to have the mistaken impression that ". . . c.w. is a dying art . . ." Having answered these questions in the affirmative, using reasonable effort and average equipment you should be capable of communicating with all fifty states within a year's duration. This feat should not prove too difficult to accomplish because Novices have been known to do it repeatedly. I offer the twelve month time quota in the form of an estimate since it would be pointless to establish precise time standards when everyone's geography, topography, and free operating time differs so greatly.

In order to apply your aptitude to the facilities of your station in a beneficial manner you ought to develop versatility of operation. Adjusting to various circumstances with ease is the mark of a good amateur. Since public service is the principle reason for our amateur existence one should immediately learn the established methods, if not already known, on how to properly transmit and receive messages on voice and by use of c.w. Correct procedure has shown itself to be quite essential, on both modes, to the accurate relay of "traffic."

Contests offer us an excellent chance to demonstrate and to test our own techniques while in competition. ARRL sponsors many such events periodically, which are diversified to some degree so as to suite our particular interests. Among these are Sweepstakes, DX Competition, CD Parties, and Field Day, not to mention the Novice Roundup for the newcomers. In addition to these, there are many club sponsored contests in the form of state QSO parties, etc. You will be able to check your progress by your score placement and in some instances, such as Sweepstakes, even further by comparing your time and (power) class with fellow contestants of nearly identical score. Current information relative to these activities can be found in the Operating News section of this magazine.

Perhaps you are a "paperhanger." In that case you will particularly enjoy improving your talents while simultaneously using a few certificates as incentive. As previously suggested in this article, the Worked All States (WAS) certificate should rank high on your list of operating goals. Possibly, if you relish distant contacts, membership in the DX Century Club might be given some consideration. A fact that should be remembered as you pursue DX is that frequently the agility and timing of the operator rather than his signal strength account for QSOs with new countries. Maybe, in view of equipment or time limitations, this award is not feasible for you. Taking this under consideration, the Worked All Continents (WAC) certificate might be more appropriate. For those who lack the competitive spirit required to obtain most certificates, county hunting may be the answer, particularly on the lower frequencies. Also along this line is the ARRL code proficiency program which provides encouragement to all through the issuance of a certificate with endorsements to the extent of 35 w.p.m.

Certainly these suggestions are not made with the intent of eliminating common rag chews in order to make BPL, DXCC, and win contests, since this type of informal but informative communication in itself has greatly helped to advance our technical knowledge of equipment, both our own as well as those types we encounter on the air. These ideas *are* presented with the purpose of making every amateur aware of his operating capabilities and that of his station in order to make one's amateur potential a realization. The well-rounded amateur is one who, though he may specialize in a particular realm, retains a combination of interests. Despite your preference, established operating practices should be followed in all instances.<sup>1</sup>

"Live up" to the privileges of your license. Don't confine yourself. Following this plan of action you will serve both the public and yourself more advantageously, especially in time of emergency. Remember the Amateur's Code,<sup>2</sup> particularly statement no. 3 — "The Amateur is Progressive." Consequently, the progressive amateur is versatile, ready for most anything. How about you, QRV?

<sup>1</sup> "The Importance of C.W.," *QST*, August, 1964, p. 9.

<sup>2</sup> Details can be found in "*Operating an Amateur Radio Station*," an ARRL publication.

<sup>3</sup> "High Standard of Conduct," *QST*, February, 1964, p. 9.



## CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Nov. 16 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Nov. 5 at 0500 Greenwich Mean Time on 3590 and 7129 kc. **CAUTION!** Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT Nov. 16 becomes 2130 EST Nov. 15.

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

Code practice is sent daily by W1AW at 0030 and 0230 GMT, simultaneously on all listed c.w. frequencies. At 0030 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sunday, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 0030 GMT daily, speeds are 10 13 and 15 w.p.m. The 0230-0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending in step with W1AW (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230-0320 GMT practice on those dates:

Date Subject of Practice Text from Sept. QST  
 Nov. 1: *It Seems to Us*, p. 9  
 Nov. 4: *Testing a Sideband Transmitter*, p. 14  
 Nov. 10: *Quadrangle*, p. 20  
 Nov. 16: *Frequency Measurement* . . . , p. 28

Date: Subject of Practice Text from *Understanding Amateur Radio*, First Edition  
 Nov. 19: *The Decibel*, p. 35  
 Nov. 24: *Amplifier Classifications*, p. 35  
 Nov. 29: *Tetrodes and Pentodes*, p. 36

## OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Considerations to bear in mind include a clean signal, good keying, careful enunciation, correct procedure, judgment and courtesy. The League's Operating Aid No. 11 lists further examples. Send your vote for "Operator of the Month" to the ARRL Communications Department.

During September the following additional amateurs were nominated in recognition of their extra skills and courtesies:

K1ARO K3YXQ  
 K1DYG W4ELO  
 W10BY W41BI  
 K13RE W4NNIL  
 W1WPO W4R9V  
 K1WQI K5GBB  
 K1YKT K8DOO  
 K1ZVN W4RGLF  
 K2AJA WNSROJ  
 W42GX I K8V8N  
 WB2KSG WN0KTC  
 WB2LUT WN0NCR  
 WA2TFR K0OPA  
 K2UBG DL5FL  
 W3KVG/2 JT1AG  
 W3NWB K6GAIG  
 W3ORJ PY2QL  
 K3USC VF3MV



## SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.  
 WIDE-BAND F.M. 52.525, 146.94 Mc.

### Briefs

In the September report of the June V.H.F. QSO Party, our cryptographic efforts failed and we erroneously showed WB6JLC as WB6JCC. Sorry, Pat! The Oregon high single operator score should be shown as W7TYR, winning the section certificate award.

## W1AW SCHEDULE, NOVEMBER 1965

The ARRL Maxin Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 3 p.m.-3 a.m. EST, Saturday 7 p.m.-2:30 a.m. EST and Sunday 3 p.m.-10:30 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. The station will be closed November 25, Thanksgiving Day.

GMT*	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0030			Code Practice Daily <sup>1</sup> 10-13 and 15 w.p.m.				
0100		C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>
0120-0200 <sup>4</sup>		7.080	7.080	3.555	7.080 <sup>6</sup>	3.555 <sup>6</sup>	7.080
0200		Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>
0205-0230 <sup>4</sup>			3.945	50.7	145.6	1.82	3.915
0230		Code Practice Daily <sup>1</sup> 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.					
0330-0100 <sup>4</sup>			3.555	7.080	1.805	7.080	3.555
0400	RTTY OBS <sup>3</sup>		RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>	RTTY OBS <sup>3</sup>
0410-0130 <sup>4</sup>			3.625	14.095	3.625	14.095	3.625
0430	Phone OBS <sup>2</sup>		Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>	Phone OBS <sup>2</sup>
0435-0500 <sup>4</sup>			7.255	3.945	7.255	3.945	7.255
0500	C.W. OBS <sup>1</sup>		C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>	C.W. OBS <sup>1</sup>
0530-0600 <sup>4</sup>			3.555 <sup>6</sup>	7.080 <sup>6</sup>	3.555	7.255	3.555
0600-0700			7.080	3.945	3.555	7.255	7.080
0700-0800			3.945	7.255	3.945	3.555	3.915
2000-2100		14.280	21/28 <sup>5</sup>	14.100	21/28 <sup>5</sup>	14.280	
2100-2200		14.100	14.280	14.100	14.100	14.100	
2300-2345		7.255	21/28 <sup>5</sup>	21.1 <sup>6</sup>	21/28 <sup>5</sup>	7.255	

<sup>1</sup> C.W. OBS (bulletins) and code practice on 1.805 3.555 7.08 14.1 50.17 and 145.6 Mc.

<sup>2</sup> Phone OBS (bulletins) on 1.82 3.945 7.255 14.280 50.17 and 145.6 Mc.

<sup>3</sup> RTTY OBS (bulletins) on 3.625 and 14.095 Mc.

<sup>4</sup> Starting time approximate. Operating period follows conclusion of bulletin or code practice.

<sup>5</sup> Operation will be on one of the following frequencies: 21.075 21.1 21.41 28.08 or 28.7.

<sup>6</sup> W1AW will listen for Novices on band indicated before looking for other contacts.

Station Staff: W1QIS W1WPR.

\* All times/days in GMT, general operating frequencies are approximate.

SCM - AREC - ORS - CP - SEC - OBS - TCC - OO

# Station Activities

OES - A1OPR - EC - DXCC - CLUBS - RM - OPS - RCC

## ATLANTIC DIVISION

**DELAWARE**—SCM, Roy A. Belair, W3IYE—SEC: K3NYG. PAM: W3CFA, VHF PAM: K3OBU, RAI: W3EEB.

Net	Freq.	Local time	Days
DEPN	3905 kc.	1800	Sat.
DSMN	50.4 Mc.	2100	Tue.
Dover 6 & 2	50.4 Mc.	2000	Wed.
KCEM	3905 kc.	1300	Sun.

Renewals: W3RDZ as OO, K3SXA as ORS, K3YHR as ORS. New appointment: WA3BQT as ORS. K3GKF combined physics lecturing at several VE2 and VE3 universities with vacationing. K3NHL has added another 70-ft tower to his growing antenna farm. K3CNH is active from Sussex County on 6 and 80. K3YZF is now set up for handling traffic via RTTY. WA3BQT has a new Drake R4. W3TGF is going to be less active for a while—he is getting married. Traffic: (Aug.) W3EEB 152, WA3BQT 97, K3YZF 54, K3YHR 8, K3NYG 2, W3IYE 1. (July) W3EEB 25.

**EASTERN PENNSYLVANIA**—SCM, Allan R. Breiner, W3ZRQ—SEC: W3PIL. Rms: W3EML, K3MVO, K3YVG. PAMs: W3SAO, K3LSV, EPA C.W. Net had QNI of 347 with QTC of 292. PTTN had QNI of 388 and QTC of 295. Eastern Pa. Emergency Phone & Traffic Net QTC of 22. W3BUR is back home and has painted the house. Help! W3AXA needs a 6693 or 68J7 tube. Got any spares in your junk box. K3FIV spent his vacation in New York traffic-handling. It was K3YQJ and not K3YVG who spent his vacation in New Hampshire (so sorry). W3NOH has been busy erecting the antenna farm before the big freeze comes. W3EU visited K2US at the World's Fair. New Clear Dept.: W3MPN added an Apache and an SB-10. W3ORX added an SB-300 and SB-400, his ir. operator is WA3BEB. WA3BBI added a DX-100. K3AOH erected a 40-80-meter Telrex inverted "V." W3ZRQ and K3FCB switched antennas to an 80-meter folded dipole. K3RTR added RTTY gear to his station. WN3DSZ is now Novice Class in Coplay. WA3CCG and WA3AUM are now Technician class. WA3BSV and WA3CCO upgraded to General Class and K3HTZ and W3ZRQ passed the Extra Class exam. K3UKZ is on active duty in the Navy and K3NYX, your editor's Jr. operator has enlisted in the Navy. Hazleton ARC officers are W3DRS, pres.: W3OHL, vice-pres.: K3PII, secy.: K3YVP, treas. WA3AQF is on 6 meters in the New Holland Area. K3VAX entered Drexel Institute. K3MNP added 4 more new certificates to his wallpaper collection. WA3CRL would appreciate contacts with anyone interested in amateur TV. The Abington ARC Net meets Sat. on 28.63 Mc. at 0130Z and Tue. on 50.44 Mc. at 0130Z. The present station lineup of W3RV is SB-200 and SB-400, Drake 2-B and vertical antenna. K3RZE made HPL the hard way and on our section's training net. W3UKP is EC and has activated the AREC in Cumberland County. The following counties still lack an EC: Adams, Berks, Tioga, Chester, Monroe, Northampton, Bucks, Dauphin Luzerne, Lebanon, Lancaster, York, Sullivan and Schuylkill. Traffic: W3CUL 5634, W3EML 1018, W3VR 511, K3MVO 354, K3MYS 248, W3A1Z 154, K3RZE 147, K3PIE 132, K3YVG 118, K3FIV 105, W3ZRQ 98, K3HKV 85, W3JXX 82, WA3BHN 73, K3ZUN 66, WA3CBL 65, W3AXA 64, W3VAP 87, K3PWW 54, K3ZSK 46, K3YQL 42, W3RV 38, WA3BYH 23, K3HLD 27, K3KTH 23, W3A1P 23, WA3OKA 21, K3KKO 21, W3CBH 20, K3KXJ 13, W3QDW 11, W3BUR 7, K3OMP 7, K3YQJ 7, WA3BMY 6, WA3BNC 6, W3BFF 5, W3ELI 5, W3KJJ 5, WA3CXZ 4, WN3BSV 3, WA3CCC 3, WA3BJI 1, WA3BJQ 1, K3HTZ 1.

**MARYLAND-DISTRICT OF COLUMBIA**—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JZY, W3QCW, W3UE, W3ZNV. PAMs: W3JZY, K3JFD.

Net	Freq.	Time	Days	Sess.	QTC	Ave.
MDD	3643	0000Z	Daily	31	324	10.5
MDDS	28200	0130Z	Daily	23	1	0.04
MEPN	3820	2200Z	Daily	22	8	0.27
MSTN	50150	0030Z	Daily	31	56	1.8

Note change in starting time for MSTN. K3NCQ is on active duty at Andrews AFB. Welcome to WA3CRA, who reports for the first time this month. K3DNO is working

• 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.

over an ARR-2 for 220 Mc. W3TN has returned to traffic business with this month's BPL honors K3IPX/3, of MSTN fame, is new OPS. W3HQE has gone to France and Spain again; hope he has time for some hamming this trip. W3PZW also returned to traffic-handling after the summer in Florida. K3ZIX is a new ORS appointee and working on the QRO final. K3UFV is back on the air after a long session in the hospital. K3VGX is looking for new members in the AREC nets in Baltimore on 2 or 10. K3NCM has been off the air because of poor health; hope you are OK, Bill, by the time you read this. K3VHS is too busy with two summer jobs to get time on the air. W3ZUH operated from K2US. W3QCW visited ARRL Headquarters and the World's Fair. K3TJE is building a QRO final. K3QDD has a new T4X. K3FKY has a new TCS-12. W3QA visited the San Francisco Bay area. W3YAG is operating temporarily from a wheel chair after a fall from a ladder. WN3DKH wants to get into traffic work. W3EOV reports 6-meter coverage of the Severn River Sail Boat Regatta. WA3AZI has three new antennas working and K3VCG has his antenna back up after a month without it. K3URE handled emergency traffic during a local power failure. K3RUQ is attending the Capital Inst. of Technology. Look for announcements on the proposed Maryland QSO party. Traffic: (Aug.) K3TJE 252, W3LBC 216, W3TN 181, K3QDD 97, W3PQ 77, K3LFD 62, W3QCW 59, W3HQE 56, K3GZK 53, K3IPX/3 51, K3OAE 45, K3FKY 36, W3FOV 34, K3URV 34, W3PZW 31, WA3AJR 30, K3JYZ 23, K3URE 21, W3RKK 19, K3ZIX 16, K3LLV 15, W3ECP 14, K3UFV 11, K3VHS 10, K3ZSX 7, K3GME 5, K3VGX 5, W3ZNV 2. (July) K3VHS 16, K3NCQ 7.

**SOUTHERN NEW JERSEY**—SCM, Albert E. Hankinson, WB2PHV—This is my first and last report as SCM of S.N.J. Because of job requirements, I am being transferred to the Denver, Colo., area approximately Oct. 1. Several section members have questioned me as to how I became SCM without the necessity of a mail ballot. I should refer them to the Operating News section of QST where all announcements are made and in which was the news that only one nominating petition was filed and therefore a ballot was not necessary. It seems regrettable that a section with the potential of Southern New Jersey does not have spirited competition for the post. I had hoped to start things in my two-year term by visiting all the clubs and making all the hamfests to find out why support is limited. Since this is not to be, I will report briefly on the news I received. WN2SBD is new in Hardinville with a 75-watt homebrew rig. K200K is now W3CDB in Philadelphia. The Gloucester County ARC is to be commended on the excellent issue of *Crosstalk* for August. No news was received from Cumberland or Cape May Counties; No reports from Atlantic or Salem Counties either. It seems a shame that after the fine turnout at the SCARA's Hamfest, that no news of an upsurge of activity is available. Traffic: W2RG 118, WN2SBD 76, WA2KIP 75, W2ZI 35, W2GIW 29, WA2KAP 4.

**WESTERN NEW YORK**—SCM, Charles T. Hansen, K2HUK—SEC: W2ZRC. PAM: W2PVI. RMs: W2RUF, W2EZB and W2FEB. NYS C.W. meets on 3670 kc. at 1900. ESS on 3590 kc. at 1800. NYSPTEN on 3925 kc. at 2200 GMT. NYS C.D. on 3510.5 kc. and 3993 kc. (s.s.h.) at 0900 Sun. and 3510.5 kc. at 1930 Wed. T.CPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT. NYS County Net on 3510 Sun. at 1000 and 3670 at 1700 Sat. Appointment: WA2UFI as OO. Endorsements: WB2FPG as ORS, WB2ALK AS OPS. Congratulations to RPLers K2KQC, WA2UFI and W2OE. W2RUF reports that the NYS C.W. Picnic was a great success. K2MQN reports

that the Erie County Net held a picnic at Chestnut Ridge Park with 26 hams and their families in attendance. Special thanks goes to K2EQB and W2SSG who stayed all night to hold spot. NYSPTEN secy, WA2RLV reports that WA2JWL is Net Mgr. and WA2TUI is chairman of the Policy Committee. The net picnic was held at Thatcher State Park and W2PVI reports that WB2AEK burned up his ignition wires on the way and WA2OGU lost his gas tank when leaving. In spite of this everyone had an enjoyable time. K2MQN had his equipment set up at the Erie County Fair. K2EQB and WB2ARG also helped with the display which depicted RACES, RAGS had a club station set up at the N.Y. State Exposition at Syracuse and 27 clubs had names and addresses listed on a placard at the exhibit, reports club secy. W2SEI, WB2-NZA now is mobile with an NCX-5. He had to relinquish NCS on NYSPTEN because of attending North-eastern U. in Boston. Many thanks to all of the young fellows who do a fine job on the traffic nets while home on summer vacation. The Utica ARC held an FB family picnic at the Power Dam. GRAMS also held a picnic at the YMCA Camp near Batavia. Now is the time more than ever to support your local organizations including RACES and AREC. The new ARRL *V.H.F. Handbook* is a honey in case you haven't noticed. Traffic: (Aug.) K2KQC 672, WA2UFI 545, W2OE 349, WB2GAL 204, W2RUF 150, W2LYG 85, K2JBX 61, K2DNN 60, WB2-NZA 50, W2FEB 45, W2HYM 42, WA2TUI 35, K2IHOH 31, W2RQP 29, K2QFV 27, K2IMI 26, WA2IHP 21, K2-MQN 19, W2CFQ 17, K2QDT 12, W2PNU 10, WA2FOJ 9, WB2FPG 5, WB2NNA 5, WA2GLA 4, K2BWK 4, K2RYH 3, W2EMW 1. (July) W2MTA 18, K2MQN 15, K2RYH 7.

**WESTERN PENNSYLVANIA**—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Chawtvia, W3-NEM, SEC: K3ZALH, PAMs: W3TQC, K3VPI (v.h.f.), HMs: W3KUN, W3AIFB, K3OOU, W3UHN. Traffic nets: WPA, 3585 kc. 0000 GMT Mon. through Sun. KSSN, 3585 kc. 2330 GMT Mon. through Fri. K3PLQ has gone mobile with an Elmac AF-67. K3UZ is s.s.b. on 7 Mc. WA3AGS sports a new Tri-band beam on 14 Mc. W3REO is mobile on 28 Mc. WN3DUF joined the Etna ARC. K3-ZGI visited K2US. K3SBU runs a new HT-44. K3SHT is s.s.b. on 6 with 200 watts. WA3CXQ has gone to 6-meter mobile. K3SAF, with a new Squalo, and K3OUK, with a new Finco beam, get out on 6. Former W3VFR is now K4VLR at Lexington, Ky. K3PYS and Dad, K3SOH, set a world's record taking down the WPA Traffic Net. Picnic direction signs after it was over. WN3DDO, WN3-DGN and WN3DGI all graduated to General Class. K3-DME received his QRP Club certificate. K3FIO now locates in Corapolis. K3SAA and K3OQP participate in MARS activities. WN3BOV moved to Washington, D.C. New Members of the Two Rivers ARC are WN3-DOG, WN3DYJ and WA3DTR. WA3DBN and dad, WA3BSP, became General Class licensees. New Novices are WN3EHI and WN3EGQ in Ambridge. WN3EGN in Corapolis. W3ZZO runs a 4-125 on 6. Interested in an appointment? If so, drop your SCM a request, and how about that "ticket"? Have you checked the expiration date lately? Do so—now. New appointments: W3WBH as EC Westmoreland County, K3KMO as ORS. Reendorsements: K3CQT, W3JCC, W3SAY as ECs; K3FFF, W3-UGV as OBs; W3CA, W3IDO, W3IYL, W3NEM, W3YA as ORN; W3UHN as ORS/RM; W3TAS as ORS/OPS; W3GJY as ORS/OBS; W3BJQ, W3BOZ as OPS; W3-BWU, W3KWL, W3ZZO as OESs. The section welcomes back K3KMO who now locates at Lemont. Emergency coordinators still are needed in some counties. How about you? Contact K3ZMH, Section Emergency Coordinator. W3AUD sends AARL Official Bulletins via RTTY on 3610-3620 kc. K3SID signed up with the ARPS. If you want operating activity, the SS is at hand again. If you want traffic-handling know-how, check into KSSN at 2330 GMT or WPA Traffic Net at 0000 GMT, both on 3583 kc. Traffic: K3PYS 326, W3KUN 171, W3LOS 55, K3ZAIH 55, W3-UHN 24, W3GJY 18, WA3AKH 16, W3MFB 16, K3SMB 14, K3SOH 11, W3YA 9, W3SMV 7, K3EDO 6, W3OEO 4, W3LOD 2.

### CENTRAL DIVISION

**ILLINOIS**—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: George Nesbitt, W9LOF. SEC: W9RYU, RM: W9EVJ. PAMs: W9VWJ, WA9CCP and WA9KLB (vht). Cook County EC: W9HPG.

Net	Freq.	Time	Aug. Tfc.	Mgrs.
IEN	3940	1400Z Sun.	—	W9AEX
ILN	3515	0100Z Daily	146	W9EVJ
NCPN	3915	1300Z Mon.-Sat.	529	K9CYZ
NCPN	3915	1800Z Mon.-Sat.		
ILL PON	3925	2200Z Mon.-Sat.		W9SMD

The Moultrie Amateurs Radio club has built a new club house at Bruce, Ill., with a spacious club room and am-

ateur station. The Egyptian Radio Club Hamfest was well attended and many an eyeball QSO was held. Hundreds of amateurs stopped by the ARRL radio exhibit at the Illinois State Fair, which was staffed by the operators of the Sangamon Valley Radio Club using the club's call, W9DUA/9. The Six-Meter Club of Chicago now meets at Marquette Park Clubhouse the 3rd Fri. of each month. WA9KAW, K9ZOO, K9BDJ, W9BOD and K9EWW are now on RTTY. K9AMG was appointed Skokie Civil Defense Communications Officer. K9THY was awarded a fellowship to the University of Illinois, where he is working on his Master's degree. WA9JWN, K9KLI and K9-ZXM are mobilizing on 6 meters. K9RRF, K9YOA, WA9-KRC, WA9DGY and W9CHT are on 146.95 f.m. K9-AHH's new QTH is Moline, Ill. WA9NFS received his WAS award. The Worth Township ARC held a demonstration at the Evergreen Park Shopping Plaza Aug. 5-7 to originate traffic and to demonstrate amateur radio generally. W9NWK, net manager, reports that the 75-Meter Interstate Single Sideband Net had a traffic count of 543 for the month. WA9CNV was honored with an A-1 Operator Award. W9LNQ lost his 40/80 antenna during the high winds in August. W9YHZ has a new Drake TR-4. W9EEP is bringing in the hard-to-get signals with a new tower and beam. WA9FEI has a 700-watt linear on 2 meters. W9RCJ has a new Galaxy transceiver. K9HVB and K9HUY have recovered from recent illnesses. New calls heard were K9ZNY and WA9PSY. Section Net certificates were issued to W9EVJ, WA9NFS and K9AVQ. Amateurs wishing information regarding Navy MARS are asked to contact K9QJH. New appointments include K9WAM and W9VYF as OOs, WA9EAP as OFS and WA9NFS as ORS. The LARKS held an installation dinner in Morton Grove Sept. 11. WA9CCP is the only RPL award recipient this month. Traffic: WA9CCP 1219, WA9-CNV 389, WA9NFS 283, W9EVJ 250, W9NXX 104, K9-WMP 102, W9HOT 74, W9DOQ 73, K9BTE 57, WA9GUM 34, K9HSH 33, W9XXV 25, W9LNQ 10, W9PRN 10, WA9-F14, WA9KLB 4, W9HJM 1.

**INDIANA**—SCM, Ernest L. Nichols, W9YX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET.

Net	Freq.	Time	Aug. Tfc.	Mgr.
IFN	3910	1330Z daily, 2300 M-F	322	K9IVG
ISN	3910	0000Z daily, 2130 M-Sat.	670	K9CRS
QIN	3656	0000Z daily	157	WA9BWY
RFN	3656	1300Z Sunday	80	WA9IZR

K9GLL, PAM of Hossier v.h.f. nets, reports August traffic of 73. W9QLW, RM of 9RN, is back in circulation after a stay in the hospital, and reports 9RN traffic of 377 and 100 per cent representation by Indiana in Aug. New appointments: WA9CYG as ORS and OPS. BPL winners: K9IVG, WA4QR/9, W9JOZ and W9NZZ. QIN Honor Roll: K9VHY, K9HYV, WA9CYG, K9WVJ, W9-HLY, WA9IZR, W9QLW and W9ZYK. WA9LUG has moved to Indianapolis. Ex-W5WVY/9 is now W9IXG. W9HRB came back from vacation to a new Drake R4 receiver. The Madison Co. AREC Net now meets on 50.4 Mc. at 2100 EST on Sun. and 1900 EST on Mon., Wed. and Fri. Many QIN, 9RN and RFN members are heading for Purdue University. Amateur radio exists because of the service it renders. Traffic: K9IVG 1826, WA4-RQR/9 883, W9JOZ 633, W9QLW 277, WA9IZR 233, WA9-CYG 222, W9NZZ 191, WA9QCS 150, K9HYV 131, W9-VAY 91, K9VHY 88, K9CRS 79, WA9LUG 60, W9VYX 59, K9RWQ 56, W9SNQ 50, K9GLL 41, W9BUQ 39, W9-FZW 34, K9WVJ 34, W9FWH 31, K9EYF 28, K9VZQ 27, K9ILK 22, K9QVT 21, W9RTH 21, WA9BRD 20, WA9-GJZ 20, K9ZLB 20, W9CC 12, WA9BWY 11, W9-HZI 11, WA9CHY 11, W9DOK 11, W9HHB 11, K9KTL 10, K9UEO 10, WA9JWI, 9, W9BDP 7, WA9CFW 6, W9-HCQ 5, WA9MEJ 5, WA9AXF 4, W9DZC 4, WA9LNX 4, WA9QW 2, WA9BGQ 1, K9TSJ 1, K9YKE 1.

**WISCONSIN**—SCM, Kenneth A. Ehneter, K9GSC—SEC: K9ZPF. PAMs: W9NRP, K9IMR, K9HJS and WA9EZT. RM: None. Net reports received for Aug.:

Net	Freq.	Time	Sess.	QNI	QTC	Manager
BEN AM	3985 kc.	1300Z Mon.-Sat.	23	158	38	W9NRP
BEN N	3985 kc.	1800Z Daily	31	562	141	K9HJS
WSBN	3985 kc.	1800Z Daily	31	1128	354	K9IMR
WIN	3535 kc.	0045Z Daily	31	225	80	W9KQB
SWRN	50.4 Mc.	0300Z Mon.-Sat.	23	250	20	WA9EZT

Net certificates went to WA9MIO for WIN, W9IBM and WA9FAB for WSBN. New appointments: W9BLQ as ORS. Renewed appointments: WA9AKE, K9GSC, W9-KZZ and W9CXY as ORSs, W9EWC, K9PKQ and W9-UJM as ECs. W9KQB has a new SX-117 receiver. WA9-MIO made WAS. BPL certificates for Aug. traffic went to K9IMR and WA9GJU. W9NXXH has passed his

General Class exams and at 13 is wondering if he is the youngest Class in Wisconsin. New in Wisconsin is WA8-MSG/B in Superior, gone for a year to KL-7-Land is W9DTI/KL7. Wisconsin representation on 9RN has picked up but still needs help. WA9MRG has added a v.l.o. to his c.w. rig. The SCM and SEC visited the WYKA and toured its FB club station, W9NDW. Traffic: (Aug.) WA9GJU 503, K9MR 297, W9DYG 192, W9NRP 118, K9GSC 95, WA9MIO 83, WA9LWJ 57, W9YT 45, W9KQB 37, W9CBE 31, K9RCR 30, K9JXW 24, K9UTQ 24, W9AYK 23, W9HWQ 21, W9B1Q 10, W9TRP 9, K9YQKU 8, W9OTL 4. (July) K9DBR 12, K9QKU 10, W9AYK 9.

## DAKOTA DIVISION

**MINNESOTA**—SCM, Herman R. Kopischke, Jr., W7QCK—SEC: WA0BZG. RMs: W01SI, WA01DZ. PAMs: K0FLT, K0QBI, W0HEN, WA0DWM. Congrats to WA0DWM, new 6-meter MSTN PAM, and to WA01DZ, new MJN RM. Many thanks to WA0CQG, who did much in building up 18TN and to WA0JQD, who had to relinquish his MJN RM duties because of college studies added to his work schedule. W0PHD is a newly-appointed OES. Wally is NCS for the Navy MARS 2-meter net and is active on 6, 2 and the 420-Mc. band. He is looking for other 432-Mc. stations with which to work tests. Appointments renewed: W0HEN as EC, OPS and PAM; K0JFJ as ORS. The Arrowhead Radio Amateur Club supplied communications for the Duluth Portorama Days celebration and also put on a successful amateur radio demonstration with three stations operating three bands, plus an emergency communications display. K0ZRC and K0ZRD vacationed in the East and attended Parents' Weekend Activities at Annapolis Naval Academy where their son K0ZRE is a member of the class of 1969. WA0MKF and WA0JDE, with the help of WA0LYP, QSOed for 12½ hours of continuous operation on c.w. and phone. K6EA, ex-W0EA, has been renewing old friendships on the air from his cottage on Lake Bemidji. W0PKO has moved to Malibu, Calif. Kewpie's new call is W6BOE. W0KYG has moved to a new QTH in Minneapolis. W0YZH put on a well-attended pow-wow with a chicken dinner. Because of the flood the St. Paul ARC still is looking for a permanent meeting place. WA0LAW has enlarged his station with a 10-A, DX-100 and a Matchbox. The well-attended picnics at St. Cloud and Minneapolis rounded out a pleasant picnic season. WA0JKT made BPL the second month in a row. Traffic: (Aug.) WA0JKT 433, WA0LAW 241, W0SYD/O 139, W0SYD 118, WA0FYQ 108, WA0EDN 84, K0ORK 65, W0HEN 52, WA0BYO 42, W01SJ 38, K0QBI 34, WA0EPX 30, K0FLT 27, W0TCK 25, K0ZRD 25, WA0DVH 22, WA0ACI 20, K0KQU 20, WA0BZG 15, W0ENY 15, WA0FUR 15, K01CC 14, WA0MKF 14, W0MXN 14, K0ZKK 14, WA0LJ 13, W0UMX 13, WA0IJ 9, W0FKC 8, W0PET 8, K01KU 7, WA0AAM 4, WA0DWM 4, WA0DFT 1, K0SRK 1. (July) W01SJ 24.

**NORTH DAKOTA**—SCM: Harold L. Sheets, W0DM --SEC: W0AYL. PAM: W0CAQ. ORS: W0PQW. K01VQ went to the Twin Cities and passed the Amateur Extra Class exam. He is making the West Coast for the winter. W0GFE recently came by an SB-34 from the cross-trader K0RSA. W0FVX erected a garage to anchor the tower for a new beam. W0GZD is repairing wind damage to that super-duper 20-meter beam. WA0DVT drove to Portland where he did some nice mobile work on 20 meters. WA0BIT has a new Hi-Gain all-band vertical tower on order. W0TUF got an SX-71 receiver. WA0AYL has been busy setting up a North Dakota weather net between 7:15 to 7:45 A.M. on 3996.5 kc. during the winter months. It went into operation Oct. 4 with WA0AYL acting as Net Control. K0QYD received his DXCC-130 endorsement sticker. K0CND reports on a setup that the BARK Radio Club has with the Bismarck hospitals to provide emergency communication. W0CZR is doing duty with the U.S. Navy at Great Lakes. WA0AYS and WA0FDA will be returning to NDSU in Fargo while W0HQF will be on at Mandan this winter. K0EFC says that he has a super Qud that will take the winds of North Dakota. WA0LQ is a new Conditional at Backoo. A brother, W0M1SJ, is building a new rig. The N.D. RACES Net kept operating during the summer months and reports for Aug.: 276 check-ins, 6 formal, 30 informals. The average check-ins per evening was 20. W0PQW and K0SPH and W0CGM will be back as NCS. Traffic: K01TP 64, W0DM 6, WA0BIT 2, K0CND 2.

**SOUTH DAKOTA**—SCM, Seward P. Holt, K0TXW --SEC: W0SCT. RM: WA0AOY. Newly-elected officers of the SFARC are K0FKJ, pres.; K0ECS, vice-pres.; WA0ECK, sec'y.; K0RPK, treas. A new call in Sioux Falls is W0ODNK. W0PRL has moved back to Sioux Falls. After a long absence K0ZTV is getting the gear

readied for a return to network activities. Rapid City is holding a v.h.f. AREC net on Sun. and Wed. at 2000 MST on 147.6 Mc. K0KLIH is using a BC-522 on 2-meters. K0FQH is using a new NCX-5 on s.s.b. W0DJQ now has a Knight 100-A receiver in his shack. August report of the So. Dak. C.W. Net indicates 13 sessions, 62 QNI, 26 QTC. K0VYY was high QNI with 13. K0GSY 12, WA0AOY 10, K0TXW 9, WA0YD 7, W0DJQ 3, W0BSC 2, WA0JUM 2. Other QNI's were W7HLA, WA0KQU, WA0JCV, K5VBA and K0AZY. Traffic: WA0AOY 112, W0SCT 69, K0VYY 23, W0FJZ 9, W0DIY 5, WA0FJG 3, W0HOJ 3, W0DJO 2, W0ZAL 2.

## DELTA DIVISION

**ARKANSAS**—SCM, Curtis R. Williams, W5DTR--SEC: W5NPM. RM: K5TYW. PAM: WA5GPO. NAs: K5IPS, WA5IIS. Congratulations to W50BD, on making the BPL again. WA5HNN has resigned as net manager of OZK to devote full time to school work and other activities. K5TCK has returned to the U. of Arkansas. W5DTR visited League Headquarters recently and caught W1LVQ working late. New reports:

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave. Tj.
OZK	3790	0100Z	Daily	30	112	210	3.7
RN	3815	0001Z	Daily		(no report)		
APN	3885	1200Z	Mon.-Sat.		(no report)		
OZK	late report		(July)	29	123	225	4.2

Top stations on OZK were WA5IIS 22, WA5HNN 21, W5NPM 17, W5DTR 16, K5TCK 14. Amateur radio operators are performing another excellent communications service helping with communications during and after Hurricane Betsy. Why not now take the time to contact your local EC and join the Amateur Radio Emergency Corps? Traffic: W50BD 634, WA6HNN 380, W5NPM 314, W5MJQ 172, WA5IIS 158, W5DTR 94, K5TCK 52, WA5KJT 40, W0KON/5 40, WA5GPO 37, WA5BBS 21, K5VBF 17, W5HXB 14, WA5KUD 4, K5EDH 3.

**LOUISIANA**—SCM, J. Allen Swanson, Jr., W5PM--SEC: W5BUK. PAM: W5TAV. RM: W5CEZ. V.H.F. PAMs: W5UQR and WA5KHE. With the arrival of Hurricane Betsy the Delta S.S.B. Net, the LAN C.W. Net, the Gulf Coast Sideband Net and many individuals were immediately activated. WA5EVU has assumed Net Control for the Delta 75 Sun. mornings. W5TAV gave many years as NCS and deserves a grand handshake. W5QPS and W5WFO passed the Extra Class exam. The Chet-machi ARC nominated W5LDH and W5PM for director and vice-director. W5UQR sustained extensive lightning damage in July and activity has been curtailed. WA5-HGX, whose main interest is Navy MARS and the Jefferson Net, says WA5LYP will be back on the air soon. WA5LWK has a new R-4. K5MYM has a new jr. operator. K5FYI complains that his new s.s.b. rig cannot reach MARS frequencies. WA5DES would like ARRL to put out a special bulletin showing code practice stations. W5GHP vacationed in Florida and Atlanta. WA5ITW has been busy with band practice. K5KQG has been busy with Navy MARS. W5XQ likes his activity in net form. K5OKR again comes through with a nice traffic total. WA5FNB still is active on LAN. WA5BLO has work schedule trouble. W5CEZ had a nice vacation in N.Y.C. K5WOD is forming a radio club in Springfield High School with 15 non-ham members. WA5JBO is primed for some 80-meter c.w. WA5KHE and his son are building a 500-watt c.w. rig. WA5KIV accompanied his dad to Dallas. WA5JVL reports 6 meters generally closed during August with about three openings. WA5QGT has a new SB-110. WA5DNA is not control of the Greater NOLA RC, which meets at 8 p.m. CST Wed. on 50.25 Mc. W5BUK has completely recovered from his operation and is back at the daily grind. WA5KQN and W5GHP made the BPL. WA5JAY had to resign as OES and OO and is off to Syracuse. The Lafayette ARC held its Annual Picnic in August. Incidentally, the LARC is sponsoring a Louisiana QSO Party Jan. 29 and 30. More on this later. We regret to report that W5CYN and K5KMG have joined the Silent Keys. Traffic: W4GHP 527, W5CEZ 233, W5KQN 195, K5OKR 119, WA5FNB 47, WA5DES 36, W5MNQ 29, WA5KIT 20, K5FYI 6, WA5ITW 4, WA5HGX 3, WA5JVL 3, K5KQG 3.

**MISSISSIPPI**—S. H. Hairston, W5EMM--SEC: W5JDF. Sorry we are losing K5RUO to the Navy. K5-UYP and WA5FII had a ball in the V.H.F. Contest with 22,300 points on 6-meter s.s.b. They worked eleven states and most contacts said it was their first 6-meter s.s.b. in Mississippi. W5BW is as young as ever with a fine signal. K5MDX still is going fine on DX nearing DXCC on 40-meter s.s.b. Look for the college boys at W5YD and W5YE. Keebler AFB ARC. K5TYP, is really hopping

(Continued on page 120)

PERHAPS this month's page should be headed *Strays*, since its purpose is to correct a typographical error in the 1964 *Radio Amateur's Handbook*.

PAGE V31 of the *Handbook* interchanged the data for the 8122 tube used in the NCL-2000 two Kw amplifier with that for the 8121 — which is a convection cooled tube with a plate dissipation of only 150 watts. The 8122 is a high power ceramic tetrode designed specifically for SSB by RCA, and has a plate dissipation of 400 watts. Two 8122's are used in the NCL-2000 for a total of 800 watts of available plate dissipation — and they run very cool indeed at an average kilowatt. When you reverse the listings for the 8121 and 8122 in your copy of the *Handbook* ('65 *Handbook* is OK), you may also want to make a note that the allowable no-load plate voltage for the 8122 is 3000 volts when certain circuit parameters are met (details available from RCA's Tube Application Engineering Department).

THE ABOVE would not be particularly important, except for the fact that a number of early 8122 tubes used in the NCL-2000 failed when first placed in service because of manufacturing defects in the tube. These failures, coupled with the typo in the *Handbook*, led to supposition that the 8122 tubes used in the NCL-2000 were being run out of rating.

THE FACT is that the initial failures were due solely to eccentricity between the grid and screen of a number of 8122 tubes in a particular production run which resulted in grid-screen shorts very early in their operating life. NCL-2000 owners who experienced such failures found that these tubes were backed 100% by RCA's guarantee, and that they were immediately replaced with no questions asked. The defect was, of course, corrected by RCA as quickly as possible — and *all* tubes in new NCL-2000 amplifiers in distributor stock were replaced with tubes from the new production run.

TUBES from the new run were tested at RCA by running random pairs *continuously* for 500 hours at 2000 watts single tone "DC" input. Only one failure occurred — when the water cooling system to a dummy load failed and the dummy load was destroyed. These tests were performed, incidentally, at 150 Mc.

WE'VE covered quite a bit of detail about the 8122 because we're very jealous of our reputation for conservative design — and the suggestion (unfortunately given credence by the *Handbook* typo) that we would market a product with marginal tube ratings is an exasperating one.

THE NCL-2000 is the *only* amplifier on the amateur market with a manufacturer's I. C. A. S. rating of 2000 watts single tone D. C. input for the entire equipment. The NCL-2000 may be so operated into a dummy load indefinitely. As a matter of fact, the power transformer is the only component in the amplifier with a 2000 watt I. C. A. S. rating — all other components, including tubes, are rated at 2000 watts C. C. S.

SPEAKING of conservative design, the use of 8122 tetrodes in the NCL-2000 offers a number of important advantages over common grounded-grid circuits using zero-bias triode tubes — tune-up is much easier because tuning of the amplifier has no effect on the exciter — driving power is minimal (adjustable as low as 20 watts) instead of requiring as much as 100 watts and more for proper amplifier operation — exciter linearity is maximum, and potential TVI minimized because the exciter is not working in excess of its power capabilities — ALC control of the NCL-2000 is possible and compatible with our own NCX-5 and other transceivers and transmitters incorporating ALC provisions — the use of modified Class AB<sub>2</sub> operation in the NCL-2000 provides total protection from destructive peak currents resulting from accidental overdrive\* — and passive grid operation permits the incorporation of a 50 ohm dummy load in the NCL-2000 grid circuit to allow exciter tune-up and adjustment into the amplifier without placing a signal on the air.

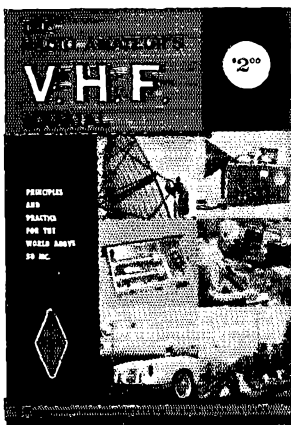
MIKE FERBER, W1GKX

\*See the *National Page* in *QST* for July, 1964.



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(Continued from page 118)

with about 75% now ARRL members. New officers are K9MHR, pres.; K5WYN vice-pres.; K3SPC, secy.; WA6MDL, mat. officer; K9JDQ, librarian. At the club's new location there is a wide-spaced four-element 20-meter beam on a 65-ft. tower, a Heath SB300 and SB400, operating c.w., a.m., s.s.b., RTTY. The frequencies 3900-3930 continue active, with W5ESC and many others on in the daytime looking for mobiles. Check into the nets:

"Miss" C.W.	3547 kc.	6:45 CST
Magnolia	3879 kc.	7:00 CST
Gulfcoast S.S.B.	3925 kc.	5:30 CST

Traffic: K5VBA 367, W5JDF 255, W5WZ 56, WA5FII 42, W5RW 16, K5MDX 8.

**TENNESSEE**—SCM, William A. Scott, W4UVP—PAMs: WA4GQM, W4PPP, WA4EWW, RM: W4MXF.

Net	Freq.	Time	Days	Sess.	QNI	QTC
TN	3635 kc.	0100Z	Daily	61	375	220
		0230Z	Daily			
TSSB	3980 kc.	0030Z	Tue.-Sun.	26	1206	145
ETPN	3980 kc.	1140Z	M-F	22	371	20
TSN	3635 kc.	0000Z	T-T-8	13	53	18
TPN	3980 kc.	1245Z	M-Sat.	31	1142	205
		1400Z	Sun.			

Glad to announce the appointment of WA4EWW as PAM for ETPN. Sorry to report the resignation of W4RRV as SEC for health reasons. Please send EC reports to the SCM. Congrats to W4EX on making the BPL. WA4OXD leaves several net control vacancies as Joe heads to Ga Tech. W4ZJY has taken a job in Huntsville, Ala. K4ERY has a new s.s.b. rig. W4WQZ was presented a plaque for the most valuable article in July QST. His 144-Mc. converter has several unique features. W4MXF and TN kept Hurricane Betsy watch. Traffic: W4PX 972, W4OGG 379, W4MXF 298, WA4GQM 263, K4SXD 166, W44RZ 134, W4PQP 111, W4WRK 82, WA4NUJ 74, W4KAT 66, W4UVP 52, K4LSP 45, WA4MCC 25, K4ERY 30, W44JVU 26, W4PPP 25, K4RCT 22, K4UWH 20, W4VTS 15, K4UWV 11, WA4HGQ 9, W44ZB 9, W4TYV 9, WA4EQA 7, WA4OSD 7, WA4BXH 3, K4BTY 2, WA4ISC 2, WA4PSU 2, W4VJ 2, WA4YNF 2.

## GREAT LAKES DIVISION

**KENTUCKY**—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: K4URX, PAMs: W4REJ, W4RDF, K4YZU, V.H.F. PAMs: K4KZH, WA4UW, RM: W4RHZ. Appointments: WA4GMA as EC, W4RHZ as RM, Endorsements: WA4MEX as OPS, W4REJ as OBS and PAM.

Net	Freq.	Days	EST	Sess.	QNI	QTC
EMKPN	3960	M-Sat.	0630	26	324	41
EMKPN	(July)			27	382	52
MKPN	3960	Daily	0830	31	597	125
KTN	3960	Daily	1900	31	1087	208
KYN	3960	Daily	1800 & 2000	40	389	218

WA4UMN is now General Class and has the S-Line and Warrior ready to go. Vacations found W4JUI in Mass. and WA4TNH in Mich. W4VNB has a pair of crossed Yagis on 144 Mc. and works MS DX. W4TKH is planning 1 kw. on 432 Mc. with a 20-db antenna. W4CDA is ready for a big traffic season. WA4GHQ is working 6- and 2-meter DX and has a new monitor scope. The Louisville AREC had a hard workout during the recent industrial plant explosion. The Henderson Hamfest was well attended and the HARC is to be congratulated on the fine job it did. The Owensboro Club has applied for a club license. The SCM was invited to speak at the Kentuckiana Radio Club in Louisville. WA4UAZ is attending college. WA4TPB will assist W4RHZ with the new slow-speed c.w. net at 1800 EST. K4NYO is back on KYN after a summer layoff. W4OYI has the new Marauder on the air. Traffic: (Aug.) W4RHZ 239, WA4UAZ 172, K4YZU 156, WA4TPB 154, K4DZM 145, W4BAZ 144, W4ARDE 104, WA4AGH 96, WA4KFO 90, W4OYI 83, W4AST 75, WA4GMA 43, W44VCN 42, WA4QLK 26, W4QCD 16, W4YYI 15, W4BTA 13, W4CDA 12, W4KJP 12, K4TOZ 11, W44ZF 8, K4HOE 7, WA4MEX 7, W44SZB 5, (July) K4LOA 30, W4ZXV 24, W4BTA 13, K4HOE 13, WA4GHQ 6, WA4MEX 1.

**MICHIGAN**—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU, RMs: W8ELW, K8KMQ, PAMs: W8CQU, K8LQA, K8JED, V.H.F. PAM: W8YAN. Appointments: W8FLW as EC; K8JJC and W8OCC as ORS; WA8CZJ and W8OCC as OPS; K8JJC as OBS; WA8DXW, W8WNX and K8WXX as OESs. W8PT has retired and moved to North Carolina. K9EMQ retired from G.M. Oct. 1 and will now have time to study for the Extra Class exam. Under new V.H.F. PAM W8YAN the Michigan PON 6-Meter Net is off to a good start with 25 sessions and a traffic total of 57 for Aug. How about

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A-82, 40M . . . . . 14.70	A-75CW, 3.6-3.8 mc 5.75
A-83, 20M . . . . . 14.30	A-71, 40M . . . . . 5.10
A-84, 15M . . . . . 14.30	A-72, 20M . . . . . 4.70
	A-73, 15M . . . . . 4.60
	A-74, 11M . . . . . 4.30
	A-76, 10M . . . . . 4.45
	A-77, 160M . . . . . 5.80

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other 6-meter nets getting on the ball? EC W8KQX has the Oakland County AREC off to a good start. His YF made General and is now K8LAL. The Oakland County AREC Banquet is scheduled for the 1st Sat. in Nov. at Masonic Hall, Birmingham. WA8BZZ and WA8CDR are now in their new QTH, right near K7UGA. 2518 East Goodrich Road, Phoenix, Ariz. 35016. Ex-W8HH8 is now W1CER on the Tech. staff of ARRL. WA8FPA and WA8-MCE are both in Fairwood Hospital, Warren. The HVARA is running code practice near the top of the 2-meter band Wed. 2100 to 2130. Anyone ever hear of the "Meows." WA8CPH is going to Israel with his dad for a year. WA8CNG, K8JDAI and WRPTW have their Aeronica back in the air. What no ham gear in it? K8ZJU says AREC 2-meter fun, provided communications for the Egoze Water Festival. K8WXO and K8AMU now are on 433-Mc. I.m. W8AHV is back on at a new QTH on 2 meters. W8FCB finally reports after many years. He is working at WDBC. W8AAM has a new 3283. W8-DSW now has a TR-3. WA8BNO has left M.I.T. K8QKY has a new 4-250A final. W8CQB reports from the PON, Oakland AREC, and Tri-County AREC Nets. The U.P. Oakland elected the following net managers: YL Net, K8-SUP; Sun, A.M. Emerg. Net, W81OC; Eve, Sideband Net, W81NZ. W8ZUL is U.P. Ham of the Year. Traffic: (Aug.) K8QKY 556, K8LNE 424, K8KMQ 184, W8CQB 169, K8HLR 166, WA8BQK 116, K9RHU 78, W8ENW 74, W8QQK 68, W8BEZ 65, W8AKNO 63, K8GOU 59, W8ELW 56, W8YAN 52, K8JED 49, WA8HC 39, WA8-MQT 24, WA8CTE 23, W8FX 22, W8RTN 20, W8HKT 19, WA8CZJ 15, W8WVQ 15, W8HGE 14, W8LBR 14, W8UFS 12, WA8XF 8, W8IBB 8, K8VDA 8, WA8DZP 7, W8WV 7, W8EU 6, W8DSE 4, W8LTD 4, W8AHV 3, W8FGB 2, K8GJD 2, W8WNX 1. (July) K8HLR 357, K8GOU 96, K8ZJU 79, W8GBN 12, W8CQB 11.

**OHIO**—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE, SEC: W8HNP. RMs: W8BZK, W8DAE and K8LGB. PAMs: W8VZ, K8BAP and K8-UBK. W8OYV drove your SCM to the Canton Chapter of the QCWA Dinner at Bonyecho's, southwest of New Philadelphia. W8DNC, W8EUK, W8KMF, W8MEI, W8-NAL, W8NBK, W8QAZ, W8SBM, W8SJC, W8TRS, W8-TPS, W8TS, W8WH, W8YAB and W8ZA attended with their wives. W8VDH is now WA6IPF and would like to contact some of the Cleveland gang on 7205 or 7210 kc. WA8CFJ was on vacation. W8LZE and family took a Mediterranean cruise on the SS Atlantic, KFEA, stopping off in Madeira, Casablanca, Gibraltar, Naples, Elba and Barcelona. Six Meter Nomads' The Amateur Extra says the club held a picnic. Massillon ARC's MARC Newsheet tells us that K8UBK was in the hospital, K8JIL has a new baby girl and passed the Amateur Extra exam, W8VYU has a new baby boy and W8OYL vacationed in Arizona. W8BZX has a new HQ-170 and vacationed in Colorado. K8OGN has a new beam on 2 meters. WA8-POU received his WAS certificate. Mt. Vernon ARC's K8EEN Newsletter tells us the club is planning to acquire property to erect a clubhouse and W8NTP moved to Florida. Miamisburg Wireless Association's The Spectrum informs us that WA8KTK moved and W8AJ moved to Florida. According to Columbus ARA's Carascope the club's FD generator met with an accident en route to the FD site: the trailer is junk, but the motor and generator looks as though it will be OK on a new chassis. Toledo's Ham shack Gossip says the Toledo RC held its family picnic and W8HNP reports that K8TVW, Lucas County EC, joined the Silent Keys. Canton ARC's Feedline informs us that the club held its annual picnic. K8BXU graduated from Case Tech. and was offered and accepted a job in research and development with Pratt & Whitney Co., W8HR/VE1 is vacationing in Nova Scotia and W8-OYV is on vacation. The Ohio S.S.B. Net had 1691 QNIs and 764 QTCs in August. W8DAE made the BPL in July and August. K8WIW has a new Galaxy V transceiver. K8ZCZ joined the Silent Keys. WA8FQW operated mobile VE3 for several days. WA8NXS received his General Class license along with an R-4. WA8ERV is attending Ohio U. WA8KHP is attending Muskingum. W8ZVI, of the Apricot Net, is in charge of the amateur radio display at Cuyahoga County Highland View Hospital. W8SHW is now W7CBO and is operator at the television station there. W8QNG, the son of W8-AEU, joined the Silent Keys. Traffic: (Aug.) W8UPII 457, W8DAE 332, K8UBK 176, W8FSPX 153, W8FSA 151, WA8AUZ 145, WA8CFE 135, W8AGYX 119, W8QES 87, W8LBR 63, WA8FGD 61, W8RGO 61, WA8AJZ 58, W8MGA 42, WA8FKD 41, W8LAG 41, K8BMI 38, W8-HZX 33, K8BYR 20, K8LGB 16, W8TV 16, W8MOK 12, WA8NXS 8, WA8POU 8, W8WEG 6, W8EEQ 2, (July) W8DAE 242, W8LBR 20.

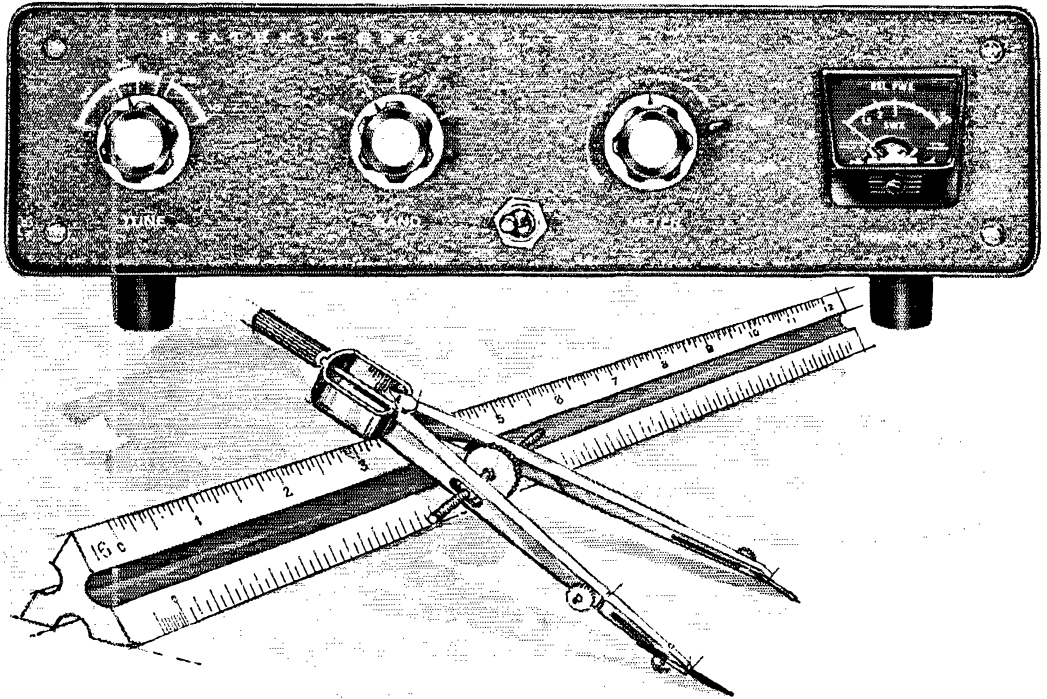
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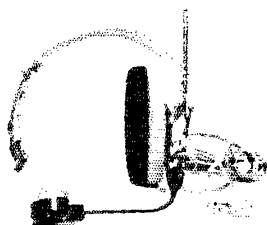
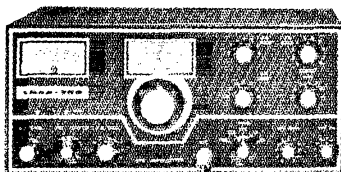
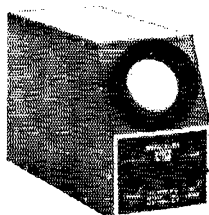
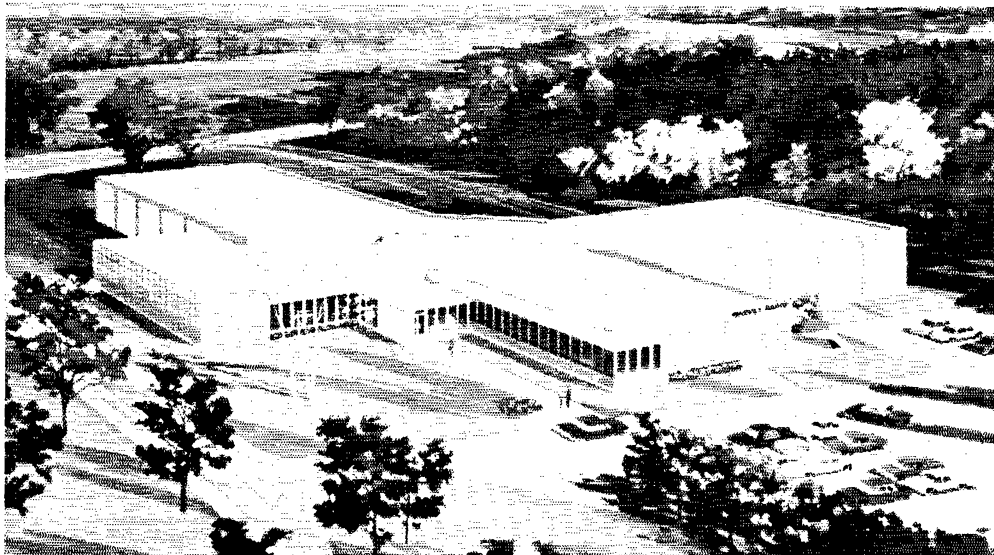
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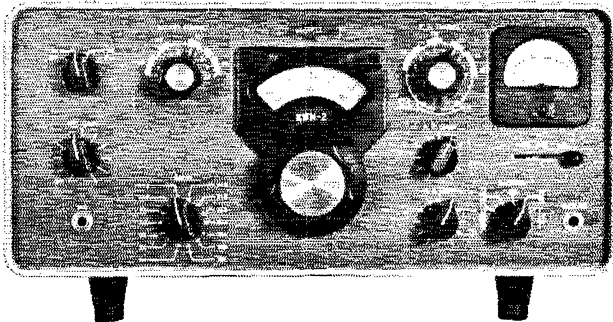
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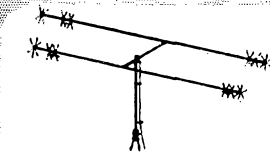
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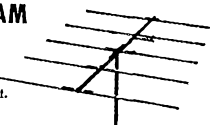
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3590 kc. nightly at 2300 GMT. Endorsement: W2KGC as SEC, K2GCH and WA2QAO as ECs. The ESS Net Picnic was held at the home of Mgr. WA2VYS with 21 members and guests present. Thatcher Park, near Albany, was the location for the NYSPTEN Picnic with over 50 members and their families in attendance. The Schenectady Club Picnic was held at the Saratoga Lake camp of W2GFH, also with a large turn-out. The August hidden transmitter hunt of the New Rochelle Club was won by WA2ZPD and WA2USG, with WB2FXB and WB2OQQ close runners-up. WA2BAH is working for the Communications Dept. at Newington. Congrats, WB2-HZY has a new quad in the construction stage. He has a new five-element 2-meter beam. Moonbounce on 432 Mc. from K4BPZ was reported by K2CBA on his 44-element array. Jud works consistently over 200 miles on 432 Mc. K2DEM is working/5 mobile from Biloxi, Miss., where he is a lieutenant in the Air Force. The New Rochelle Club visited ARRL Headquarters escorted by WIBGD/K2UTV of the staff. Also in August, the Schenectady AREC handled sailing races for the Saratoga Lake Yacht Assn. Over 35 members attended the NYS Picnic at Van Etten, near Ithaca, on Aug. 28. Traffic: WA2VYS 125, WB2HZY 91, WB2DXL 72, WA2-HGB 57, WA2JWL 43, WA2LJI 38, K2S2JN 35, W2PKY 30, W2FXB 25, W2ANV 19, WB2FYP 19, W2BXP 16, WA2WGS 12, WA2ZPD 9, W2URP 8, WB2FVD 4.

**NEW YORK CITY AND LONG ISLAND—SCM,**  
Blaine S. Johnson, K2IDB—Asst. SCM; Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

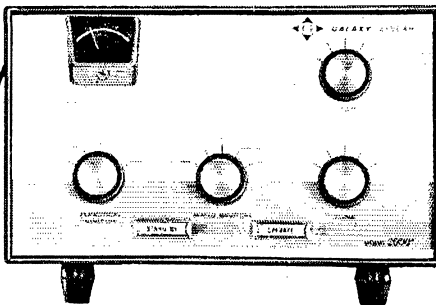
NLI	3830 kc.	1915 Nightly	WA2EXP-RM
VHF Net	145.8 Mc.	2000 TWTH	W2EW-PAM
VHF Net	146.25 Mc.	1900 FSSNM	W2EW-PAM
NYCLIPN	3932 kc.	1600 Daily	WB2HWB--PAM
NLS (Slo)	3930 kc.	1845 Nightly	WA2RUE-RM

NYC-LI AREC Nets: See Dec, 1964 column for schedules. WB2DXM, WB2MHT and W2EW made the BPL. WB2DXM made his with a new SB-10, HB keyer and Q-Multiplier added to the faithful old rig. WA2EXP and W2VKG are working on a 10 GC microwave link for net liaison. WB2EUI has installed a new IIB 20-meter beam which is expected to enhance the long-haul traffic work. WB2AEK is running an NCX-5 and SB-200 on 75 through 10 meters. WB2DBW wished the section well as he skipped off to Fresh-Land at Clarkson College. W2-DBQ's spunking a new antenna encountered an ill wind that blows no good and slipped quietly to the ground. Outraged, W2DBQ put it right back up there! WB2EMJ put his new quad up 50 feet this time but, alas, all he gets is rare ones now. W2PUH just latched on to a Poly-Comm 2 and an HE-45B for the shack. Listen, all you Queens guys who can operate on 10 meters, EC W2IAG says, "C'mon and join the AREC on 29.5 Mc. every Monday night at 1800. You'll get a bang out of it and meet a nice lunch besides!" W2PF relates that the Jumpsuiters have formed the New York Amateur Radio Luncheon Club which meets once a month for lunch at the Hotel Lancaster, Madison Ave. and 38th St., New York City. WB2AWX zipped down to Washington, D.C., on Labor Day for a day of fun and frolic at our capitol, so there! WB2HJT launched himself into the new school year with a nice little New England-type vacation. Hey, WA2WAO just got his mobile half off the ground by installing a converter so he can hear his favorite band and a burglar alarm so some knave won't steal it! K2DGI is back after moping all over Colorado and reports that the antennas are back up and the Nassau AREC Bunny Hunts on 28.720 Mc. will continue through the winter Mon. nights. WA2YKK, EC Manhattan, is recruiting new members for existing work on the Manhattan 2-and 6-meter networks. K2JGZ, W2JJW and K2ORA have received their RACES calls on the Nassau AREC/CD Net on 10 meters. W2JKF spent about 6 weeks in Europe. WB2PUK glopped on to a shiny new HT-44! Say, do you remember K2LTC? What if I say W2MPO? Now you got it, right? Well, now, K2LTC/6 has been in Southern Calif. since last November and works the East Coast on 10-, 15-, 20- and 40-meter c.w. from the mobile. I'll be darned, WB2MDH is back from a summer in Naples, Manie! WB2ART has gone and dug up a new HQ-110. The Hospital Amateur Radio Network (HARN) has been formed with WA2TAQ, dir.; Mr. P. F. Cronin, vice dir.; WA2WAO, secy.; WB2NRC, treas.; W2OCL, operations mgr. The avowed purpose of HARN is to provide emergency communications between hospitals through amateur radio. Participating hospitals and supporters are Peninsula General/Rockaway RC, Queens General/Tu-Boro RC, Long Beach/5-Towns RC, South Nassau Communities/Md-Island RC, Fort Hamilton V.A./WA2MAH, Nassau Mineola/WB2NRC and Queens Red Cross/Red Cross Emergency RC. Traffic: (Aug.) WB2DXM 547, WB2MHT 532, WB2HWB 316, W2EW 253, WA2EXU 236, WB2EUI 223, W2GKZ 142, K2AAS 132, WA2QJU 117, WA2UWA 110, WB2AEK 87, WB2DBW 81, WB2NGZ 82, WB2LUK 54, W2DBQ 26, WB2EMJ 25, W2RQF 15, W2PUH 11, W2IAG 10, W2PF 7, WB2AWX 3, (July) WB2MHT 516.

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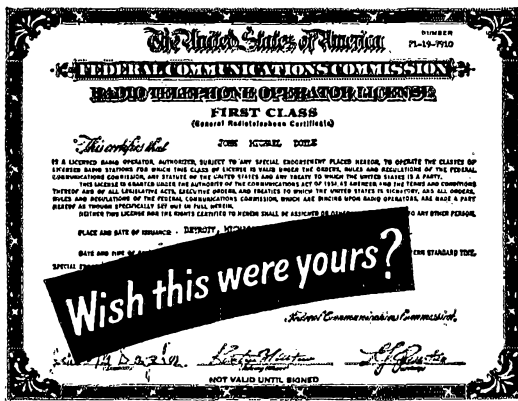
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NJ 6&2	31150 kc.	11:00 p.m.	M-W-Sat.	K2VNL-PAM
NJ 6&2	146700 kc.	10:00 p.m.	Tue.-Sat.	K2VNL-PAM

All times local. AREC skeds are available from K2ZFI. Good luck to WB2KXG in college and thanks for his service as RM of the New Jersey Novice Net. This leaves a vacancy for an RM appointment. Any takers? The Knight Raiders report on station activities of their members. Such reports are welcome. W2MKN will be operating from the USS *Tanner*. WN2SHM is on 2 meters with a Gonset III and a big wheel. WA2MOD is mobile on 6 meters. WB2CRV has 10 watts on 6 meters, while WB2HGQ has a new 99er. K2RPZ has 32 states and 3 countries on 6 meters. WA2RIN manages to keep up ham activities on week-end passes from Ft. Tilden, N.Y. WB2LAM has installed a ground-plane on 2 meters. WA2PWI vacationed in N. H. WB2GFY has a new HT-44. WB2BCS maintains KTY skeds on 146.8 Mc. Tue., Thurs., and Sun. at 7 and 10 p.m. with N. J., N. Y. and Conn. WB2QMA is on 2 meters with a Twoer and is working hard toward a General. K2UCY is getting back in shape after an injury. WB2IYO has been appointed RO for Raritan Township. Congratulations to WB2SYU on the receipt of his General Class license. K2UKQ is having her tower refurbished and will add a 2-meter beam. WB2MAT has an SX-117 and an HT-44. WA2DEW is a member of the Central New England, Vt. S.S.B. and Granite State Nets. K2RDX is experimenting with baluns and has come up with an improved design resulting in lower s.w.r. for the 432-Mc. band. WB2KLD has conducted extensive experiments comparing a variety of commercial and home-brew 6-meter converters. Additional Field Day messages were received from K2PTI/2 and K2VLT/2. WN2OUO has 13 states and is a member of RCC. WA2UDT has 13 states on 2 meters. WB2TRV is a new ham in Union on 40-meter c.w. W2PEV has a new 45-ft. tower and will put a quad up. The New Jersey Net held its annual outing in Red Bank. The New Jersey Phone Net held a picnic in Washington Crossing State Park. The Monmouth County Radio Amateurs continue to hold a luncheon the 2nd Tue. of each month, 12:00 noon at the Colt's Neck Inn—not a business meeting; all hams are welcome. Your SCM is back in the section and hopes to stay awhile. Keep the reports coming in. Traffic: (Aug.) WB2JWB 212, K2VNL 169, WB2AEJ 160, WB2ALF 121, WB2GFY 117, WB2HLH 100, WB2KSG 90, WB2FIT 80, WB2IYO 66, WB2LUT 58, WA2SRK 47, WA2TEK 38, WA2MYB 25, K2UCY 20, WB2ICH 18, K2KDJ 17, WB2KLD 14, WB2KXG 13, W2LQP 8, WA2DEW 6, WB2MAT 6, W2CFB 5, WB2QGB 4, W2VMX 4, WA2CCF 2, WA2PWI 2, W2EWZ 1. (July) WB2BCS 32, WA2MYB 28, W2PEV 9.

### MIDWEST DIVISION

**IOWA**—SCM, Dennis Burke, W0NTB—SEC: K0BRE. New appointee: K0EXN as Woodbury County EC. Our new SEC, K0BRE, has his work cut out for him. He has 24 vacancies to fill. ECs are needed in Allamakee, Audubon, Benton, Bremer, Butler, Calhoun, Chickasaw, Dallas, Delaware, Greene, Henry, Johnson, Kellogg, Keokuk, Lee, Mahaska, Marion, Monroe, Marshall, Pottawattamie and Worth Counties as well as four District ECs. Contact K0BRE if interested in one of the EC appointments. KH6JL called on Director K0NWX recently. We met this fine gentleman five years ago on his previous trip to the mainland. W0HNE/W0TCC passed away suddenly recently. It was my privilege to call him a friend. We shall miss him. The Iowa Severe Weather Net, under the leadership of W0GPL, continues to grow in size and importance. Rav hopes more people will take time to help in this project. We hear there is a fine v.h.f. net in O'Brien County. I would appreciate a report on activities.

160M Net Aug.	QNI 540	QTC 2	Sessions 31
75M Net Aug.	QNI 1223	QTC 130	Sessions 26
Hamilton Co.	QNI 172	QTC 2	Sessions 31

Traffic: W0LGG 932, W0NTB 93, K0QKD 57, WA0DYV 21, K0TDO 12, WA0AUF 11, W0BKR 11, WA0HQQ 10, W0NGS 10, W0NWX 8, K0TFT 8.

**KANSAS**—SCM, Robert M. Summers, K0BXF—SEC: K0EMB, RM: WA0JII, PAM: K0EFL, V.H.F. PAM: W0HAJ, K0VHP, Endorsements: W0FRG, K0JDD, K0LPE as ECs; W0KSY, W0OAG, K0HVD, W0RIF, W0OHI as ORSs; K0GQO, K0JID, K0YVB as OPSs; K0GIC, W0HAJ as OESs; W0VBK as OO. New appointments: WA0VII as ORS and RM; K0LPE as OPS; W0AKA, W0HAJ as OBSs. Net reports for Aug.:

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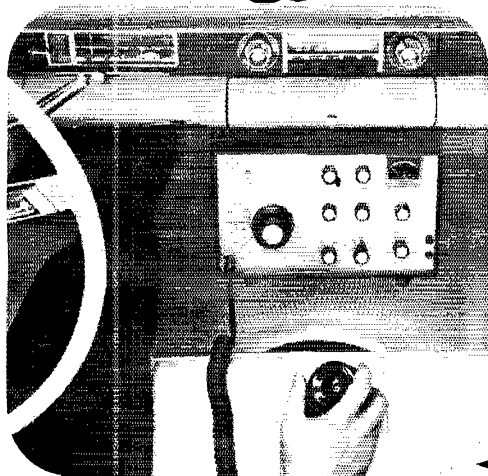
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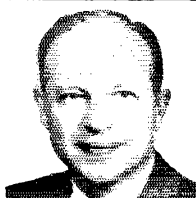
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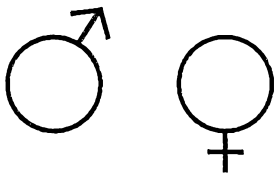
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SUPERPRO ENGINEERING IN EVERY SET

Net	Freq.	Time	Days	Sess.	OTC	QNI	Ar.
KWN				24		181	
HBN	3.380	1805Z	Daily	22	212	639	30.0
KSNB	3.920	1800 CST			80	189	
NCSs:	KOEMB, KOLPE, KOLHF, KOSKK,						
QKS	3610	1830	Daily	19	22	60	
NCSs:	KOBXF, WAOJII, WOVBO,						
Kans. EC	3920	1300 CST	Sun.				

The Scott County Picnic was held Aug. 29 with a good turnout. WØZUX, EC Zone 15, reports mobile and emergency gear tested with the affair. WØFRC now is mobilizing Kansas with an HW-12. WAØCCW and KØMZZ are about to set up a RACES circuit from Beloit to Salina. WAØDZI wants to hear from any and all v.h.f.ers interested in starting a State 6-meter traffic net. For a start he is operating Sat. at 1900 CST on 50.85 Mc. KØJDD reports the Dodge City Picnic Program will be telecast on KGLD-TV, Zone 10 AREC Net meets at 2100 CST on 145.5 Mc.; Johnson County Zone 6 AREC Net on 50.62 Mc. at 1930 CST. KØGII is in a new QTH. Contact your SCM for information on appointments. Traffic: (Aug.) WØOHJ 1102, KØBXF 93, KØLHF 53, KØGZP 38, WAOJII 36, KØEMB 33, WAØCCW 25, KØLPE 23, KØJKA 11, WAØMIQ 10, KØSKK 10, KØJMF 8, KØJDD 1. (July) KØGZP 76, KØGII 72, WOVBO 10, KØVQC 3.

**MISSOURI**—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL, WAØFKD has been appointed RM as mgr. of this QMO Net which fills the Sun. spot vacated by SAIN. WØHVJ received PAM appointment as mgr. of Mo. PON. Other new appointments: KØDEQ, WAOJII as ORSs; WAØCHH as OQ and OPS; WØMRJ as OPS. Appointments renewed: KØYNB, WAØCW, WØGBJ, WØRTO as ORSs; KØTGU, WØHVJ, KØVNB, KØBWE as OPS; WØAKM, KØTCB, KØVNB, WØRTO as ECs; KØJPL as OQ; KØONK as OPS. New officers of the Zero Beaters ARC are: WAØBSZ, pres.; WAØLBI, vice-pres.; WAØKPL, secy.; WAØAYA, treas.; WØNVM, act. mgr. Over 120 hams plus families registered at the SMARC Picnic in Springfield. QO reports were received from KØGSV, KØHNE, KØJPL and WØQWS. KØHNE's was outstanding. QES reports were received from KØFPC and KØJWN. NCSs for the Mo. Slow Speed Net (MSN, 3715 kc., 9 p.m. CST) are: WAØJLJ, WAØFKD, KØLGZ, WAØDKT and KØONK. NCSs for SMN (3580 kc., 10 p.m.) are KØYGR, WAØFKD, KØLGZ, KØJPL and KØAEM. The QMO Net (3580 kc., 4 p.m., Sun.) has WAØFKD and WØOOD as NCSs. NCSs for MON, now operating daily, are WØKIK, KØONK, WØVYJ, KØVNB, WAØFKD, KØAEM, KØYGR and KØFPC. WNØMLG the NYL of KØRWG, won an NCX-5 at a hamfest. WAØCHH received DXCC the second WAO to make it. WAØBQU received WAC. WAØENI received his Extra Cl. ticket. KØWOP has a new NCL2000 and moved to K.C. WØGGR is back on after 17 days in the hospital. WØTPK has 12 volts in the VW bus; now for the rig. Net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MON	3580	0100Z	Daily	29	187	142	WØVYJ
MNN	3580	1900Z	M-Sat.	25	63	22	WØOOD
SMN	3580	0400Z	Daily	15	45	29	KØAEM
MSN	3715	0300Z	Daily	31	57	24	KØONK
MoSSB	3063	2400Z	M-Sat.	26	607	157	KØTCB
MoPON	3810	2100Z	M-F	22	232	105	WØHVJ
QMO	3580	2200Z	Sun.	2	7	8	WAØFKD

Traffic: (Aug.) KØONK 1957, WAØFKD 410, WØVYJ 165, KØAEM 158, WØHVJ 72, KØHNE 68, WØOOD 66, WAØDKT 54, KØVNB 42, WAØEMX 33, WØTPK 33, KØFPC 31, KØOYV 27, KØJPS 24, WAOJII 23, KØLGZ 20, KØTCB 16, KØTGU 10, WAØKBZ 8, KØJPL 7, WØGGR 6, WØKIK 5, WØRTO 3, WAØFL 2. (July) WØGQR 2.


**NEBRASKA**—SCM, Frank Allen, WØGGP—SEC: KØJXN. Appointments: WØFIG, KØWPF, KØOUWK as ECs; KØUWK as PAM. Net reports: Nebr. Emergency Phone Net, WAØBID, QNI 1178, QTC 59. Nebr. Morning Phone Net, KØUWK, QNI 691, QTC 32. West Nebr. Net, WØNIK, QNI 450, QTC 42. Nebr. C. W. Net (NEB), WAØGHZ, 1st sessions QNI 185, 2nd sessions 164, QTC 74. Nebr. AREC C.W. Net (NACN), WAØEI, QNI 12, QTC 3. Nebr. Storm Net, KØJXN, 1st session QNI 790, QTC 38, 2nd session QNI 333, QTC 13. Storm Net sessions are now at 2330Z and OØ30Z on 3982 kc. AREC Net, WØIRZ, QNI 163, QTC 1. V.h.f. Official Observers are needed badly. If you can qualify, please contact the SCM. Two more h.f. observers also could be used. The summer slump in traffic apparently is over and traffic counts are starting to pick up. If your net isn't listed here, it's probably because a report has not reached the SCM. Let's hear from you. Traffic: WAØGII 214, WAØGVJ 108, KØYDS 90, WØLOD 76,



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Model 619 Dynamic \$28<sup>50</sup><sub>net</sub>

Model 719 Ceramic \$16<sup>50</sup><sub>net</sub>

 These new beauties are tough. No fragile plastics or light-weight metal. A 400-ton high-pressure die casting machine turns two pounds of molten metal into a solid stand that laughs at heavy service. And tough baked enamel plus heavy chrome plating guarantees lasting good looks.

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All models are omnidirectional, and come complete with heavy-duty cable. Most economical is the Model 719 ceramic. Response is from 80 to 7,000 cps at -56 db output.

For top quality, choose the Model 619 dynamic models with exclusive E-V Acoustalloy diaphragms. Smooth, peak-free response from 70 to 10,000 cps at -56 db output insures highest talk power and full modulation. Choose either Hi-Z or balanced Lo-Z model.

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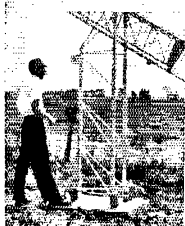


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**Versatility**—designed to support the largest antennae with complete safety and assurance at any height desired!

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## NEW ENGLAND DIVISION

CONNECTICUT—SCM, Fred Tamm. KIGGG—SEC: WIEKJ, RAI: WIZFM, PAM: WIYBH, V.H.F. PAM: KIRTS. Net reports:

Net	Freq.	Days	Time	Sess.	QNI	QTC
CN	3640	Tu-ly	1845	31	329	249
CPN	3880	M-S	1800			
		Sun.	1000			

High attendance: CN—KILMS, KITKS, WA1APY, W1ZFM, K1EIR, CPN—WIYBH 26, K1DGG 25, K1EIC 25, W1LUH 24, K1YGS 24, K1LMS 20, K1OJZ 18, WIYBI 17. CPN reports 30 sessions, 213 messages, average of 7. average stations per session 14, average net time 42 minutes. Your SCM would appreciate your station, club and net activity reports. I can only fill this column if I have something to report and with the summer-vacation period behind us, I'm sure you will find time to drop me a note to let me know what is going on in our section. K1DGG/I again is on the air from his new QTH in Fairfield. The station is not completely assembled yet, with RTTY gear still mostly unpacked but we hope to get things going real soon. New appointments: KIAFC as OBS, WA1APY as ORS. Appointments renewed: WIQV as OPS AND OBS, WIGEA as OPS and EC. Congrats to the Bucks Rock Work Camp station K1PGQ in New Milford—BPLers for July and August, as reported by WA2VZN, chief operator. K1RQO is unloading at the Thous-

## NEW ENGLAND QSO PARTY

December 4-5, 1965

sponsored by  
The Connecticut Wireless Association

*Times:* CWA calls this its SEVEN-ELEVEN PARTY because the operating periods are as follows: 7-11 P.M. EST Saturday night, 7-11 A.M. EST Sunday morning, 7-11 P.M. EST Sunday night. Seven and eleven are lucky numbers

Try your luck!  
*Eligibility:* All amateurs in New England are eligible and are invited to participate. Only single operator entries will be considered for awards; CWA members not eligible; Portables and mobiles to "rare" counties welcome, and they may compete from more than one county if desired.

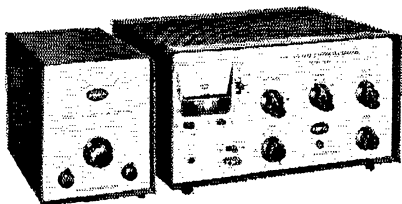
*Frequencies:* All amateur bands may be used; it is suggested that the 35 kc. low edge of each band and sub-band be used. A station may be worked twice per band; once on phone and once on c.w. Those taking part are urged not to disrupt net operations for contest points.

*Exchange:* Call "CQ New England" on phone; "CQ NE" on c.w. Exchange will consist of QSO number, signal report, name of county (may be abbreviated) and state. For example, W1ELA might send: "NR 7 589 HARTFORD, CONN."

*Scoring:* 1 point per complete QSO. Multiply total QSOs by number of NE counties worked, and then again by the total number of NE states worked (Maximum 67 counties and 6 states). For example, if W1TX works 50 stations, 35 different counties and all 6 states, his score would be  $50 \times 35 \times 6 = 10,500$  points.

*Awards:* A handsome plaque, engraved with the winner's name and call, will be awarded to the highest scoring station. Certificates will be awarded to the 1st and 2nd place scorers in each state, to the top NE Novice scorer and to the top NE Technician scorer. CWA members are not eligible for awards.

*Logs:* Logs must show date and time (in GMT) of each contact, complete exchange information, call and address of operator and final score calculations. If competing for special Novice or Technician awards, be sure to so indicate this. Mark each new county or state as worked. Mail copy or carbon of log to: Conn. Wireless Ass'n., c/o Peter Chamalian, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107, not later than January 11, 1966.

**AMECO***Leader in Compact, Quality Ham Gear***NEW VFO FOR TX-62 or any other VHF TRANSMITTER****NEW AMECO VFO FOR 6, 2 & 1 1/4 METERS**

The new Ameco VFO-621 is a companion unit designed to operate with the Ameco TX-62. It can also be used with any other commercial 6, 2, or 1 1/4 meter transmitter.

Because it uses the heterodyne principle and transistorized oscillator circuits, it is extremely stable. An amplifier stage provides high output at 24-26 MC. The VFO includes a built-in solid state Zener diode regulated AC power supply.

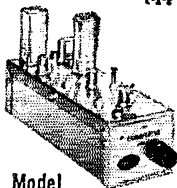
This new VFO is truly an exceptional performer at a very low price **Model VFO-621 \$59.95 net.**

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In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

**SPECIFICATIONS AND FEATURES**

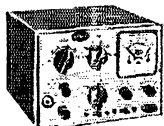
Power input to final: 75W. CW, 75W. peak on phone.  
 Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator.  
 Crystal-controlled or external VFO. Crystals used are inexpensive 3 Mc type.  
 Meter reads final cathode current, final grid current and RF output.  
 Solid state power supply.  
 Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.  
 Potentiometer type drive control. Audio gain control.  
 Additional connections in rear for key and relay.  
**Model TX-62 Wired and Tested only \$149.95**

**AMECO EQUIPMENT CORP. 178 HERRICKS RD., MINEOLA, L. I., N. Y.****NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE****Model CN****CN-220K in kit form. (specify IF.) \$34.95**

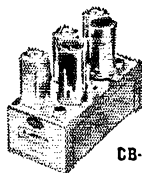
Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. **Model CN-50W, CN-144W or CN-220W wired, (specify IF.) \$49.95. Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) \$34.95**

**ALL BAND NUVISTOR. PREAMP 6 THRU 160 METERS****MODEL PCL. Wired, \$24.95 MODEL PCLP, with built-in power-supply, wired, \$32.95**

2 Nuvistors in cascade give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required — 120 V. at 7 ma. and 6.3 V. at .27 A. — can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

**COMPACT 6 THRU 80 METER TRANSMITTER****Model TX-86**

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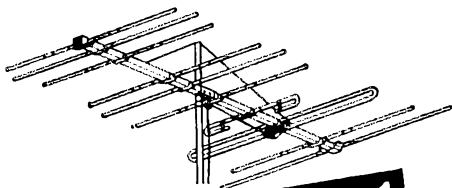
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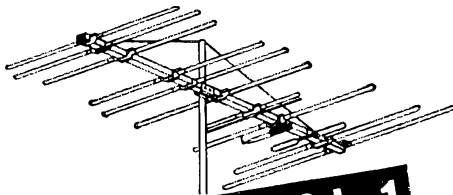


**2 ANTENNAS in 1**

## MODEL A-62 · 300 OHM

- |   |                     |
|---|---------------------|
| <b>On 2 Meters:</b>                       | <b>On 6 Meters:</b> |
| 18 Elements                               | Full 4 Elements     |
| 1-Folded Dipole Plus Special Phasing Stub | 1-Folded Dipole     |
| 1-3 Element Colinear Reflector            | 1-Reflector         |
| 4-3 Element Colinear Directors            | 2-Directors         |

Amateur Net . . . \$33.00  
Stacking Kit . . . \$2.19



**2 ANTENNAS in 1**

## MODEL A-62 GMC · 50 OHM

- |                                |                        |
|--------------------------------|------------------------|
| <b>On 2 Meters:</b>            | <b>On 6 Meters:</b>    |
| Equivalent to 18 Elements      | 4 Elements             |
| 1-Gamma-Matched Dipole         | 1-Gamma-Matched Dipole |
| 1-3 Element Colinear Reflector | 1-Reflector            |
| 4-3 Element Colinear Directors | 2-Directors            |

Amateur Net . . . \$34.50  
Stacking Kit . . . \$18.00

### MODEL AB-62 GMC

- |                           |                          |
|---------------------------|--------------------------|
| <b>On 2 Meters:</b>       | <b>On 6 Meters:</b>      |
| Equivalent to 30 Elements | Equivalent to 6 Elements |
| Amateur Net . . . \$52.50 |                          |

- Also:**
- 5 New 6 Meter Beams
  - 3 New 2 Meter Beams
  - 1 New 1/4 Meter Beams

Gold Corodized for Protection Against Corrosion

See Your Finco Distributor  
or write Dept. QS for Catalog 20-226

**The FINNEY Company - Bedford, Ohio**

sand Islands. KIAFC will be on RTTY soon. New Novices in Wallingford: WN1EUK, WN1EVZ. K1ZND made DXCC with 150 watts. Reports received: K1QGC as 00. Traffic: (Aug.) K4EHY/1 538, W1ZFM 215, K1EIC 218, W1NJA 178, W1A1PY 164, K1LFW 143, K1PGQ 140, K1EIR 136, W1EFW 134, W1GKF 129, K1RQO 110, W1BGD 86, W1YBH 58, W1RFJ 54, K1TKS 46, W1BDI 36, K1OGG/1 32, W1WCG 30, K1GGG/1 28, W1QV 25, W1YBI 23, K1YGS 21, WA1CCR 16, W1WV 14, K1ZND 14, W1OBR 7, W1BNB 2, K1WKK 1, (July) K1PGQ 115, W1DTU 17, WA1BZS 5.

**EASTERN MASSACHUSETTS—SCM, Frank I. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from K1PNB, K1DZG and W1STX and now is Radio Officer for Medford. Those interested in MARS should write to W1QVK for Army, K1NAY for Air Force and W1TOI for Navy. The 6-Meter Crossband Net had 22 sessions, 324 QNIs. 12 traffic. WN1EZB is on 40-80 c.w. Officers of the Milton ARC are K1VY, pres.; W1YCV, vice-pres.; WA1BPL, secy.-treas.; K1ZSI and K1GGP, directors. W1LLZ and W1PGN are on 10 again. W1QGN has a new baby YL. K1YUB is building a rig for 6. K1LJK bought a mountain in N.H. W1ONK went on a trip through Europe. K1YPE is in Saudi Arabia. W1AEC had its annual outing. W1AE has a skel on 10 with W1CDO/2 in N.J. W1VAH's temperature compensated his Ranger v.f.o. W1KZD and PRC are studying for the Extra Class exam. K1DZG and WA1BUJ provided extra communications for the Somerville Red Cross during the fire works display July 4. W1EPL has a tilttable 2 over 2, twenty-element 6-meter array. W1HL has a skel with WA2TDM, ex-W1LVV, and is going to help W1MBA with c.d. WA1CCM is c.w. on several bands. W1OER is back on the air on 40-, 20- and 15-meter c.w. with 270 watts. W1AKN is doing a lot of fishing. WN1EOX worked G3OX and SM7BDU on 15-meter c.w. WA1EKS is active on 40. WA8ENO writes that he will be at M.L.E. this year. W1AQV says he is going to start a club school again this year at the West Medford Radio Club. W2QHO has been busy on the Mass. QSO Party. The Yankee RC held a ham and hobby auction with W1AAT at the podium. The net will be on 28.9 Mc. with K1UVX and W1OFY as NCs. W1VRK has a new TH-6 Hy-Gain beam. Our license plate committee has done a nice job sending out over 11,000 envelopes to every ham in the state with forms for 1966. Appointments endorsed: W1QMN, W1AKN, K1ICJ, W1AQV as OBS; W1AOG and W1PEP as OPSs. K1PNB, our RM for the Nova Net on 3733 kc., sends out a nice bulletin. WA1DCZ is now General Class. W1PEX, W1CRX and WA1CFT made the BPL. K1CLM is busy handling traffic. WA1ABU has a new SB-300. WA1CFP enjoys traffic work, converting DX-80 for VOX operation. WA1DIT is moving to Chelmsford. K1ZHS worked DXCC. K1VOK worked 31 stations in 14 counties in the N.J. QSO Party. WA1DEC-DED have made many Western contacts on 6. WA1DJC is up in camp at North Sebago, Me. W1CRX, ex-W4ZAE in Billerica, has 1 kw. all bands. K70TR writes that he is going to get an SB-34. EN2MN had 22 sessions, 164 QNIs, 89 traffic. W1CWV is home from the hospital. WN1DOD has a Tower. W1OFY is a new 00. W1HH is rebuilding his shack. W1HTT is celebrating his 30th anniversary. K1BGK has been endorsed as PAM for the 6-meter band. K1ESG is studying for a higher license. K1LZY is active on 160. Traffic: (Aug.) W1PEX 1279, W1CRX 587, K1CLM 152, W1EMG 131, WA1CFT 125, W1DOM 124, K1VJ 81, WA1CFP 56, WA1DLT 52, W1ZSS 45, K1GKA 42, K1ZHS 30, W1AOG 25, WN1EAT 25, W1OFK 18, W1SIV 13, K1ESG 10, K1WJD 10, W1CTR 9, K1LQ 9, WA1CT 8, K1VOK 7, WA1DEC 6, K1BGK 5, K1BZ 4, WA1ED 2, WA1DJC 2, WN1DOD 2, (July) W1EMG 209, W1CRX 60, W1LES 54, K1WJD 15.**

**MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG, PAM: K1WQI, K1ZVN, RM: K1TMK, V.H.F. PAM: K1OYB. Traffic nets: Sea Gulf Net Mon. through Sat., Pine Tree Net c.w. daily on 3590 kc. Two Meter Phone and Traffic Net Thurs. 1930 to 2000 on 145.08 Mc. One of our old old-timers W1AI, of Millbridge, recently became a Silent Key. He was one of the pioneers of radio, building much of the things he used, operating in rag-chews and many of the nets. It sure was a pleasure to know him along the way and he will be missed by all who knew him. Up in the high frequencies K1MTJ, K1UGQ and K1OYB are doing real well working up to 18 states on 2 meters including Florida and using low power. K1GUP is on 2 meters and looking for contacts. K1TVT and K1WUS are moving to Poland in Maine. K1TAJ took care of the Pine Tree Net while Curt was in training. Traffic: K1ZVN 68, K1WQI 45, K1TVT 34, K1GUP 16.**

**NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: W1ALE/W1TNO. PAM: K1APQ, RM: W1DYE. The GSPN meets on 3842 kc. Mon. through Fri. at 2300Z and Sun. at 1330Z. VTNNH meets on 3685 kc. Mon. through Fri. at 2230Z. Flash: K1APQ's GSPN had 731 check-ins and handled 80 pieces of traffic.**



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station**

**only 64½  
cents per watt**

The brilliant new **SB-34**, SSB 4-band transceiver serves as your receiver and exciter... the new matching **SB2-LA** Linear furnishes the big bang! This advanced design power combo costs you only 644.50, unquestionably the lowest cost per watt obtainable! But this is only part of the value story. **SB-34** has a **built-in power supply**, 117V AC and 12V DC... needs no separate inverter... connects directly to the 12V car battery when you want the added pleasure of 4-band mobile transceiver operation. **There's just no comparable value!**

**SB2-LA LINEAR AMPLIFIER . . 249.50**

Husky, heavy-duty, with 1KW P.E.P. input capability on 80-40-20-meters, 750 watts on 15 meters, this exceptionally compact amplifier matches SB-34 in general size and appearance. Operates perfectly with SB-34 but can boost the output of any SSB exciter to a full KW. AC power supply is built-in.

4-bands, 80, 40, 20, 15 meters • Full band switching • Passive grid input for resistive load to exciter. Drive: 60W or more depending upon the linear amplifier power output • Low plate voltage (800 volts) and high plate current • Easier on capacitors, rectifiers, power transformers • Safer under environmental extremes • High filter capacity for dynamic regulation • Built-in antenna relays (2), internal blocking bias • HI, LO power and TUNE/OPERATE switches • Panel meters for output and plate current • Six parallel-connected 6JE6's are used in amplifier • 115V AC power supply (built-in) is all-solid-state. Size: 5¼"H, 11¾"W, 11¾"D. Wgt. 35 lbs. (apprx).

**SB-34 TRANSCEIVER . . . . . 395.00**

New... advanced... with important plus performance features! Transistors and diodes replace vacuum tubes (except for the 2-6GB5's in PA and 12DQ7 in RF driver) — equipment size is reduced greatly — current drain lowered substantially. Example: **SB-34** draws only 500 ma on receive standby.

Built-in supply for 12V DC and 117V AC • Power input: 135 watts P.E.P. (Slightly lower on 15 meters) • Frequency range: 3775-4025 kc, 7050-7300 kc, 14.1-14.35 mc, 21.2-21.45 mc • 23-transistors, 18-diodes, 1-zener, 1-varactor, 2-6GB5's PA, 1-12DQ7 driver • No relays — solid state switching — breakthrough! USB or LSB selectable by panel switch • Collins mechanical filter — transmit, receive • Delta receiver tuning • Solid-state dial corrector • prewired for VOX, 100kc calibrator accessories — both units are optionally available. Single-knob dual-speed tuning. Size: 5"H, 11¼"W, 10"D. Weight 20 lbs. (Approx).

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Absolutely freestanding. Capable of withstanding 60 mph winds at full 70 ft. height, with up to 16 sq. ft. of antenna. Rust free. All Tri-Ex towers are hot-dipped galvanized after fabrication. Unusual strength due to high strength steel tubing, solid steel bracing, all-electric welded by certified welders. Lowest possible wind drag.

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This is the highest ever recorded. Congratulations to Ed and the net members on such a fine job; also the net controls who put up with that ever-present RTTY and other assorted QRM. W1LOO and K1JFQ have a new TR-4. WAIDAO is a new ham in Keene. K1IK is licensed as OH1TH in Finland. W1AAQS has a new TR-4. W1TWP of Portsmouth is now a Silent Key. W1CTW almost worked K1BPZ in the July 432 moonbounce. W1TXK took K1FXM up in his plane to take pictures of W1HPM Field Day operations. K1BGI reports 112 check-ins and 36 traffic for NHPON. A GSPN certificate was issued to K1MINK. K1DWK reports 43 check-ins for M1VAREC. The v.h.f. nets need more support now that vacation time is over. K1VLX is mobile in his spare time. V1NH reports 95 check-ins and 80 traffic. Traffic: K1BGI 58, K1IK 35, W1ALE 30, W1SWX 2.

**RHODE ISLAND**—SCM, John E. Johnson, K1AAV—SEC: W1YNE, PAM: W1TXL, RM: W1BTY, V.H.F. PAM: K1TPK. New appointment: W1CZB as EC. Endorsements: W1POP, W1JFF, W1VWR and K1TPK as ECs. R1SPN reports 31 sessions, 564 QNL, 103 traffic. R1N reports 22 sessions, 72 QNL, 37 traffic. The R1SPN Net meets at 50.6 Mc. daily at 1830 local time. The R1N Net meets at 3.540 Mc. Mon. through Fri. at 1900 local time. The W1AQ Club of Rumford issued W1I certificates to the following: No. 65 to IT1AGA, 66 to W1WFZ, No. 67 to W0GNX, No. 68 to K2BG and No. 69 to W1ABFH. The Annual Club Family Picnic was held at Lincoln Woods with K1CZD as chairman. On Aug. 28 the club held its Annual Ladies Night. W1CYE has received his General Class ticket. W1YNE now has an HT-44 and is s.a.b. on all hands. K1USD will be attending the Univ. of Rochester this fall. He also has the call N0ZDM in the Navy MARS program. Congratulations to W1EDE, who recently received his Extra Class license. Traffic: W1TXL 466, W1BTY 119, W1AFV 83, W1YKQ 69, K1VYC 45, K1TPK 41, K1BRJ 35, K1QZW 28, W1YNE 24, K1YVN 24, W1ACSO 13, K1USD 9.

**VERMONT**—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA, RM: W1WFZ. Aug. net reports:

Net	Freq.	Time	Dv	QNI	QTC	NCS
Gr. Net.	3855	2230Z	Dv x S	401	19	W1VMC
Vt. Fone	3855	1400Z	Sun.	109	x	W1UCI
VTNH	3685	2330Z	M.F.	No		K1UZG
VTCD	3990.5	1500Z	Sun.	report		W1AD
VTSB	3909	2330Z	Dv x S	100	16	W1CBW
		1330Z	Sun.	503	24	

The above time will be in effect Oct. 24. K1RMG, confined to the hospital, is now home and on the mend. The new VTSB Net is doing quite well with over 500 stations checking in for first full month of operation. All modes are welcome to QNI. K1VQU has worked all counties in N.Y., Pa., N.J., Del. and New England except Essex. Can anyone help Al? Traffic: (Aug.) K1BQB 92, W1CBW 13, W1JLF 12, K1MPN 12, W1IDM 8, W1I2S 3, K1EQI 2. (July) W1WFZ 17.

**WESTERN MASSACHUSETTS**—SCM, Percy C. Noble, W1BVR—C.W. RM: K1JYV. Manager of Hampden County 10 Meter Traffic Net: K1PKZ. We are in need of a Section Emergency Coordinator. That is a very important position and we need a good organizer for it. Don't be bashful—if you can handle it, please let me know! W1ZPB has a new Hallcrafters HT-44 s.s.b. rig. Our deepest sympathy to him and his family in the passing of his father. K1RYT received country No. 80 on 75-meter s.s.b. K1WZS and W1ABDN are now in Worcester. K1TGS is in the Coast Guard. W1BKQ reports that the Pittsfield RACES is falling apart. And from what I gather it ain't only Pittsfield! Our AREC members don't seem too active either. The West. Mass. C.W. Traffic Net handled 124 messages during the month with the following in attendance (listed in order of activity): K1WZY, K1BVR, K1JYV, W1DWV, K1SSH, W1ZPB, W1ZEL, W1MNG, K1VFN, K1LBB, K1JFS, W1DWA, W1AAEV. W1ACQF won the New England Division Novice Roundup with 10,850 points. Congrats. K1PEZ passed the Extra Class exam Aug. 25. Nice going, Paul boy! Emergency Coordinator positions are open in many of our West. Mass. cities and towns. If you can handle, please let me know. Traffic: W1BVR 130, K1SSH 108, K1JYV 67, K1WZY 55, W1ZPB 51, K1LBB 36, W1MNG 22, W1DWV 8.

### NORTHWESTERN DIVISION

**IDAHO**—Acting SCM, Raymond V. Evans, K7HLR—PAM: W7GGV. The group at the Boise Hamfest elected W7GGV as the Idaho Ham of the Year. We heartily concur with their choice. Wish we had more public-service-minded hams in the section. Those interested in RACES, contact W7YON on 3990 at 8:15 A.M. local time or on the noon time net. There also are evening nets for those unable to make those times. Those interested in Navy



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The Apollo Linear was conceived as a capable companion to the popular Clegg Venus sideband transceiver. Alone or with the SS Booster this station produces a superb signal on six. The Apollo is not, however, exclusive - try it with an HX 30 . 62S1 ... 99'er ... Communicator IV ... or homebrew - it makes any exciter sound big on six.

### SPECIFICATIONS AND FEATURES

- Power input is 675 watts peak DC.
- Parallel final tubes pi-network coupled for 50-70 ohm output.
- RF Power Output
 

SSB (PEP)	350 W
CW	350 W
AM	75 W carrier with 180 mil. plate current
- Power supply built in, using the latest solid state techniques.
- Three illuminated meters continuously metering critical circuits for easy tune-up.
 

Grid Current	Relative Output	Plate Current
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- Instant Exciter/Linear selection when used with the VENUS (other units require plug-in accessory relay).
- All functions controlled from front panel when used with the VENUS.
- Attractively styled cabinet matches the VENUS.
- Blower for cool operation.
- No neutralization is necessary.
- Tube line up: (2) 8236 (1) OA2
- Power requirements: 115 VAC, 60 cycle, 500 VA (approx. at full load).
- Physical Dimensions: 15" wide, 7" high, 10½" deep.
- Weight: Approx. 35 lbs.

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APOLLO/VENUS INTERCONNECTING CABLE  
(PART NO. 510-007) ● \$9.75

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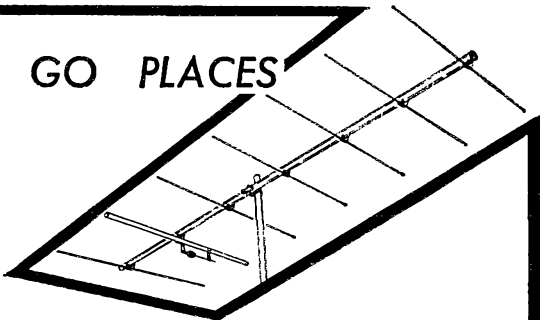
A144-11	2 meter	11 element	\$13.95
A144-7	2 meter	7 element	10.95
A220-11	1 1/4 meter	11 element	11.95
A430-11	3/4 meter	11 element	9.75
A144-20T	2 meter	Multi polarized	29.50
A50-2P	6 meter	Portable	10.95
A26-2P	6 & 2 meter	Portable	15.95
A50-3	6 meter	3 element	14.95
A50-5	6 meter	5 element	21.50
A50-6	6 meter	6 element	32.50
A50-10	6 meter	10 element	49.50
A26-9	6 & 2 meter	10 element	27.50

Cush Craft coaxial stacking kits are available for all of our beams listed. They are complete — ready to use. Amateur net price \$4.95.

Cush Craft Quad arrays are complete package systems of four matched beams with stacking frames, hardware, and phasing lines for direct 52 ohm feed.

A144-11Q	2 meter	44 element	\$84.50
A144-7Q	2 meter	23 element	72.50
A220-11Q	1 1/4 meter	44 element	64.50
A430-11Q	3/4 meter	44 element	52.50

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MARS should contact K7M1NZ of Aberdeen. The adventures of public service in ham radio are unlimited. Letters and calls. There are KACES, MARS, NTS, ARCC, to name only a few. Take your choice, but don't just sit there. Do something! 11 Farm Net: 21 sessions, 524 QNT, 60 QTC. Traffic: N4HLR 149, W7GMC 109, W7GGV 44, K7OAB 14.

**MONTANA**—SCM Joseph A. D'Arcy, W7TYN—SEC: W7RZY, V.H.F. PAM: K7IOA.

Montana S.S.B. Net	3910 kc.	1800 NIST	M-F
Missoula AREA Net	3895 kc.	0900 NIST	Sun.
Montana FON	3885 kc.	0815 NIST	Sun.
Montana KACES	3906.5 kc.	0500 NIST	Sun.
Montana State Net	3520 kc.	1900 NIST	M-F, R.

Butte-Anconda 2 Meter Net 141450 Mc. 1900 NIST Wed. New appointments: K7EGG as CBS; K7IOA as V.H.F. PAM. If you have any v.h.f. equipment write K7IOA in Great Falls and let him know what you are doing on the "World above 50 Mc." W7IRG, at Billings, is now an OES. Endorsements: K7KME as EC, K7UPH is going mobile with an HW-12. K7PVP recently had lunch with the Postmaster General of the U.S. in Butte. WATBR is a new call at White Sulphur Springs; WAACAB is a new call in Hozenau, along with WAACAC, WNTTOS, and WANDLO, a brother team, are newly-licensed at Roberts. W7ZPT has received his BA license from Bozeman. W7MIX is moving to Bozeman as the Regional Manager of the Yellowstone Park country and got some fishing tips from W7QRN, K7YNY, K7OEK, W7CPS, W7NDGI and W7TQC were some of the gang from Anconda at the very fine VINIIT Hamfest, K7TZZ, in Butte, has a new SB-10. We received a copy of the MARS activity newsletter put out by W7LBR. Another fine newsletter is put out by K7PVP for the Montana PON. To get a copy write Don joining the PON and he will put you on the newsletter list. W7UWY is on with a new TR-4. Traffic: K7YEM 30, W7RZY 20, K7SVR 15, W7NPV 13, K7UPH 10, W7FIS 1.

**OREGON**—SCM Everett H. France, W7AMN—RAI: W7ZEH. By request, a list of counties and Emergency Coordinators: K7CENZ for Benton, W7UDJ for Clackamas, K7AXP for Coos, K7QCM for Curry, K7BEY for Douglas, W7DEMI for Josephine, W7SOO for Linn, W7TAF for Marion, K7PHP for Multnomah, K7GID for Tillamook, W7KTG is now on 8 meters and using a beam. W7LNG is trying a little s.s.b., with 20-A and SX-90. K7TVD made the BPL again. K7DYK's NYL, WNT-CHE, is now W7YCHE. W7LWY now has a 40-meter beam. W7DDH is the new net manager for 2-meter. ARCC Portland Area, W7ADWX is a newcomer to Grants Pass. W7DEM is on the air with a Marauder; says he had to join the s.s.b.s. W7AZD and K7PHP are Navy MARS. Anyone interested in learning net procedure and c.w. traffic-handling are invited to participate in the Oregon State Net (OSN), 5385 kc. 0130 GMT Mon. through Fri. All ARCC members are invited to participate in the Oregon ARCC Net, 3875 kc. 0200 GMT daily. If you have any special amateur activities, your reports are welcome. Traffic: K7VUD 588, K7WID 489, K7RFG 208, W7ZETI 27, W7EHA 34, W7DEM 17, W7GVT 4, K7DYK 2, (OH)P, K7VID 205, W7DEM 10.

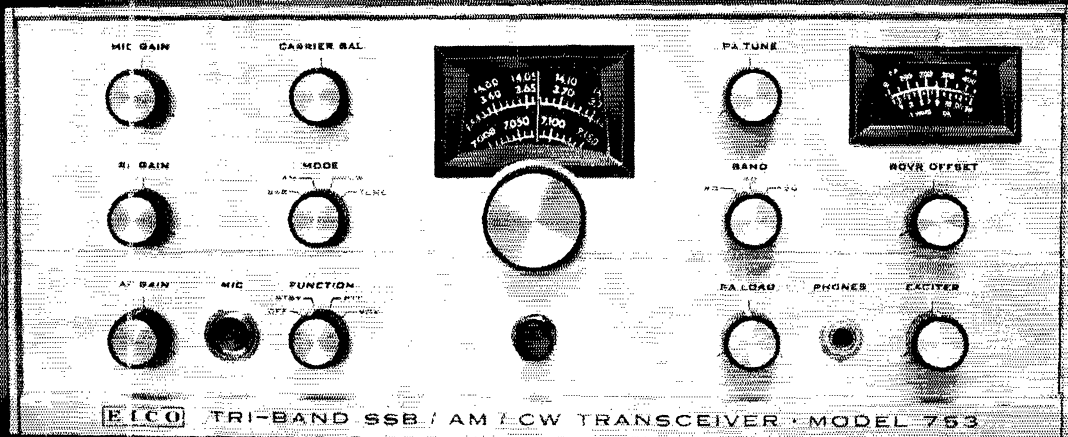
**WASHINGTON**—SCM Everett E. Young, W7HXA—SEC: W7ENQ, RAI: W7OEB, PAM: W7LPA, V.H.F. PAM: W7G1 NTS news:

W7SN 0200Z Daily 3535 kc. No Report  
W7ARTS 0230 Daily

NTN Sun. 3970 kc. QTC 164 QNT 965 Sess. 28  
NTN 1630 Daily 3970 kc. QTC 898 QNT 935 Sess. 26  
W7HF hosted the RC of Tacoma and a good time was had by all. W7ZEY is busy with traffic. OHS W7AO is back from a Montana vacation. OHS W7AYB claims DX is showing signs of winter but traffic is normal. OHS/OBS W7AMC sends a nice report. OHS W7GYP continues the 2nd and 4th Mon. at 8 P.M. as meeting time of the Moses Lakes Ham ARC, in McCosh Park. Visitors are welcome. Winner of the 11th High-gain beam at Yakima was the son of K7MUT. W7RKS and W7KXT, Bob and Iren, are now grandparents. W7DNU (SKED BYSK. Deeply sympathetic goes to W7EKT, who lost his wife after a short illness. K7YGI now is operating from the U. of Washington. W7MFG and NYL W7DPL are back from a Yellowstone vacation. K7ZPM AND W7VU have applied for ORS appointment. EC K7ALGA is setting up a 2-meter relay for the Yakima area. As this is written K7CTP is off on a trip through Colorado, New Mexico, Arizona, Nevada and California. W7XSK operated 77 from Kansas, also had help from W7NBZU over in the eastern part of section. W7LBC transmits code practice on 3738 kc. Mon.-Fri. starting at 1600Z. OO W7OVR sends in a nice report and is waiting for the second rotor unit for his beams. EC W7IEG had K7GPK very high one day—up on the roof finding holes while NYL K7AMJ moved the bricks in the bedroom. K7CZP is back from a Spirit Lake vacation. W7RGD is off to the hills panning gold.

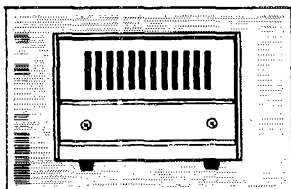


# NOW! A TRI-BAND SSB TRANSCEIVER KIT FOR 179.95

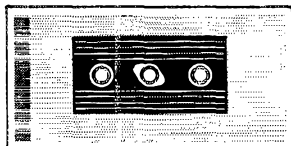


## NEW EICO 753 SSB/AM/CW TRI-BAND TRANSCEIVER

Power Supplies Tailored for Optimum Performance of the 753.



**Model 751 Solid State AC Supply/Speaker Console.** Matching table-top companion unit. Built-in PM speaker. Kit \$79.95    Wired \$109.95



**Model 752 Solid State Mobile Supply.** For use with 12 volt positive or negative ground systems. Fully protected against polarity reversal or overload. Kit \$79.95    Wired \$109.95

Build the finest of SSB/AM/CW tri-band transceivers with 200 watts of SSB punch and every wanted operating facility, plus the extra reliability and maintenance ease inherent in kit design. Assembly is made faster and easier by VFO and IF circuit boards, plus preassembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The new EICO 753 is at your dealer now, in kit form and factory-wired. Compare, and you will find that only the 753 has all these important features:

- Full band coverage on 80, 40 and 20 meters.
- Receiver offset tuning (up to  $\pm 10$ kc) without altering transmitter frequency.
- Built-in VOX.
- Panel selected VOX, PTT & STANDBY.
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- Automatic carrier level adjustment on CW and AM.
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- Position of hairline adjustable on panel.
- Illuminated S-meter/PA Cathode Current Meter and tuning dial.
- Fast attack, slow decay AGC.
- Grid-block break-in CW keying.
- Product detector for SSB and CW, triode detector for AM.
- TR relay with auxiliary contacts for use with high power linear amplifier.
- Includes mobile mounting bracket.

### ADDITIONAL SPECIFICATIONS

FREQUENCY COVERAGE: 3490-4010kc, 6990-7310kc, 13890-14410kc. SSB EMIS-IONS: LSB 80 and 40 meters, USB 20 meters. RF POWER INPUT: 200 watts SSB PEP and CW, 100 watts AM. RF POWER OUTPUT: 120 watts SSB PEP and CW, 30 watts AM. OUTPUT PI NETWORK MATCHING RANGE: 40-80 ohms. SSB GENERATION: 5.2 Mc crystal lattice filter; bandwidth 2.7kc at 6db. STABILITY: 400 cps after warm-up. SUPPRESSION: Carrier-50db; unwanted sideband-40db. RECEIVER: Sensitivity 1uv for 10db S/N ratio; selectivity 2.7kc at 6db; audio output over 2 watts (3.2 ohms). PANEL CONTROLS & CONNECTORS: Tuning, Band Selector, AF Gain, RF Gain, MIC Gain with calibrator switch at extreme CCW rotation, Hairline Set (capped), Mode (SSB, AM, CW, Tune), Function (Off, Standby, PTT, VOX), Carrier Balance, Exciter Tune, PA Tune, PA Load, Receiver Offset Tune, MIC input, phone jack. REAR CONTROLS & CONNECTORS: VOX Threshold, VOX delay, VOX sensitivity, Anti-VOX sensitivity, PA Bias adjust, S-Meter zero adjust, power socket, external relay, antenna connector, key jack, accessory calibrator socket. METERING: PA cathode on transmit, S-Meter on receive. SIZE (HWD): 5 $\frac{1}{2}$ " x 14 $\frac{1}{4}$ " x 11 $\frac{1}{4}$ ". POWER REQUIREMENTS: 750 VDC at 300 ma, 250 VDC at 170 ma, -100 VDC at 5 ma, 12.6 VAC at 3.8 amps.

The Model 753 is an outstanding value factory-wired at \$299.95.



For FREE Catalog and 753 Spec. Sheet write to EICO Dept. QST-11, 131-01 39th Ave., Flushing, N. Y. 11532

# New

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### ALL BAND VERTICAL

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### WVG MARK II

New low cost vertical antenna which can be tuned to any amateur band 10-80 meters by simple adjustment of feed point on matching base inductor. Efficient radiator on 10, 15, 20, 40, 75 and 80 meters. Designed to be fed with 52 ohm coaxial cable.

Conveniently used when installed on a short 1-5/8" mast driven into the ground. Simple additional grounding wire completes the installation. Roof top or tower installation. Single band operation ideal for installations of this type. Amazing efficiency for DX or local contacts. Installed in minutes and can be used as a portable antenna.

#### Mechanical Specifications:

Overall height - 18' Assembled (5' Knocked down)  
Tubing diameter - 1 1/4" to 7/16"  
Maximum Wind Unquayed Survival - 50 MPH.  
Matching inductor - Air Wound Coil 3 1/2" dia. Mounting bracket designed for 1-5/8" mast. Steel parts irridite treated to MILS Specs. Base insulator material - Fiberglass impregnated styrene.

#### Electrical Specifications:

Multi-band operation - 10-80 meters. Manual tap on matching inductor. Feed with 52-75 ohm line (unbalanced). Maximum power - 1000 watts AM or CW-2KW PEP. Omni-directional. Vertically Polarized.

### WRL WORLD RADIO LABORATORIES

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# \$15.95

Whaaaat? WAYARE has his Tech. Class ticket. WAY-AQR is on 40 meters with 40 watts from 40 miles south of Tacoma with an NC-300. The Evergreen State Net operates daily on 3920 kc. at 0200Z to expedite amateur traffic. Your SCM welcomes reports of net and individual activities. If you belong to a net why not insist that a regular and prompt report of activities be made not later than the 2nd or 3rd of each month? It's a most important item in the march of amateur radio. The Spokane Radio Amateurs report through Pres. W7BFI that the Girl Scout Roundup required many hands for the two-week period but that communications were provided throughout. The club has new meeting quarters in the Red Cross Bldg. SRA participates fully in RACES work and has local haul nets on 146.16 and 29.6 Mc. Erwin is very active in RACES, takes part in AREC, holds first phone and activates emergency equipment on a regular basis. K7CHH will renew OBS appointment from the Richland area after the U. of W. presents him with a hunk of leather saying MISEE. K7YDZ is breaking in a new Swan 350. Other traffic nets:

NW SS 3700 kc. 2300 Z QNI 246 QTC 65 Sess. 27  
NWSB 3945 kc. 0130Z No Report

Traffic: W7BA 2618. W7DZX 1050. K7TCY 933. K7JHA 613. W7APS 503. W7HMA 329. K7CTP 213. W7BTB 196. WN7CFN 110. WN7CFY 43. K7MGA 42. K7ZPM 41. W7-HMQ 39. W7GYF 37. W7AMC 30. W7AIB 24. K7VVA 21. W7JC 8. W7ZEY 8. K7CHH 4. W7EVW 3. W7JEY 2.

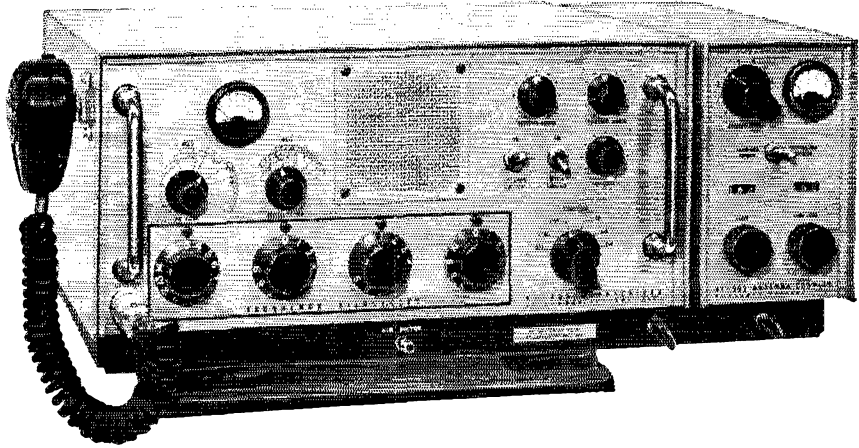
### PACIFIC DIVISION

**EAST BAY**-SCM, Richard Wilson, K6LRN-SEC: WA6OLF. Appointments as of Sept. 1: OESS-WA6VAT, W6NDR, WA6MXL, K6SPP. OPS-K6TFT, ORS-WB6ETY, WA6WNG/WB6CRC, WB6IH, W6IDY, OGS--Class I, W6CBF, WA6KLL, W6OJW, W6BEZ; Class II, K6LRN, OBR8-K6TFT, WA6VAT, WB6IBU, W6DUB, W6LGV, W6UB, EC8-WA6FFF, WA6ANE, K6TFT, WB6ILH has a new pacemaker and a Quad. WB6ETY has a new antenna up at the new QTH and is on 432 Mc. with WB6IVZ. W6UB reports lots of repeater activity in the Bay Area with the SACEN-6 Net operating through its repeater Thurs. at 2015 local time. W6TYM has added break-in. W6IDY, a new ORS, is off to a good start with TCC skeds on Fri. and Sat. nights. Congrats to WB6CRC on making the KPL, W6BAM operates from W6BB at the U. of C. in Berkeley. WA6PTU QN1s NCTN along with K6TFT and others. WB6APK will be attending U.C. and will be QRT until June, 1968. WA6-ZTY operated the Aug. CQ V.H.F. Test from K6JHV and snagged 13 counties. K6JZR says his new terminal unit is almost ready. HRC reports 1043 QSOs for 8585 Field Day points. K6SPP has his Seneca back on the air after watching it go up in smoke on Field Day. Before-140 watts, after-modification/repair-195 Hmmm. The August Livermore Club meeting was highlighted by a Junkbox Derby which called for dividing the club members into teams providing them with a minimal set of tools and a sack of goodies and making something. Winners were WB6MNV, WA6KLL and WB6LVN for their triode tester with WA6WHY, W6BEBX, W6BSP and WA6YU second with a fired pressure boiler that boiled water and made steam. There should be nothing but T-9X signals coming from the Livermore area after the fine series of articles on how to build a monitor your c.w. rig by WA6KLL in the LARK. Let's have some activity in the Southern Alameda County area. There are no ECs, no traffic outlets, maybe no hams. That includes the area from San Leandro south to the county line.

NCN	3635 kc.	0300Z	Daily
NCTN	3905 kc.	0130Z	Daily
SCVSN	146.7 Mc.	0300Z	Daily

ECs! Please send your reports to the SEC. by the 1st of the month so we can get his report to me by the 4th or 5th. Traffic: (Aug.) WB6CRC 718, K6TFT 338, W6ILH 185, WB6APK 158, K6LRN 108, W6TYM 61, W6IDY 23, W6BB 21, WA6OLF 18, WA6PTU 12, W6BETY 11, WA6-ZTY 4, WA6QZA 3, (July) K6TFT 40, (Jan.) K6JZR 58.

**HAWAII**-SCM, Lee It. Wical, KH6BZF-Ass. SCM/SEC: Ernie J. Kurlansky, KH6CCL. PAM: KH6ATS, RM: KH6EWD, V.H.F. PAM: Vacant. It's that time of year again and the spirit of the Holidays is upon us. Happy Holidays. KH6FON dropped by to eyeball KH6-BZF. KH6LEPW has a new auto to cart his antenna to F.D. KH6CJY was ex-KP4BEV. KH6EXI has applied for OPS appointment and awaits his 2-meter s.s.b. k.w. rig. KH6EEM and KH6CMM flew over to Maui to start KH6EXI in v.h.f. activities. KH6CMM has been running tests on 2 with WA6LEP at Stamford Ins. who's using a 150 ft. parabolic, it's reported. Maui ARC, with EXI pres., had a post Field Day display at the Kahanui Shopping Center. W8TES, from Waynesboro, Pa., was a visitor at a recent Honolulu ARC meeting. KH6BZF and KH6FGA were both out in KR6-Land. KH6FGA is a new papa—a son for him. KH6BZF recently was on the Big Island and Maui. Typhoon Lucy hit Chichi Jima, re-



**This HF Single Sideband Transceiver  
meets Full Military Requirements  
and is available off-the-shelf  
at a commercial price.**

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The Model RF-301, SSB Transceiver was designed by RF Communications as a company product without government support. It was designed to be used by military customers in military applications. Now in production, it can be bought in quantities from one unit up with short delivery (averaging 30 to 90 days) at a very modest price. The RF-301 costs about one-third of that normally paid for military transceivers with similar characteristics.

**RF-301, SSB TRANSCEIVER**

*Brief Specifications*

**Frequency Range:** 2 to 15 Mc

**Synthesizer:** Can be tuned to 1 Kc increments. Provisions for unlocking synthesizer and tuning continuously.

**Power Output:** 100 watts p.e.p. and average

**Stability:** 1 part  $10^6$  standard, 5 parts  $10^6$  optional

**Modes:** USB, LSB, AM, CW. Also FSK with adapter.

**Power Input:** 115/230 volts, 50/60 cycles standard. 12 or 24 volt DC with additional built-in module.

**Size:** 7 $\frac{3}{4}$  x 17 x 14 $\frac{3}{4}$  inches • **Weight:** 59 pounds

*Please contact us  
for further details.*



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142

ports KH6IG, YE8AH and his pleasant XYL were visitors to our islands and our convention. His home is in Inuvik, N.W.T. An old friend Homer Turpin, ex-KA-Land, was at the latest Honolulu S.S.B. Club dinner. KH6BWT works in the Pearl Harbor Naval Electronics yard. KH6BJ's been knocking off the DX of late. KH6AED/DU1 is on from Manila. Sam is an ex-SCM of Hawaii. KH6FRE, ex-W5JKJ, is on 6 meters with an SR-46. KH6DEM returned to Oklahoma City for additional FAA schooling. Next month we'll find out about KH6KDO's job as QSL Mgr., Hawaii. Traffic: (Aug.) KH6AIG 182, KH6ATS 16, KH6DEM 1, KH6EWD 1, W4EXM/KH6 1, KH6FRE 1, KG6IG 1, (July) KH6AIG 108, KH6ATS 28, KH6FAM 1, KH6FGA 1.

**NEVADA**—SCM, Leonard M. Norman, W7PBV—SEC, W7JU, K7JU, The Nevada C.W. Net meets on 3650 kc. at 2000 local time under the leadership of W7AFF, K7RBM/7 made the BPL. W7BFL reports activity picking up around Fallon, with W7BQQ opening his new clinic. W7BLF, ex-WA6YQI, and family are residing in B.C. K7RKH still is operating portable from Utah and Arizona, giving Southern Nevada amateurs a chance at these states. We're going to make it yet. Anyone want to talk sail-boating, 11 so, try WA7BEU, W7JU/K7JU, W7PBV, K7PYF or W7TKV if you have a couple of hours or so. Mark your calendar now for the SAROC (Sahara: Amateur Radio Operators Convention) at the Sahara Hotel Las Vegas Jan. 7, 8, and 9, 1966. K7ZOK received a PSA certificate. Sixth Army MARS has appointed W7PBV as Assistant MARS Director for Nevada. W7ZT is the Nevada State MARS Director. Traffic: K7RBM/7 638, W7AAF 123, W7YRY 14, W7PBV 3.

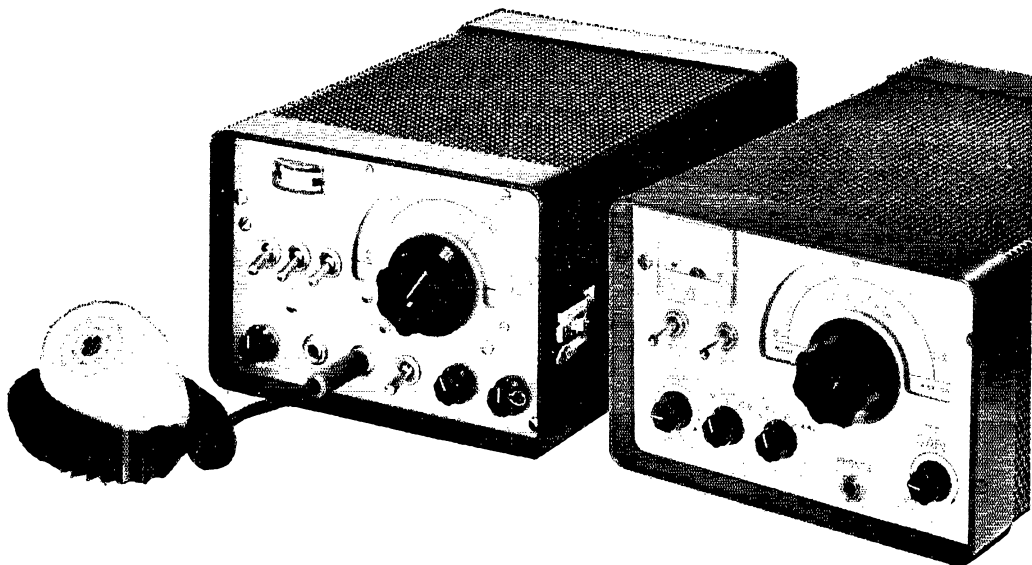
**SACRAMENTO VALLEY**—SCM, John F. Minke, III, WA6JDT—

SVN	3690 kHz.	0200Z	Daily
SCEN	146.28 MHz.	0400Z	Wed.
NCN	3635 kHz.	0300Z	Daily
NCTN	3905 kHz.	0100Z	Daily

The Sacramento Valley Net (SVN) began operation as scheduled Sept. 1 with 4 QNI and 3 QTC handled. SVN still is looking for members, especially you fellows up north. *This is your section net!* See you on 3690. If you are not a c.w. operator, QNI the Northern California Traffic Net on 3905. Let the rest of the division know that we are here. During the month of August W6GDO completed the first SV-LA QSO on 432 MHz with W6NLZ, a distance of 385 miles. W6GDO is now s.s.b. on 220 and 432! W6SMU, Sacramento Co. EC, says that there now are 30 AREC members in the county and they are planning to combine with RACFS. W6ECE is a new OO in Paradise. W6ZJW still faithfully performs his duties as OO. What about the rest of you OOs: are you doing your part? On Oct. 23, the Sacramento ARC (W6AK) celebrated its 50th anniversary. K6TWE passed the Extra Class exam. W6WLI built a larger ham shack. W6YZO is on ATV in Fair Oaks. W6ZJF is busy transmitting code oscillator schematics via RTTY. Traffic: W6LNZ 52, WA6JDT 35, WB6HAW 30, K6YBV 25, WB6LXX 18, W6CMA 17, WB6MAE 11.

**SAN FRANCISCO**—SCM, Hugh Cassidy, WA6AUD—SEC; W6KZF reminds all ECs that he wants more Form 5s. New appointees are WA6IVM as OO and K6PPO as OES. The Marin Club held a successful auction in Sept. with W6KUF as the perennial auctioneer. The San Francisco Section Net meets Mon. and Fri. at 3900 kc. at 6:30 p.m. local time. The Greater Bay Area Hamfest held in San Rafael was a well attended and successful affair. Traffic reports are up with W6YKS back on the air after Army Service. WA6STS had a 2-meter amplifier ready for the Sept. V.H.F. Contest. WB6GVI has a new Eico s.s.b. exciter. W6GQA got a 25-w.p.m. certificate on his first attempt. W6EAJ attended the 160-meter meeting at Livermore in Aug. WA6QXV reports copying the 2-meter repeater at San Rafael from Ukiah. Sonoma County amateurs participated in the Caledonian Games in Santa Rosa over the Labor Day week end, providing communications for some of the foot races. WB6CKT is putting together a transistorized repeater for 2 meters. During the Sept. V.H.F. QSO Party W6BCC, WB6KDF, WA6STS, W6ARQ, WB6EAS and WB6CKT were active on 50, 144 and 220 Mc. K6LHN worked into ZL-Land with his DX-40 on a.m. WA6ALK had her sister from Omaha visiting during Aug. W6IDL manages to handle a good amount of traffic in spite of uncertain working hours. Section certificates for the Northern California Net were issued to W6YES and WA6BYZ. Net certificates for the San Francisco Section Net have been issued to W6BIF, W6NL, WB6YS, W6IDL, WB6AIS, WB6GLD, W6CYO, K6QQI, K6ALI, WB6GYI, WB6JON and WB6GDJ. WA6JUV finally handled his first piece of traffic. W6BYS is kept busy during the night hours telephone relaying from the Western Pacific. WA6AIGG has finished winding a 2500, 5-amplifier plate transformer for some highpowered operation on 75 meters. WA6IVM has picked up three

# DESIGNED FOR THE AMATEUR WHO IS ACTIVE ON SIX



COMPLETE, SELF-CONTAINED STATION FOR FIXED,  
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## LI'L LULU TRANSMITTER FOR 6

Special gang-tuned circuits in Li'l Lulu let you QSY instantly — there's no buffer tuning and final dipping needed when the frequency is changed. And the rig is really TVI proof! By keeping the VFO grid circuit in the 25mc range, TVI is eliminated.

- 117 vac, 12 vdc integral power supply. Class A high level modulation. Carbon dynamic or crystal mic input. Push-to-talk, or use panel switch • Built-in cw keying filter • VFO spotting switch • VFO control • 12 DQ7 final.

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Specially developed to complement the famous Li'l Lulu one-knob-controlled transmitter for 6 meters, the new Li'l Lulu receiver is unmatched for performance.

- AM, CW, SSB • Product detector for SSB • BFO crystal controlled • Delayed AGC operates on AM, CW, SSB • Integral front-end filter • Tunes 50-54 mc, and 10 mc for WWV and converter input • Critical components are temperature compensated • 10 mc crystal filter ahead of 3 IF amplifiers • Built-in CW monitor • ANL operates in all modes • S meter controlled by non-delayed AVC • Front panel control for companion transmitter — 80 to 1 drive reduction for precise tuning • Matches the Li'l Lulu transmitter.

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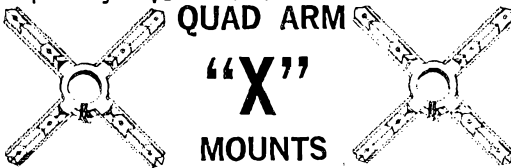
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## FIBERGLASS QUAD ARMS

First time ever offered at this unbelievable price. More than 2 years in R. & D. These full length mandrel processed reinforced Fiberglass arms are practically indestructible in application. Cross arms are reinforced at base and wire intercept points. Give your Quad a professional look with high reliability.

13 ft. Long. These Quad Arms can be purchased separately at \$5.50 each.

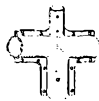


These rigid die cast mounts are poured from a special aluminum alloy bullion with low deterioration and fatigue factor. 2 in. hub diameter. Special "V" angle will handle any diameter quad arm from 1 in. to 1 3/8 in. O.D. Comes complete with all necessary hardware.

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## BOOM TO MAST "T" MOUNT

Die cast to true fit a 2 in. O.D. boom to a 1 1/2 in. O.D. steel mast such as popular T. V. mast. Complete with hardware.



Separately, \$4.95 each

## COMPLETE KIT PRICE

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### CONTENTS

- 8 Fiberglass Arms
- 2 Quad Arm "X" Mounts
- 1 Boom to Mast "T" Mount

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1 Instruction Manual  
Designs by W8FYR — W4WSM

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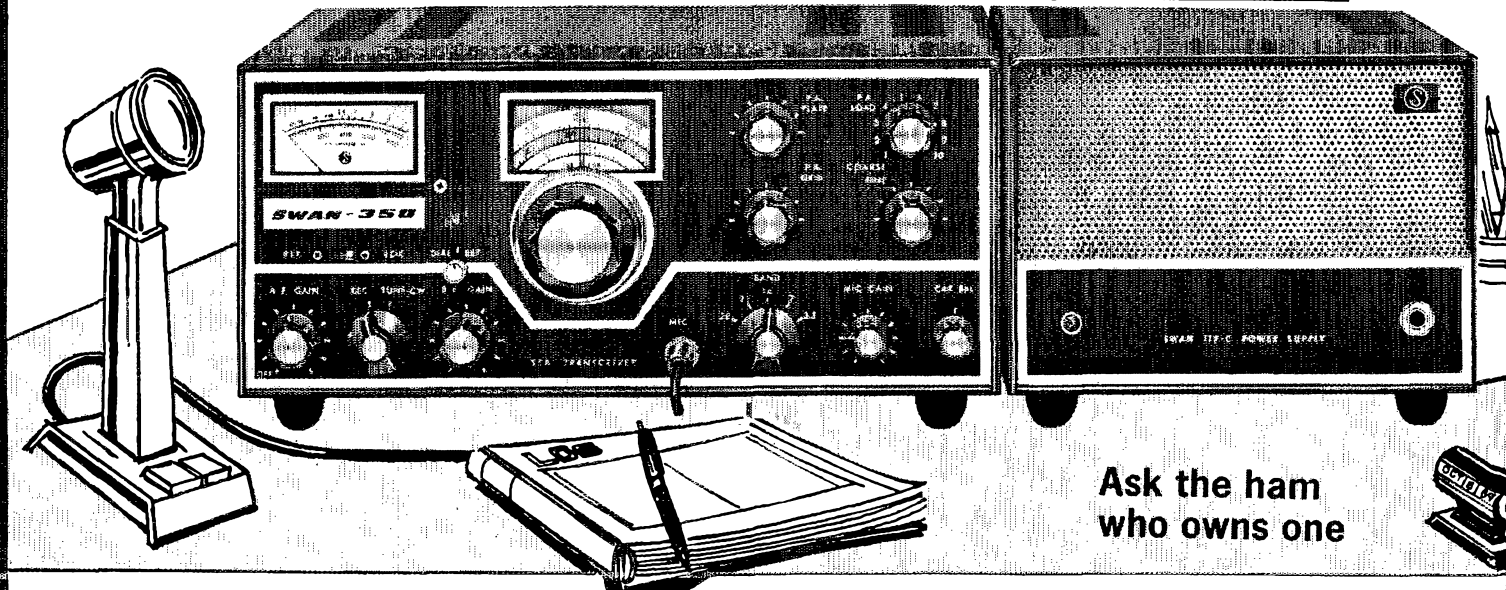
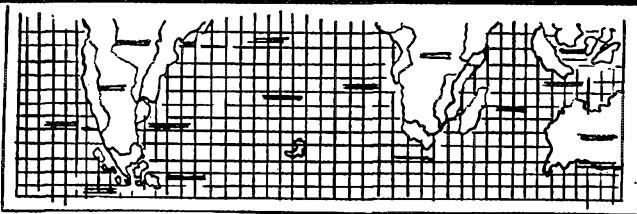
more confirmed for his DXCC total. The San Francisco Radio Club had a representative from SWAN talk at its Aug. meeting. The Marin and Tamalpais Radio Clubs provided point-to-point communications for the annual running of the DIPSEA Race across Mt. Tamalpais with W6IFO, K6JGX, W6CXU, K6RKG, K6BAQ, W6TBV and W6HST providing 75-meter communications and the Tamalpais Club providing a parallel 2-meter system. W6BWV has his 2-meter ARC-5 working and has fine signal reports. W6BDGJ has gone mobile with a Galaxie transceiver. W6YKS worked into VE6-Land on 6-meter f.m. W6RLY and W6ZZK are active on 6 meters and W6-AEY, W6RLY and W6BWV are active on 2 meters in the Eureka area. Traffic: W6YKS 348, W6GLD 154, W6-UDL 79, W6KVQ 34, W6GVI 25, W6GQA 8, W6AUD 7, W6IVM 6, W6BIP 5, W6CYO 4, W6QXV 4, W6AJUV 2.

**SAN JOAQUIN VALLEY**—SCM, Ralph Saroyan, W6-JPU—The Western Single-Sideband Association held its Tenth Annual Convention here in Fresno at the Del Webb Hotel with about 300 in attendance. Among those present were W6JUK, K6LEJ and K6LRW. W66ETR and family had a bad automobile accident near Merced and are recuperating now. W6ETQ and his NYL are vacationing in W7- and WQ-Land with a KWM-2. W6-KOK has a new Swan 350. W6DKJ was heard aeronautical mobile on 2 meters. W6AVZ was operating on San Benito Peak on 2 meters. W6AZIJ and W6KQJ are heard on 2 meters. K6ANM and W6BFU are heard on 20-meter s.s.b. W6VFN is moving to WQ-Land. The Sacramento Valley started its own net Sept. 1, 1965 on 3690 kc. at 7 p.m. W6GML, W6HVV, W6NQC, W6HVA, W6KUG, W6MIVY and W6PSC all operated portable in Alpine County Aug. 21-22 and reported many contacts with that rare county. K7SNS and W4BHC drove from Lovelock, Nev., just to have lunch with them. W6UBK bought another antenna farm and is moving. The San Joaquin Valley Net reports for the month of Aug. 879 check-ins, 127 contacts, 59 traffic counts, 15 phone calls and 7 QST. W6AILZ is on 6 meters. W66EXT has moved to Merced. W6ATZN is now mobile on 144 and 220 MC. W6DAU has keyer problems. Would anyone from the Bakersfield area care to drop me a line? Traffic: W6ATZN 204, W6ADB 128, W6HVA 75, W6ARE 46, W6VFN 46, W6MIVY 21, K6VSK 16, W6ZKH 16, W6TLR 12.

**SANTA CLARA VALLEY**—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO. SEC: W6-HVN. RM: W6QMO. V.H.F. PAM: W6RRH. W6VZE made the BPL on originations. *Short Skip*, the club bulletin of the Santa Cruz Radio Club, featured an article on W6INC and W6FFV. The club's September meeting featured a talk on RTTY. *The Northern California Net Bulletin* now is being published by W6QMO. S.C.V. RM, Jert is planning a net get-together in the near future. W6KSY now is working MARS traffic nets as well as NTS. K6DXY is back on the air after a vacation in Ohio. Smitty is OBS on 3625 kc. and 144.6 Mc. M-W-F at 8:30 PDST, both RTTY and c.w. W6QMO reports that the following stations were among those handling San Mateo County Fair traffic: K6MPN, W6VSY, W66-ODS, W6PFV, W6EME, W6DEF, W6BDE, W6VZE and W6VQY. She also reports that W66FME, W66FMF and K6LVJ won the transmitter hunt put on by Redwood City e.d./RACES. W6PFV is now Asst. Radio Officer for Burlingame C.D. W6DEF credits NCN with the job of outlet for the San Mateo Fair traffic. W6AGR works NCN. RN6, PAN and TCC. W66FME sends in a first report. Sharon is active at W6WVJ and enjoyed handling her first traffic. W66FHH is active as ORS from Atherton. W6HC reports better-than-average traffic conditions. W6PLS was busy making plans for the SET for the Half Moon Bay group. Gene won the trophy for high score in the FHC/CHC QSO Party. W6YBV is building new gear. W6AUC is active as OO and is calling the roll on the QCWA Sunday Net. W6ZRJ vacationed in Colorado. W6SAW has been busy installing new gear for 80 through 15 meters and 2 meters. Herb is happy to hear that W1AW will now be RTTY. W6ASH reminds us that the monthly Oscar meeting is held the 3rd Thurs. of every month at the Foothills College Headquarters. All interested amateurs are invited to attend. The August meeting featured plans for Oscars IV, V and VI. W6LAC has moved to Merced. W66IZF has a new longwire on h.f. and a seven-element Yagi for v.h.f. Ed is active in the King City area organizing e.d. and AREC operations. W6ARXB is moving to Redondo Beach. *Paragraphs* reports that films and a rebash of Field Day were featured at the August meeting. The Palo Alto Club meets the 1st Fri. of each month at 8 p.m. in the Menlo Park Council Chambers. Traffic: (Aug.) W6SY 497, W6VZE 310, K6DXY 242, W6QMO 215, W6DEF 201, W6AGR 185, W66FME 130, W66FHH 102, W6AIT 83, W6HC 75, W6PLS 50, W6YBV 44, W6AUC 15, W6ZRJ 6, W6SAW 5, W6ASH 4. (June) W6ASH 24.

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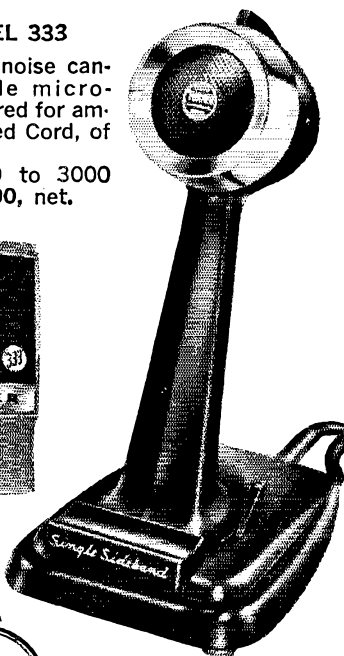
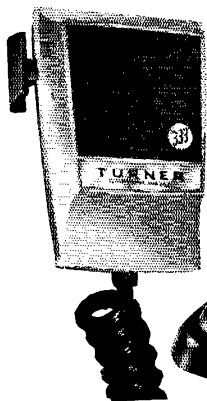
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### ROANOKE DIVISION

**NORTH CAROLINA**—SCM, Barnett S. Dodd, W4-BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MPK. RM: WA4NH. PAMs: W4AJT, WA4LWE, V.H.F. PAM: W4HJZ, WA4BSJ and WA4BVF have returned from Florida where they were in summer school. K4BBK says he has just completed building a Heath SB-400 transmitter and it is working fine. W4EVN writes: "Have W4WJI on 2-meters down here with 25 watts output, pass the word to the v.h.f. crowd to look on 145.35 Mc. at night." WA4PJS says she is having a ball participating in the ARRL-sponsored Intruder Watch. K4EO has a new tri-band beam and is planning to chase that elusive DX. WA4LWE says the SSB Net has changed its starting time to 2330Z from Oct. 1 through Mar. 31 to try to avoid some of the winter skip troubles. W4LEY says they have a new cliff-dweller rotatable, remotely-tuned dipole on order and it should be in any day now.

Net.	Freq.	Time	Days	QTC	Mgr.
NCN(E)	3573 kc.	2330Z	Daily	233	K4CDZ
NCN(L)	3573 kc.	0300Z	Daily	124	WA4ANI
THEN	3865 kc.	0030Z	Daily	55	K4WLV
SSNB	3938 kc.	2330Z	Daily	40	WA4LWE

Traffic: W4LEV 2891, W4EVN 293, W4IRE 256, WA4ICU 215, W4LWZ 193, WA4PDS 122, K4TEX 98, WA4UFQ 81, K4CWZ 63, WA4ANH 53, W4UWS 51, WA4FJM 39, K4EO 32, W4BNU 25, W4OTE 25, K4OXM 15, K4TTN 14, K4ZKQ 11, K4GNX 9, WA4GMB 1.

**SOUTH CAROLINA**—SCM, Charles N. Wright, W4-BUD—SEC: W4ECJ. Asst. SEC: W4WQM. RM: K4-LND. PAM: K4WQA. (s.s.b.). K4OCU (a.m.).

Net	Freq.	Time	Secs.	QTC	QNI
SCN	3795 kc.	Daily 0000Z, 0300Z			
SCSSB	3915 kc.	M-F 0100Z	31	120	1017
SCEFNB	3820 kc.	Daily 0130Z	36	21	312
SCEFNB	3930 kc.	Sun. 1330Z/2030Z			

New appointments: WA4HFA as ORS; WA4GRA and K4YYL as OOs. The S.S.B. Net held an emergency session Aug. 17 when communications into the Myrtle Beach-Ocean Drive Beach-Cherry Grove area were disrupted by a tornado. The net is to be congratulated because, although the session was conducted during the normal net hour and there obviously was a large number of S.C. stations monitoring the frequency, the number calling in to report that they were "standing by" was unbelievably small. Traffic: W4PED 107, WA4PFQ 95, WA4SOL 76, K4LND 69, K4ZHV 67, K4OCU 63, K4LNJ 35, W5NTO 32, WA4LPV 19, WA4QEQ 12, W4CXO 8, WA4ICF 7, WA4HFA 5.

**VIRGINIA**—Acting SCM, H. J. Hopkins, W4SHJ—RMs: W4QDY, W4SHJ, W4ZM, WA4EUL. PAM: W5-VZO/4. If you have not seen a *Virginia Ham* recently it's because WA4EUL has been called to military service. WA4DAI has taken on the important job of EC for Area 3. A new 11-year-old Novice in Richmond is WA4-AMT, the son of W4BLX. W4OWE has retired and plans more traffic and emergency work. W4SHJ attended the Winchester Hamfest and renewed many personal contacts; he also attended the Bristol affair and conferred with the Tennessee SCM and SEC as well as with Virginia locals. WA4UMX received his General Class license and is active in Waynesboro. Rare Powhatan County now has its second c.w. station, WA4TNS. Many members now are becoming active repairing and remodeling equipment and antennas in preparation for the contest season. First reminder—Roanoke Division Convention, Natural Bridge, May 28-29, 1966. The best place to establish oneself as a well-informed and well-trained operator is in one of our section nets; it also will get your call sign in this column regularly:

C. w. nets	3680	2330-0030 GMT nightly
S.s.b. nets	3935	2300 & 0300 GMT nightly
A.m. activity	3835	2330-0100 GMT nightly
Daily six-meter net, ODSBN	50.125	0230 GMT nightly

Traffic: (Aug.) WA4EDG 216, K4LJK 239, W4DVT 139, W4NLC 129, WA4EUL 118, W4FCS 100, W4ZM 73, WA4DAI 68, K4SCL 64, K4YCH 63, W4XIXU 62, K4-LMB 56, W4OKN 52, K4FSS 46, W4SHJ 42, W4RZE 32, W4QDY 27, WA4KVR 17, W4TE 14, K4VCY 14, W4VCJ 11, W4JUJ 10, K4PIK 10, W4MK 8, W4PTR 7, W4ATNS 6, W4ZAU 6, W4ZMT 6, W4RHA 5, W4KX 4, K4SDS 4, K4NOV 1, WA4UMX 1. (July) K4ITV 6, W4JXD 4. (June) W4OWE 10.



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**CASE HISTORY #139**  
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**CASE HISTORY #248**  
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**CASE HISTORY #613**  
"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success—in, e.g., DL4s, Z53, etc., all solid copy." R. D. S., Penna.

**CASE HISTORY #483**  
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**CASE HISTORY #146**  
"I have had very good luck with mine [my V80] feeding it with a Johnson Adventurer; works fine on all bands." S. L., Nebraska.

**CASE HISTORY #355**  
"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

**CASE HISTORY #84**  
"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

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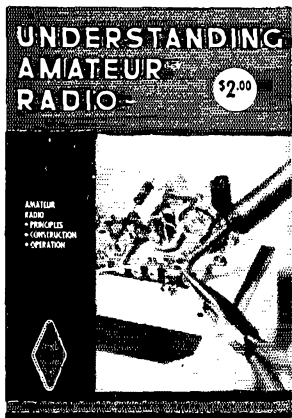
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**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—SEC: W8SSA, RM: W8LMF, PAM: K8CHW, S.S.B. Net Mgr.: K8SHP. I sincerely appreciate your support in the SCM campaign and hope to continue to justify your confidence in me. As we move through the fall season, activity is high and the WVN-Phone C.W.-S.S.B.-PON and Slo-Speed Training Nets are off to another fine season. Regional nets are operating on 8, 10 and 2 meters and the 29.6-Mc. f.m. net shows promise of covering a great portion of the state and would make a fine emergency net for ARPSC members. Appointments are available to those who qualify. If interested, I would appreciate hearing from you. Section Net report:

Net	Freq.	Time	Days	Sexs.	QTC	QNI	Mar.
WVN Phone	3890	2330	Mon.-Fri.	22	90	342	K8CHW
WVN SSB	3903	0001	Mon.-Fri.	22	24	386	K8SHP
WVN CW	3570	0001	Mon.-Fri.	24	109	119	WA8FIC

K8BIT, chairman of the W. Va QSO Party sponsored by the Kanawha Radio Club, reports top phone score and winner as K8WWW, followed by K8MQB and W8MLX. C.w. winner was W8JM, followed by WA8KCO and W3EYF/8. Our thanks and appreciation to the League and QST for the excellent publicity on pages 34 and 35 Sept. QST. W8HZA now is Class 1 OO. K8ZDV received WACWV certificate No. 42. WA8KCO is working on a home-made receiver. The following stations were active at the Town and Country Days, Wetzel County's fast growing festival: K8IUD, K8MHR, WA8ART, K8VQG, WA8AKU and K8GIP, K8WMQ and K8WWW, father and son, are NCBS on the WVN Phone Net. Traffic: WA8IMY 360, K8TPF 102, K8WWW 92, W8CKX 82, WA8KGU 11, WA8CRW 10, W8JM 10, W8HZA 7, WA8KCO 7, WA8ALI 3, K8BIT 3, K8EPI 3, K8SHP 3, K8WMQ 3, K8CHW 2, W8SSA 2, W8VYJ 2, K8CFT 1, WA8CKN 1, W8CZT 1, WA8GXD 1, W8HZH 1, K8NPF 1, W8VOI 1, K8ZDY 1.

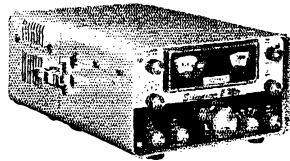
### ROCKY MOUNTAIN DIVISION

**COLORADO**—SCM, Donald Ray Crumpton, K0-TTB—SEC: W0SIN. Not much to report from Colorado this month. Seems like ham radio slows down in the summer and picks up when the weather starts getting cold again. This isn't too far off from this area, with morning temperatures hitting in the upper twenties now. Net activities seem to have been good all during the summer months with the handling of lots of traffic. Our SEC, W0SIN, has been very busy; we are in the process of renewing appointments that are running out and hope to have this completed soon. High Noon Net traffic: 136. Traffic: K0DCW 91, K0ZSQ 43, W0CBI 8, W0LCE 8.

**NEW MEXICO**—Acting SCM, Lowell E. Richardson, W5UBW—Asst. SCM: Kenneth D. Mills, W5W7K. SEC: K5QIN. K5JZD was involved in an auto accident which totaled his car. Dean and family encountered no injuries. WA5ELM and WA5FLG helped in getting K5MWW's grandson down from their mountain camp site where he was injured in a pistol accident. K5ZWI is now in Ecuador, South America, with the Bendix Company. Dave has obtained permission to operate in Ecuador and his Heath S.S.B. gear should be arriving shortly. The wife of K5VWO has presented him with their first harmonic, a boy. K5NQG has tied the marriage knot and is now living in Albuquerque. W5QHK is on the sick list after undergoing several operations. WA5AMG is working on his code speed to do some traffic-handling. Two new EC appointees are W8BZY/5 and W5ZHN. WA5LFG has high hopes of going RTTY soon. W5UNK is now home from the hospital. W5KDB is putting up a new pole to raise the 2-meter antenna higher. WA5KWK is enjoying s.s.b. with his new Swan 350. Traffic: WA5-DUH 196, WA5FLG 79, W5UBW 38, WA5FFL 34, WA5AMG 4.

**UTAH**—SCM, Marvin C. Zitting, W7MWR/W7OAD—Asst. SCM: Richard E. Carman, W7APY. SEC: W7-WKF. Section nets: BUN meets daily on 7272 kc. at 1930Z. UARN meets each Sat. and Sun. on 3525.5 kc. at 1400Z and on 3987.5 kc. at 1500Z. So far, there is no news of anyone qualifying for the new "Worked all Utah Counties" certificate. W7ZC is custodian of this award. W7EHX, having received her degree from the U. of Calif., is in Rochester, N.Y., looking for new worlds to conquer. W7POU continues to work rare DX. W7LQE and W7VTJ are enjoying the benefits of a new inverted "V" antenna. W7OCX attended the WIMU Hamfest. The Utah County AREC Net is holding part of the net on m.c.w. to promote v.h.f. c.w. activity and to build up the code speed of net members. W7WKF has moved to a new QTH and hopes to get his antennas up soon. W7MWR also moved to a new QTH. Traffic: W7OCX 138, W7LQE 128, W7VTJ 14, W7SAI 4.

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**Sola Constant Voltage DC Power Supply Cat. #281500.** Pri: 95 to 135 VAC @ 60 CPS. Three outputs. #1—24 VDC @ 10 Amps. Regulated; #2-30 VDC @ 2 Amps. Regulated; #3-5 VDC @ 2 Amps., Regulated. These units are brand new "Mint" condition. Standard relay rack panel 5" H x 19" W. (Solid State) \$90.00.

Call or write for prices on following new items, just arrived: Stoddart IM-121/URM-41 Radio Interference-Field Intensity Meter., Hewlett-Packard 616 Signal Generator (1800 thru 4,000 Mcs) . . . (TS-403/U).

**Gonset Communicator III, 6 meters, excel. condition. \$149.95.**

**Prepro All Band 100 Watt Xmtr:** 10 thru 160. CW and Phone. Only \$85.00.

**Brand new Victoreen Fall Out Detection Meter.** Range: 0 to 500 r/hr. \$49.95.

**In stock Raytel Raytheon TWR-7 Transistorized CB Transceiver. \$124.95.**

**Sale: Johnson Air System Socket #124-114-1 (for 4X150A) \$3.95.**

**Sale: Ameco PCL Nuvistor—All Band Pre-Amplifier:** 160 to 6 meters. With Nuvistors, ready to go . . . factory wired. \$19.95 (Reg. \$24.95).

**IRO-500 In stock — \$1295.00.**

**Teletype #255A Socket.** Brand new in cartons. For Teletype relay 255A or similar. Only \$2.50. W.E. Model 255A Teletype Relays. Only \$2.95.

**Silicon Rectifiers:** 800 to 900 PIV @ 1.5 Amps. @ 50¢ each; 600 PIV @ 1 Amp. @ 32¢ each; 400 PIV @ 750 Ma. @ 27¢ each; 400 PIV @ 400 Ma. @ 22¢ each. (Minimum order of 40 pcs . . . may be mixed): If you order fewer than 40 pcs, add 10% to price.

**Sale: Silicon Diode: IN3728. 400 PIV @ 400 Ma. 22¢.**

**Eimac type HR-6 Heat Radiator Cap: 95¢.**

Remember, we have the biggest diversified unused, first-quality TUBE stock in the United States. Best brands, highest quality at sensible prices. All mdse guaranteed (cost of mdse only). Ask for Barry, W2LNI.

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Enclosed is money order or check and my order. Prices for N.Y.C. shipments over 20 lbs. will be shipped collect for shipping charges. Less than 20 lbs. include sufficient postage. Any overage will be refunded. Fragile tubes shipped via Railway Express. 50¢ service charge for orders under \$5.00.

Send 10¢ for Fall "Greensheet" catalog #17.

Send information.

Name ..... Title

Company .....

Address .....

City ..... State .....

**WYOMING**—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: K7LAY. PAMs and OBS: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0830; YO Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920. In line with the incentive licensing proposals, several Conditional Class licenses in the state have taken and passed the General Class exams. K7KMT is back in Casper after being in Denver for several months. With vacationing, fishing and hunting now past, the nets are looking for much more activity. W7ASB and family enjoyed a camping trip in August in Yellowstone Park. K7ITH and his XYL enjoyed a fishing trip in the Big Horns in August. TWN is looking for Wyoming check-ins. Write me for details. Traffic: K7SLM 25, W7BPO 8, W7NKR 2, K7SAR 2, W7TZK 2.

## SOUTHEASTERN DIVISION

**ALABAMA**—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: William C. Gann, W4NML, RM: W4EXA. PAMs: K4NSU and K4WHW. Enjoyed seeing all who attended the N. Ala. Hamfest. Glad to have S.E. Vice-Dir. W4LVV present. Remember the Sweepstakes in Nov. WN4ALN is a new Novice in Talladega. New Novices in Huntsville are WN4YXT, WN4YXU, WN4YXW, WN4YUE, WN4AUF, WN4ASV, WN4ASW, WN4ASX, WN4ASY and WN4ASZ. The first 3 also Tech. Aug. section net reports (times GMT):

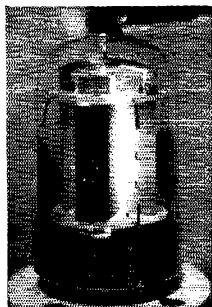
Net	Freq.	Time	Days	Seas.	Ave. T/c.	Ave. QNI
AENR	3575	0100	Daily	30	6.3	8
AENM	3965	0030	Daily	31	4	49.1
AENP	3955	1230	Mon.-Sat.	26	2.3	16.9
AENP	3955	2400	Daily	36	1.1	12.83
AENR	50.55	0115	Wed./Fri.	9	.33	17.5
AENT	3970	2230	Daily	32	3.37	7.17

AENB now has a monthly bulletin. W4PUN and K4OQY are now Extra Class. New equipment: K4HFJX HW-32, W44JWV ART-13, W4WGI 9er. W44TELX, W4U8M and K4YUD NCL2000s, W4SQV HW-12, K5-RS1/4 kever, K4WHW and W4YRM 416B preamps on 2. K4WHW 4 over 4 slot on 2, W4YRM six-element Yagi on 2, K4OAH R4, TX and HY-Tower Jr., W4SBD 4-400 final, W4PVK Swan 350. K4VPJ is mobile and K4TPD moved to Fayette. Traffic: K5RS1/4 259, W44-RER 176, W4NML 99, K4B8K 98, W44EXB 72, W44-UXC 70, K4NUW 67, K4WVP 57, K4KJD 56, K4WOP 56, W4YNG 56, W44TID 50, W44RES 34, W44EXA 27, K4DRQ 21, K4GXS 21, W4U8M 21, W4FNW 17, K4WHW 16, K4EZO 14, W4YRM 8, K44JF 7, K4AVM 7, K4FJZ 6, K4NSU 5, W44EBS 2, W4ZV1 2. (July) K4AVM 13.

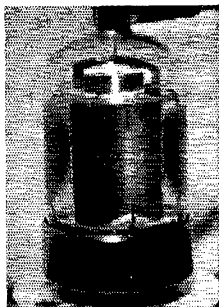
**EASTERN FLORIDA**—SCM, Albert L. Hamel, K4SJIH—SEC: W4YNT, RM C.W.: W4LUV, RM RTTY: W4RWM, PAM S.S.B.: W4OGX, PAM 40: W4SDR, PAM 80: W4TUB, PAM V.H.F.: W4AHMC. Because of the presence of our girl friend "Betsy" we were but-toned up for possible trouble. As a result the shack took on the appearance of a general storage shed. I was located behind the third trash can from the left. My good ham friends either lead very uneventful lives or just don't want to be bothered to send me a Form 1 with some news for this column. I received three cards and one of those was for last month. Come on, gang, you just might get a kick out of seeing your call here or have your club mentioned. K4YQO doesn't believe in taking too many chances. He is now the proud possessor of a 2nd-class commercial phone ticket and is going for the 1st-class plus Amateur Extra Class. K4SJP took the Extra Class exam but hasn't had the word yet. W4BKC tells me that K4LRG, our EC for Orange County, has his 2-meter antenna on top of a new 70-ft. tower. W44JH slipped a disc in his back while working on his beam and tower. Hope it's OK by now. So I wind this up with one very pointed question. "Why in tarnation can't all our ECs fill out and mail a simple card report to Andy each month?" Traffic: (Aug.) W44SKK 1036, W44BMC 771, K4Y8N 570, W44LHK/4 460, K4BY 273, W4K1S 190, W44NEV/4 178, W44QLZ 173, W44LJH 159, W4SDR 93, W44FGH 82, K4COO 81, W44IWO 80, W44NBE 79, W44YSR 63, K4KDN 61, K4SJIH 61, W44KDL 48, W44PDM 47, W44MOL 46, K44LR 43, W44DEL 42, W44EHW 42, W44KRC 39, W44-RGW 35, W44FP 34, W44YD 32, K4DAX 31, W44UHI 30, K44MB 29, W44WEW 27, W44MOL 26, W44E 24, W44CIG 22, W44OHO 18, K44MZR 17, W44HDH 14, W44RXG 14, W44YT 13, K4QAY 12, K4EBE 9, K4MTP 9, W44YV 9, W44JM 9, W44BKC 8, W44DFZ 4, (July) W44HDH 26, W44YT 13, W44FP/4 5, W44YQ 5. (June) W44FP/4 37.

**GEORGIA**—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4SAZ, RM: W4DDY. PAMs: K4PKK, K4YZE, W44HSN, W44JSU. W43CA is back in Georgia after a period in 2-

Unretouched photo  
of 6146B with  
conventional plate.  
Note pronounced  
hot spot.



Unretouched photo  
of Sylvania 6146B  
with Hi-Con plate.  
Note absence of  
any color.



## The 6146B with a difference

Let's face it---it's an old amateur custom to push final amplifier tubes to the limits of their endurance. Not because the practice shows up as a meaningful gain on some distant S meter, but because it gives the man behind the mike or the key a nice feeling of power.

Our reaction at Sylvania was to face the realities of the situation and come up with a popular type power amplifier tube that could be pushed beyond the limits of its predecessors. We've done just that with our own version of the 6146B.

To begin with, the Sylvania 6146B has a dark-coated heater that just about eliminates failure due to wire embrittlement. The heater in turn is electrically isolated from the cathode by a heavy oxide insulating coating. And increased heat transfer at a lower operating temperature is effected by the dark-colored outer coating. Together, these improvements aid in maintaining rated power output even at reduced heater voltage. Peeling and flaking of the emissive coating has been eliminated by using a new type of cathode cold-rolled from a blend of powdered metals. And that old devil "gm slump" is substantially reduced by progressive reactivation of the emissive materials.

We've also effectively reduced the possibility of secondary emission by gold-plating the No. 1 and No. 2 grids.

But the hot news is the cool-running plate. We call it the Hi-Con plate, and consider it a metallurgical breakthrough. The core material is iron. The iron is copper-plated, and the copper is then nickel-plated. This construction provides far greater uniformity in heat conduction and greater efficiency in heat radiation. Naturally, this affords a higher dissipation safety factor.

How does it work out in practice? We loaded up the two tubes shown in the photos identically. You can easily see what happened. The one on the left, a 6146B with a conventional plate, got a beautiful hot spot. The one on the right, Sylvania's 6146B with Hi-Con plate, ran cool as a cucumber.

So there you have it. Whether you want to push your luck a bit or you're just interested in longer tube life with an improved safety factor, Sylvania 6146B's will keep you happy and out of trouble.

73,  
**SYLVANIA**  
SUBSIDIARY OF  
GENERAL TELEPHONE & ELECTRONICS **GTE**

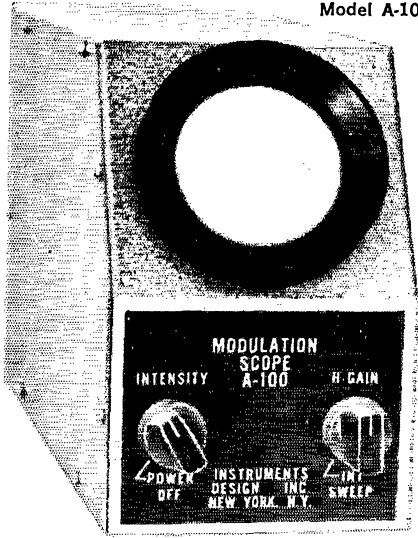
*Bob Lynch*

K2RMN

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**HAM MODULATION SCOPE**

Model A-100

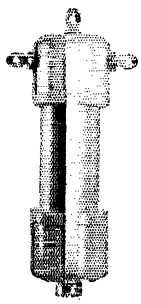


- AM, CW or SSB
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- Will handle 5W to 1 KW
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## W2AU 4-PURPOSE BALUN

Only 6 1/2 Oz.

2 KW P.E.P.—\$12.95

...with built-in lightning arrester—center hang-up hook for inverted vees, doublers, etc., eliminates center insulator—broadband 3 to 32 Mc. rated 2 Kw. P.E.P.—Two models: 1 to 1 Model goes from 50 or 75 ohm UNBALANCED coax, to 50 or 75 ohm BALANCED beam or antenna—1 to 4 model goes from 50 to 75 ohm UNBALANCED coax to 200 or 300 ohm BALANCED load.

Also Designed for Quads!

See page 160 for W2AU Quads  
W2AU Super Fiberglass Quad \$99.95  
W2AU Korean Bamboo Quad \$54.95  
UNADILLA RADIATION PRODUCTS  
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Land. WA4JSU had to get the power company to run a special line for his Yankee Special. WA4BNY and W4KXM swapped rigs. WA4JSU is DXing with a new final. K4YZE continues his v.h.f. activity and c.d. work while recovering from a broken leg. K4IKV completed his third code class resulting in 14 new Novices in Newnan. W4LRR reports state parks now has generators. Battery power will be at a premium. W4GGD is active as an OO. K4TXK reports 2 meters improved over previous years. W4HYW worked in the W. Va. QSO party. WN4ARB is a new OES. WA4AJU, the XYL of K4YZE, builds her traffic total while the OM is convalescing. WA4WKZ has a 20-w.p.m. CP certificate. WA4GAY takes over as net manager of the teenage net. WA4LLI continues active in the traffic dept. WA4CJN started Ga. Tech. Sept. 15. W4SAZ is working on 2-meter gear. W4DDY reports six new Novices in Augusta. K4NFP is the new net manager of GTN. WN4ASN, WN4ASM, WA4OSU, W4GCD, W4JOH, K4NFP and visitor K4EEY were at the Ga. Mt. Fair. K4TKM is returning to Ga. Tech and will operate from W4AQL. Traffic: K4TKM 239, WA4UYT 198, K4NFP 150, K4NFP/4 135, W4DDY 95, W4SAZ 93, WA4CJN 85, W4FOE 76, W4TFL 58, WA4LLI 55, W4RZL 54, WA4FUN 35, WA4GAY 21, WA4JSU 21, WA4AJU 20, WA4WKZ 20, WN4ARB 17, WN4AIU 14, WA4BVD 11, W4HYW 6, K4TKN 5, K4YZE 3, W4IUD 2.

**WESTERN FLORIDA**—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE, PAM: K4NMZ, W4BVE. Section Net report.

Net	Freq.	Time	Days	Sess.	QNI	QTC
WFPN	3836 kc.	2300Z	Daily	31	598	196

Pensacola: K4SOI has reactivated the 10-meter AREC Net on 29,560 kc. 0100Z Tue. WA4XF, the XYL of W4MS, joined the Silent Keys. W4DEF is mobile with a TR-3. Milton: K4NMZ has an Ameco 5 and 2-meter transmitter. Fort Walton: The WFPN Picnic drew a big crowd. W4HZ and WA4TEG, from the State C.D. Office in Jacksonville, and K4YPI, from the Tallahassee Office, discussed RACES. A 2-meter f.m. repeater linking Tallahassee, Panama City and Pensacola is being procured by State C.D. Delunak Springs: K4VWE has a new TR-4 and tri-band vertical. Panama City: WA4NRP works into Fort Walton regularly on 2 meters. W4FOX, a new OES, runs a Viking 8N2. WA4NVG has moved to Idaho. Look for him on 20 meters. More Panama City stations are needed to QNI QFN. Marianna: WA4SIB is a new OPS. Tallahassee: W4JGD replaces K4YPI as Asst. EC for c.w. WA4EOQ has a new Heath HA-14 linear. WA4EAO vacationed in New York with his Swan 350 and kept skeds with WA4EOQ and K4ZFW. WA4UBW wants information on high school radio clubs in Florida. Contact your SCM if you know of any clubs being organized. Traffic: K4VYU 223, K4BSS/4 272, W4BVE 103, K4NMZ 90, K4VWE 72, WA4EOQ 59, WA4JIM 13, WA4NRP 5, WA4NVG 2.

## SOUTHWESTERN DIVISION

**ARIZONA**—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY, RMs: K7NHL, K7TNW. PAM: W7CAF. WA7-BPF received his General Class license. W7AWH has moved from Tempe to Scottsdale and is temporarily off the air. W7LID received his 1st-class radiotelephone license. W7PZF has a new Swan 350 transceiver. K7VOR is doing a good job on his 8/2-meter OBS transmissions. A number of section appointees have failed to send in their certificates for endorsement. In order that your appointment be kept in force, your certificate must be signed annually by your SCM. W7WUB/7 has finished his homebrew 50-144-220-Mc. u.h.f. receiver and reports that it is working FB. Reports: OO from K7RUR; OES from W7AYY, K7OFL, K7NII; OBS from K7VOR. Very little news was turned in, which is the reason for the short report. Please, how about some news items. Traffic: K7NHL 122, W7FKK 33, K7UTF 13, K7PLO 6.

**LOS ANGELES**—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC: John A. Vaidean, W6BNX. RMs: W6-BHG, W6BBO, W6QAE. PAMs: K6MDD, W6MLZ, W6ORS. Wow! What a traffic total this month, 13,414, and this puts more BLP certificates on the walls for K6YVN, K6WAH, W6BHRH, K6IUV, W6GGQJ, W6-BBO, K6EPT, W6WPF, W6GYH, W6BGL and W6-VFM. Congratulations to the new BLPers. W6BBO is acting as liaison for the 8-Hall Net to SCN. New appointments: WN6MPF as OES, WA6NUA as OPS, W6AEL as ORS. Endorsements: WA6WTX as ORS. W6AM as ORS and OPS, K6KII as OO. K6VAH will be off the air until further notice. W6BERH has a Clegg 22er with a ground-plane but has a seven-element beam to put up. K6EPT says his traffic count is down with a total of 877. What is your "up" count, Smitty?



# “My Father says all soldering guns are not the same...”

“How many have detachable tips (fine, medium, heavy duty) that deliver heat power ranging from 25 to 450 watts?”

“How many are versatile enough to do delicate printed circuitry work, T.V. and radio repair, *and* heavy duty chores (like repairing radiators and downspouts)?”

“How many have ATR\*?”

“None—except the new WEN 450 (one gun, three tips, a thousand and one soldering projects).”

\*Automatic Thermal Regulation, exclusive with WEN. Utilizing a high temperature magnet wire, ATR delivers the precise amount of heat power to each tip so that it may do its job—yet requires 50% less wattage input to maintain a constant heat level after initial surge. No wasted current, instantaneous heating and cooling and maximum thermal control. With ATR, dual heat is truly obsolete.

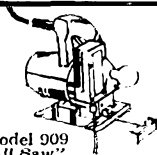


**\$13.95**

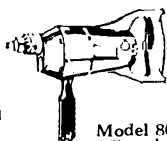
- (includes heavy duty tip)
- Light duty tip \$1.30
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- Plastic cutting attachment .60
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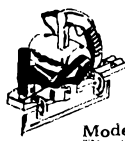
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7 Solder Guns  
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# THREE BANDS

## 200 WATTS



### FOR THE HW12, 22 or 32 TRANSCEIVER with a new idea from DYNALAB . . .

—with DYNALAB'S Sensational New Three-Band Conversion Kit for the HW12, 22, or 32 Transceivers.

A few hours of construction and color coded wiring result in a three-band unit for the "HW" transceiver. A turn of the bandswitch produces the same circuitry of all three transceivers.

Here are the results:

- Coverage: 14.2-14.35, 7.2-7.35, 3.85-4.0 Mc. (Full 75 meter coverage with THW12)
- Operation: LSB on 75 and 40 USB on 20
- Power Input: 200 watts PEP
- Calibration: 2 Kc on original dial
- Stability: 200 cps after 20 min. warm-up under normal ambient conditions
- All other specifications remain the same

#### FEATURES AND HIGHLIGHTS

- ★ Well laid out assembly modeled after the famous Heath manual
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PRICE **\$49.95** Ppd USA proper

ELSEWHERE, ADD \$1.50 FOR SHIPPING

HW12 owners order kit model THW12

HW22 owners order kit model THW22

HW32 owners order kit model THW32

For further information see "Recent Equipment" on page 54 of October QST, or write:

### DYNALAB COMPANY

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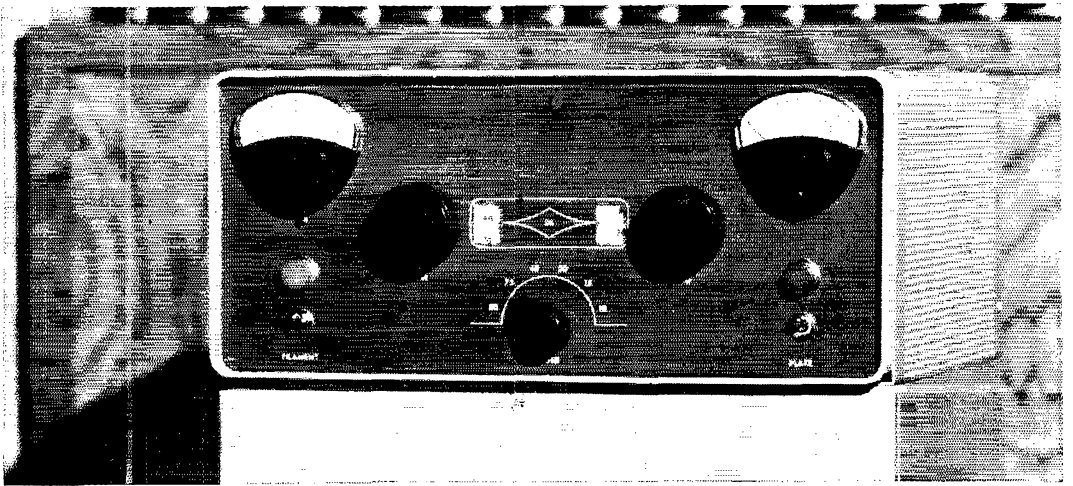
W6GYH still made the BPL even though on a three-week vacation. WA6VFM made the BPL with 152 organizations. WB6FPQ is taking off for college again. K6UMV received his 2nd-class radiophone license. WA6WKP is going to Oregon for a vacation. K6KII has 307/307 for DXCC. W6AM has a Swan 400 mobile and has worked 30 countries while driving. WB6BOW has the 2-meter antenna up 75 feet. WB6MEQ sent in logs for WAE. WB6OKZ says the Ingleswood ARC has antenna and transmitters set up in the Red Cross Bldg. at 279 Beach St. WA6YKP went s.s.b. with an HT-37 and has converted the ARB Navy receiver and it works FB. WA6QE still is sending out an FB net bulletin. WB6GXI, secy. of the Eight Ball Net, says she received word from Santa Claus that he will be on the airways again this year, which will be the 8th year in a row. He will be on 50.500 Mc. at 1830 PST. This always has been a great thing for the kiddies around this time. Congrats on a nice job for the youngsters. For better mail service use your zip code numbers. The Eight Ball Net (EBN) meets Mon. through Fri. at 1515Z and Tue. through Sat. at 0130Z on 50.5 Mcs. Southern Calif Net (SCN) meets daily at 0200Z on 3600 kc. Traffic: K6YVN 277, K6WAH 1614, WB6HRH 1566, K6LWV 1219, WB6GOJ 1172, WB6BHO 1086, K6EPT 977, W6WPF 565, W6GYH 547, WB6GGL 310, W6QAE 378, K6MDD 360, WA6VFM 152, WB6GK 129, WB6BBH 110, W6FD 105, WB6GXI 96, WA6WXP 89, K6LDM 77, WA6CTK 66, W6BNY 53, WA6VUW 40, WB6FPQ 33, K6UMV 29, W6BHC 27, WA6WKF 25, WA6NUA 20, WA6ZID 20, W6MLF 18, WA6WTX 14, W6KMIJ 10, W6PCP 7, K6II 6, WB6KVA 6, WA6WJT 4, W6AM 3, W6HUJ 2, W6LVQ 2.

**ORANGE**—SCM, Roy R. Maxson. W6DEY—The Orange County Traffic Net had 248 check-ins for July and 181 for Aug. with a total of 80 pieces of traffic, per Mgr. WB6ERG. WB6OTL is looking for swapping type bars within commuting distance of Redlands. FB bulletins were received from Orange County DX Century Club, Fullerton RC, Newport ARS, Orange County ARC, Anaheim ARS, Riverside County ARA and So-Cal Six Net. We welcome the Yorba Linda ARC. WB6ASQ pres. and WN6PNH secy. K6ZQB/ALM, on the USS *Endurance* running a Swan 350 into a 14AVQ, needs Long Beach Area contacts. WB6OPA, of K6MCA, now has help with WB6PRP transferred in from S.D. WB6CJS is getting in some QO activity and has a new whip on the car. Plans for the Southwestern Division Convention are under way with a target date of next May at Disneyland. WA6NJZ, general chairman, reports all going O.K. W6FBF advises the Desert Rats meet the 2nd and 4th Tue. at Police Station, Palm Springs. Traffic: K6MCA 2751, W6ZJB 992, WB6JFO 550, WA6ROF 117, W6DNA 88, K6LME 35, W6CK 16, WA6CXB 3, K6ZQB/MIM 6, WA6OQM 1, W6WRJ 1.

**SAN DIEGO**—SCM, Don Stansifer W6LRU—The SOBARS held its Annual Picnic at Lower Otay Lake Sept. 12. The San Diego V.H.F. Club handled communications for Hydroplane Races on Mission Bay in early Oct. K6JP, K6ANV, K6ROR and W6CCE passed the Extra Class exams. WB6CSF is back in San Diego after overseas duty. A new member of the V.H.F. Club is K4AFS/B. Over 150 attended the ARPSC Picnic. WB6KNN again is active on SCN. A new and first Phone Activities Manager in the section is WB6GMI. If you handle traffic on phone let him know it. Recent Generals are WB6OHZ and WB6OIA. W6LKC and W6YZV recently celebrated their 25th wedding anniversary. The Telstar program by the Telephone Company was featured at the Palomar Club for its Sept. meeting. Back in college are WN6MSE, WN6NIII, WB6HRN and WB6DOP. Don't forget the November Sweepstakes, an excellent chance to complete your WAS and get your feet wet operating in a good contest. Traffic: W6IAB 4258, K6BPT 3941, W6YDK 3502, WB6JUH 599, W6VWQ 570, W6EOT 516, WB6GMM 180, W6BGF 125, WA6UUO 21, WB6KNN 18, WA6TAD 7.

**SANTA BARBARA**—SCM, Cecil D. Hinson, WA6OKN—SEC: WB6NDP. RM: WWST/6. WB6NDP, recently appointed SEC for this section, has moved here from Indiana and now resides in Santa Barbara. Bob works at G. M. Research Lab in Goleta and is one of those "let's do it" hams. A new SR-500 has just been installed in the K6AAK auto. WA6HWB, a regular check-in on 3395, is now in Lima, Peru, as OA4ZU. K6EAQ reports on the "Fiesta" week in Santa Barbara where eight 2-meter f.m. stations assisted with the parade and control of 100,000 spectators. WB6PGK writes on activities in the San Luis Obispo area. Code practice is run on 2-meters by W6ZRR. W6JTA holds the DX title in the area. W6YK has put Camarillo on the moonbounce list. Bill has his E-M-E QSL card from KP4BPZ and also has just received permission to run 1 kw. on 432 MC. Traffic: WB6DPV 64, WA6OKN 2.





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## WEST GULF DIVISION

**NORTHERN TEXAS**—SCM, L. L. Harbin, W5BNG —Asst. SCM: E. C. Pool, W5NFO, SEC: W5PYI, PAM: W5BCO, RM: W5LR. The Big "D" Hamboree held Aug. 28 was a very successful meeting judging from the attendance. More than 1200 hams were present. Several contests such as transmitter hunts, guessing frequency of coil and condenser combinations and sending code with the left foot made the meeting more interesting for all. With the success of the Hamborees in the past few years I should think the Dallas Club would be ready to bid on the West Gulf Convention in the near future. The Arlington ARC members were busy talking to everyone about the 1966 West Gulf Convention at "The Inn of Six Flags." The club is working very hard to give you a good convention and now is the time to start making plans to attend. New officers of the Amarillo ARC are WA5ICS, pres.; WA5JWW, treas.; WA5IDJ, secy. WA5EMP is back in the States from Germany. K5ZOV made a hole in one using borrowed golf clubs, shoes and ball. Stolen from a car—Galaxy 5 Serial #4411V046/5605. Notify W5IYH. Traffic: K5DBJ 245, W5VFM 144, W5CVB 135, WA5EVS 37, W5VEZ 23, W5LR 19, W5NEJ 13.

**OKLAHOMA**—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil Andrews, W5MFX, SEC: K5DLP, K5ZCJ, EC of Tulsa County, has worked out an outstanding AREC plan and has it printed and ready to go. K5DLP and I would like to thank Larry for the outstanding job he has done since he was appointed EC for Tulsa County. We also would like to thank K5MIB for his outstanding work as EC for Okla. County. W5QMJ reports that he needs more stations to check into OLZ and RN5. Come on fellows, this is a good time to build up that code speed and still help out with the traffic. W5EHC has a new TR-4. K5HTF has a new Drake T-4X and R-4 combination. K5OCX reports that the Okla. City V.H.F. Club is going to set up a booth for the State Fair again this year. Paul Balbin, WA5-EQF, and Jane Tander, WA5NAU, were married at Vance AFB and departed for parts unknown, taking a rig along to keep in touch. W5TMY is off from work because of illness, but has found time to do a little hamming. He got a good laugh out of an overzealous soul who called him up to berate him for having made remarks on the 50-MHz. band in favor of incentive-licensing. J. D. favors incentive licensing, true, but he has never operated on the 50-MHz band. I still can't figure how J. D. could get his 75-meter rig in the 50-mhz band. Hi. Traffic: W5QMJ 90, K5CBA 33, W5PML 32, K5KTW 29, K5DLP 27, K5MTC 16, W5UYQ 14, W5WDD 14, K5OCX 8, K5ZCJ 8, W5EHC 3.

**SOUTHERN TEXAS**—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5RDP, PAM: W5ZPD, RM: K5ANS. A new fad in Southern Texas is to qualify for the Extra Class license. New ones in the El Paso area are W5PSB, W5NGW and K5QVH. Congratulations, fellows. The El Paso ARC is adding to its club house. W5ES, by selling 1000 boxes of apples. W5NGW is doing the best OO job in Southern Texas. He now has new GSB-101 and 100 and is punching out Official Bulletins on 14,075 kc., along with code practice sessions as a club project. Here is your chance to copy from 10- to 25-w.p.m. on Mon., Tues., Wed. and Thurs. at 0400Z. W5AC, at Texas A & M, made WAS and now is getting a keyer for the c.w. members. K5TSR and Ron are working plenty of DX from W5AC. The past-secy. of W5AC, K5SAR, is getting married. K5KSE will be groomsman, K5LZA and K5BDC ushers. K5ANS reports 185 pieces of traffic on the TEX C.W. Net in August. W5DAA, a new EC in Brownsville, reports the club is working with the c.d. for emergency communications. New officers of the Orange Amateur Radio Club are WA5DIK, pres.; WA5COD, vice-pres.; WA5AUZ, secy.; W5NMV, WA5-AUZ, K5BBN, WA5GYQ, W5ICL, WA5IPG and K5-BJB, board members. K5HZR, EC for Bezar County, San Antonio, and W5ABQ report conditions had on 40 meters making a lot of relays necessary to deliver traffic from the 7290-Kc. Net. The Lost Pines Radio Club in Smithville held its Annual Dinner meeting Aug. 20 with a nice attendance. Dir. Best, W5QKF, was the main speaker. SEC K5RDP, SCM W5AIR, local EC K5HRR and Texas State Radio Officer K5TRY also attended. Speeches must have been hot as a large supermarket burned to the ground that night. Traffic: (Aug.) K5-ANS 51, W5ABQ 18, W5AIR 7, WA5AUZ 3. (July & Aug.) K5HZR 288.

## CANADIAN DIVISION

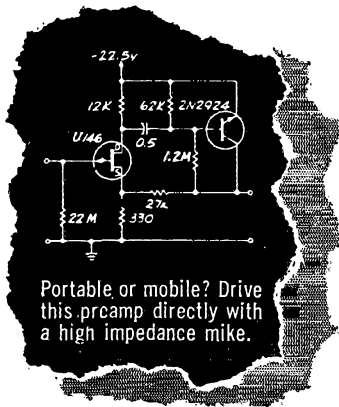
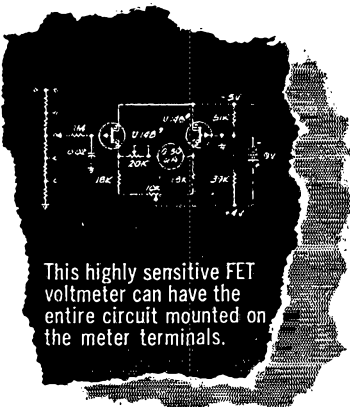
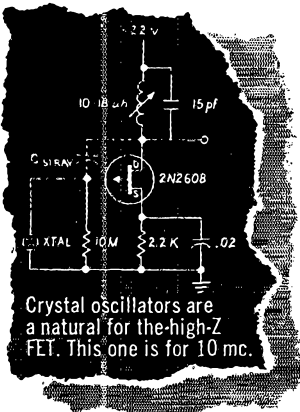
**ALBERTA**—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM: VE6PV, ECs: VE6SA, VE6SS, VE6-AFI, VE6HB, VE6ALL, VE6XO. ORS: VE6BR, OPSs:

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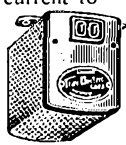
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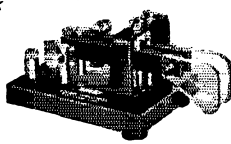


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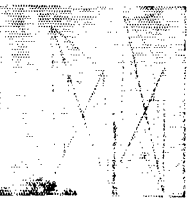
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**BRITISH COLUMBIA**—SCM, H. E. Savage, VE7FB—VE7FB, his XYL VE7SH and junior operator are on holidays and he went salt water fishing. Funny, he tried but everyone was landing cohoes. Had a royal visit in Powell River. Host VE7BOQ and his XYL invited VE7ALZ, VE7AMX, VE7AES and VE7PL. Amateur radio was well talked over; past, present and future. VE7CC, at whose station I operated s.s.b. for the first time, and VE7BNY also dropped in. VE7BKE had a short QSO. Why the silence from VE7SH and VE7FB?

**MANITOBA**—SCM, John Thomas Stacey, VE4JT—VE4XQ has been posted to France and is looking for his VE4 friends on 20 with an F7 call. VE4DQ has his DXCC. VE7NH, ex-VE4LC, paid a visit while on vacation. VE4UC and VE4JF are now located in Winnipeg. The Flin Flon gang, VE4JI, VE4PW, VE4OT, VE4SC, VE4HH, VE4EO, VE4VK and VE4OB keep the bands hot. VE4TM, at Cranberry Portage, is working on a ham club in the Residential School and has the blessing of the principal. VE4QX has his 25 w.p.m. CP endorsement and assumes the RAM position. VE4EI is putting the finishing touches on his 300-watt final. VE4AH is active from Norway House. VE8PS, ex-VE4PS, runs skeds with VE4XN and is on the lookout for Winnipeg. VE4IG, at Churchill, is the manager of the Trans-Canada ARPS Net and pleased with the high Manitoba representation. VE4RE has moved to Brandon. Traffic: VE4JT 139, VE4IQX 65, VE4EI 37, VE4EF 14, VE4NE 13, VE4QD 12, VE4JA 10, VE4EG 6, VE4QJ 4, VE4SW 4, VE4JY 3, VE4GB 2, VE4JQ 2, VE4SC 2, VE4DE 1, VE4HH 1.

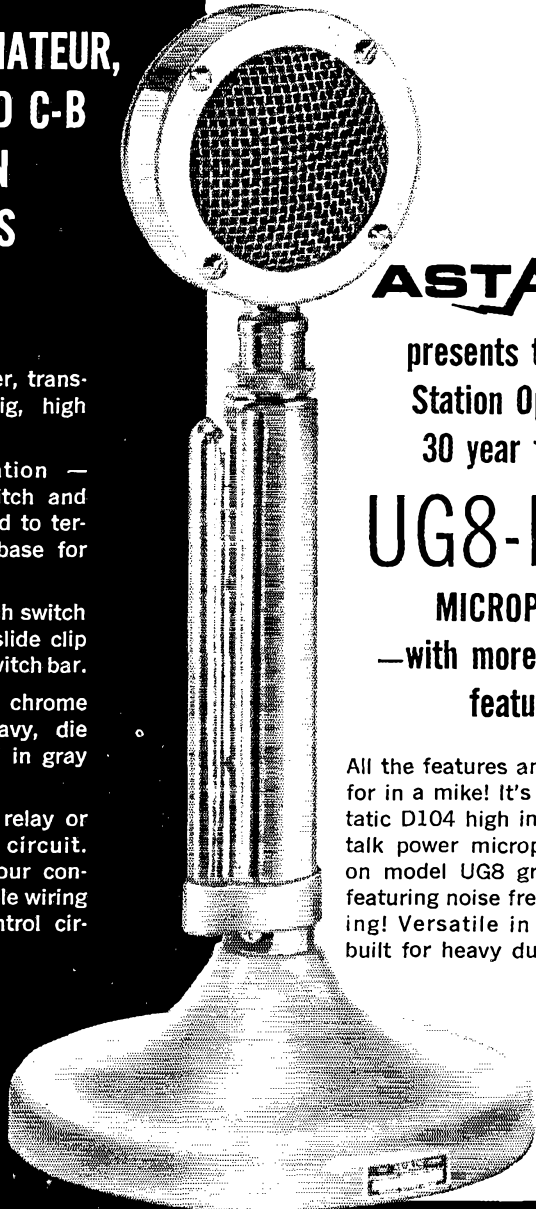
**MARITIME**—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A.E.W. Street, VE1EK, and R. P. Thorne, VO1EL. SEC: VE1HJ. Deepest sympathy is extended to relatives and friends of VE1AKQ, who has joined the ranks of Silent Keys. Congratulations to VE1PX and all members of the Annapolis Basin Club for their efforts in staging the very successful convention at Digby. Highlights of the hamfest included the dedication of the Carl Sorge Memorial Amateur Radio station. The GR Memorial Trophy was awarded to the Greenwood Club. The Leo Doucette Award was presented to VE1PX. The Brown-Holder DX Trophy was won by VE1IE. The C.W. Contest (YL) was won by VE1AKO. The OM section was won by VE1IE (50 w.p.m.) VE3-CLJ was the winner in the mobile contest. Newly-elected officers of the NSARA are VE1AY, pres.; VE1LG and VE1GX, vice-pres.; VE1ANX, secy.; VE1GC, treas. Congratulations to VE1LG, who recently celebrated his 90th birthday! New calls include VE1APK and VE1AKJ. VE1AGH takes top honors in the Worked All Bermuda Contest for the second year running. Don't forget to obtain your copy of SOR/05-347, General Radio Regulations, Part III (amended (25e), Queen's Printer, Ottawa. Have YOU safety checked your shack recently? A recent SONRA Bulletin devotes a full page to the listing of actual "unsafe" cases as observed by DOT Inspectors! *Safety pays. Check your shack today!* Please report any public service activities or unusual happenings in your area.



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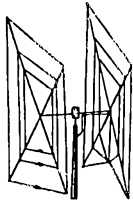
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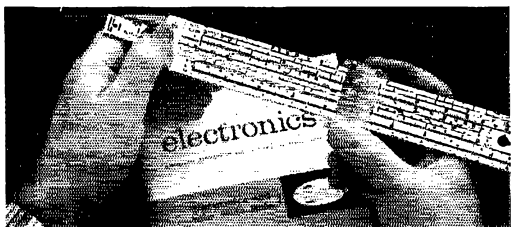


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**ONTARIO**—SCM, Richard W. Roberts, VE3NG—The Belleville and District Amateur Radio Club held a topnotch picnic at Presquille Park. VE3AVS, vice-pres. of the Lakhead ARC of Port Arthur, advises that the club has a very interesting program for the coming winter. VE3AHQ has moved from London to Windsor. VE3CJ advises that blind operators are not required to keep two logs. A log in Braille is sufficient and if a visiting Inspector requests excerpts from that log the operator must translate for him. SEC VE3EUM advises that VE3AVS is the new EC at Lakehead. VE3GH writes that the Seventh Annual S.S.B. Dinner will be held in Toronto on Oct. 23. VE3FVH has been posted to Germany and VE3DCF is now in the Toronto area. VE3COL was busy on the Ontario Phone Net during the past summer from Kingston. VE3CAB operates a 2-meter net on Mon. at 2030 on 144.710 kc. from Belleville. Port Weller was the site of the annual Weiner roast of the Niagara Penn. ARC. Ottawa ARC elected VE3CDG, pres.; VE3BYT, vice-pres.; VE3FZY, secy.; VE3EWE, treas. VE3AT, of London, is now in Woodstock. Congrats to VE3FBD and his XYL on the arrival of their new daughter, Rebecca Diane. VE3FWA is mobile on 75 with an HW-12 s.s.b. transceiver. From Windsor, VE3BGW is moving to Detroit. VE3EWW is now in Toronto. VE3HW is in the body shop for a tummy overhaul. VE3DN is in the Branson Hospital taking it easy after a heart attack. VE3GG is in the same hospital (Branson is in Willowdale). Cards are welcome. Traffic: (Aug.) VE3BII 226, VE3CYR 205, VE3NG 116, VE3DVE 79, VE3EAM 72, VE3CFR 63, VE3GI 60, VE3DPO 56, VE3FGV 49, VE3BLZ 46, VE3AWE 44, VE3DVO 41, VE3BUR 38, VE3EHL 35, VE3TT 34, VE3ETM 33, VE3DMU 29, WA8ETX/VE3 28, VE3HW 26, VE3BZU 24, VE3BWM 23, VE3EBC 23, VE3EBH/VE3 21, VE3FOA 12, VE3DH 10, VE3CFI 9, VE3BTY 8, VE3AUU 7, VE3GAG 5. (July) VE3BWM 12. (May) VE3BII 510.

**QUEBEC**—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Claude Duberger, VE2ALH. Changes in amateur regulations—see Oct. QST for details. Power raised to 1090 watts if no interference created; changes re 50 and 144 Mc. bands and less restrictions for maritime mobile operation. G2YL visited Montreal on the way to Western Canada; VE2HI was her companion and showed her the sights. The MARC will meet at Capri Hotel in the fall. Glad to report the return of Allan Campbell, who used to sign VE2RL, recently in Toronto as VE3DFN and now assigned VE2BYY. VE2BRT is back after correcting the transmitter trouble. VE2AAH (SEC) reports the possibility of closer liaison between the Civil Protection group and the Provincial Emergency Organization. A concerted effort is under way to present our case to the Government for removal of taxes and excise charges on imported commercial gear from U.S.A. The Assn. Radio Amateurs de la Mauricie held its Annual Picnic at Lac-a-la-Tortue. An interesting and constructive newsletter (in French) was mailed to members and friends of the RTQ French Net. VE2BRD is back from Alberta. The second-hand 2-meter transmitters have been distributed and should be heard soon. VE2BE attended the Digby, N.S., Convention. VE2BTT is now located in Toronto. VE2s CDT, BNA, AKD, AGI, XB and BLT participated in an important Civil Protection exercise during a period of 32 hours. VE2BYN likes a good c.w. ragchew. We had expected a report from our Asst. SCM, using the call VE0MS from VE8-Land, but none has been forthcoming. Traffic: (Aug.) VE2DR 200, VE2OJ 93, VE2AGQ/3 78, VE2ANK 70, VE2BRT 57, VE2BVY 40, VE2EC 29, VE2AJD 23, VE2AUU 22, VE2BG 16, VE2CP 7. (July) VE2BQO/VE3 3. (June) VE2BQO/VE3 8.

**SASKATCHEWAN**—SCM, Mel W. Mills, VE5QC—Well, here it is the start of the contest season on the bands and with the low sun spots passed it promises to be a very interesting winter season. Here's a tip, try your AREC procedure in operating where it applies, and I'll bet you your scores improve, also it's good practice for traffic-handling. AREC is in full swing again for another season and the SET is now passed. How did you do? Think over any possible errors or procedural wandering you noticed and send them in to the SEC, VE5CU, Box 801 Saskatoon. I would like to see more scopes used on all modes. Sitting in some dark corner of the shack is no help, components and settings will change and age. Congrats again to the technical department of the Saskatoon Club for its great effort on the moonbounce experiment of July—they were received 333. Last call for antenna adjustments before winter really sets in! Still no reports, lads. Remember, this section is for your information and use! Traffic: VE5HP 77, VE5JM 72, VE5BO 63, VE5VD 8, VE5PZ 4, VE5CB 2, VE5KZ 2, VE5AT 1.

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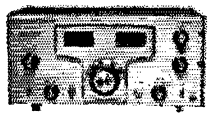
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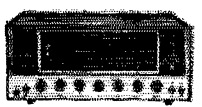
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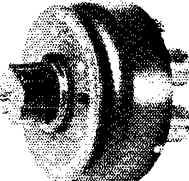
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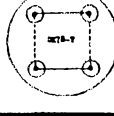
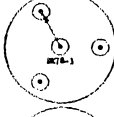
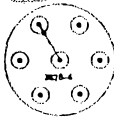
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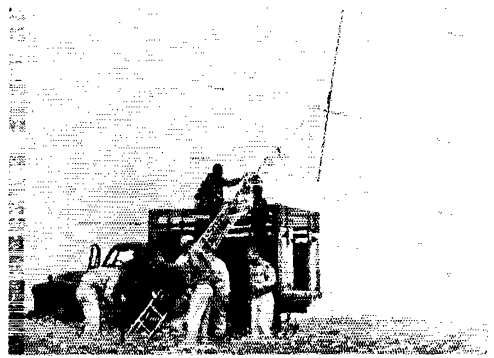
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K8SEQ/9	27-	A- 701	K2GK/2	31-	B- 279
W3ADJ/3	23-	A- 648	W4ACU/4	31-	B- 279
WA4HEB/2	71-	C- 639	W1SWX/1	25-	B- 270
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W1PBI/1	96-	B- 576	K9RXL/9	16-	A- 216
K7TPN/7	39-	B- 576	K5BR/5	22-	A- 207
W6TGO/6	16-	B- 567	W6MXX/6	21-	B- 189
W9OGZ/9	17-	A- 567	W9QO/9	14-	A- 189
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W3JYA/3	35-	A- 443	WA9CFK/9	6-	A- 81
WB6PHQ/6	1-	A- 437	WN9PM/9	13-	B- 78
K3NNE/3	7-	A- 432	W4YOK/4	38-	C- 76
W9AIV/9	31-	A- 419	W4MCF/4	9-	B- 72
VE1AIL/1	21-	B- 414	W1RVM/1	7-	B- 63
WA6YZO/6	12-	B- 405	K2EDM/2	7-	B- 63
WA6AHP/6	12-	B- 378	W9QVE/9	1-	A- 36
K9YHF/9	25-	A- 338			

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W8LT<sup>2</sup> 904, W1AEC<sup>4</sup> 639, W6ASH 489, W2TCB<sup>2</sup> 445, K5NCW<sup>4</sup> 411, K3FLT<sup>3</sup> 330, K3YQA<sup>6</sup> 308, W3VPJ<sup>7</sup> 211, W4WSF 134, WB6IH/6 112, W3NICG 90, WA4VKG 44, VE1HJ 16.

### CLASS E

W9CRM<sup>6</sup> 619, W7AY 516, K4RIN/4 420, K3YGU<sup>9</sup> 409, WB6MQS<sup>3</sup> 381, K3MBQ/21 358, W3TRF/7 337, W0BRI 313, WA4TW 296, WA5BCX 283, W4DXM/10 261, WA5HJK 252, WB6LUG<sup>2</sup> 251, W3TNO<sup>9</sup> 226, K2WUD 220, WA3CGE 210, K3PKU/3 210, WA4TCO<sup>2</sup> 210, K3ZAV<sup>1</sup> 186, W5NTD<sup>9</sup> 181, K5POU 178, W1MRQ 164, WA0HS 161, K4VRT 159, KA1GCE<sup>2</sup> 157, W3DGB<sup>4</sup> 154, W3MIR 154, WB6MIQ 140, WRMXO 138, K3ORV 132, W3EIS 126, WB20AV<sup>12</sup> 123, VE2HW 121, W6FRP 118, WB6TIN 116, WA1DX 115, K7ZZH<sup>4</sup> 114, W7TFE 113, WB6BLU 111, WA9NAG 109, W7AYC 107, W9AHW 107, WA4ED 106, WB5KN<sup>3</sup> 104, W9UUV 103, WN1DGK 102, WB6NBU 100, WA1TJS 99, WA9FGL 97, W2DRV 93, WA4TFS 90, WB2MYI<sup>1</sup> 87, K7ZHS 87, W1AW<sup>4</sup> 85, VE3FHQ 81, W5LJT 78, WA8NLH<sup>1</sup> 77, WA0KQ 77, WA3CBC 76, WA8RH 72, K3ZOL 71, WA4TW 71, WA8HW 71, W5HW 66, WB2LYO 64, WA8MAM 61, W3MNX 59, WA6TK 59, WA7AD<sup>13</sup> 57, K7YXZ 57, W3BLM 56, WA8LYT 56, WA4DZY 55, VE7BL 53, K1MJC 51, WA0HY 51, WA3AFY 50, WA9BZY 45, WA3ADV 49, WA3CBI 48, W9JUT 48, WA8NYB 47, K5MHG 45, WA1AAV 44, WA9LAV 44, WN4ZKN 43, WA0MTM 43, WA6JSA 42, WB2OLN 41, W4HOS 39, W2UAL 38, W3NIX 38, VE3DV 37, WA8KAW 36, WA9MAG 35, WB2PV 34, W7JRI 32, W9PB 30, W7UC/5 30, W6A 28, WB6JMQ 28, WA8MC 28, WA7BY 27, K2BUI 25, K8GUN 25, WA9LH 24, K7WQ 23, WA9NJR 22, WB2MNM 20, WAKRE 20, WA3AW 19, K1PQW 18, K9PIC 18, WA4DYD<sup>1</sup> 16, WNTCQE/7 16, W8WEG 16, WA0KAQ 16, WB2MJD 14, W8VDK/8 14, K5JEL 14, K3NYG 13, WA8HTY 13, WN9NZC 12, WN3DTH 11, WA8PR 11, WB2KNJ 8, WA6YWS 8, K9FBL 8, WN0LYO 7, WB2LUT 6, WNGOWA 6, WN1CMI<sup>2</sup> 5, W1WEE 5, W6IRJ 5, WN7LOB 4, WA9KDC 4, WN20UO 3, W6UHY 2, W6NMP 1.

<sup>1</sup> 2 ops. <sup>2</sup> 3 xmtrs. <sup>3</sup> 13 ops. <sup>4</sup> 5 xmtrs. <sup>5</sup> 15 ops. <sup>6</sup> 3 ops. <sup>7</sup> 3 xmtrs. <sup>8</sup> 2 ops. <sup>9</sup> 2 xmtrs. <sup>10</sup> 2 ops. <sup>11</sup> 4 xmtrs. <sup>12</sup> 8 ops. <sup>13</sup> 3 xmtrs. <sup>14</sup> 2 ops. <sup>15</sup> 2 xmtrs. <sup>16</sup> 4 ops. <sup>17</sup> 3 xmtrs. <sup>18</sup> 6 ops. <sup>19</sup> 13 xmtrs. <sup>20</sup> 5 ops. <sup>21</sup> 3 xmtrs. <sup>22</sup> 4 ops. <sup>23</sup> 4 ops. <sup>24</sup> 20 ops.

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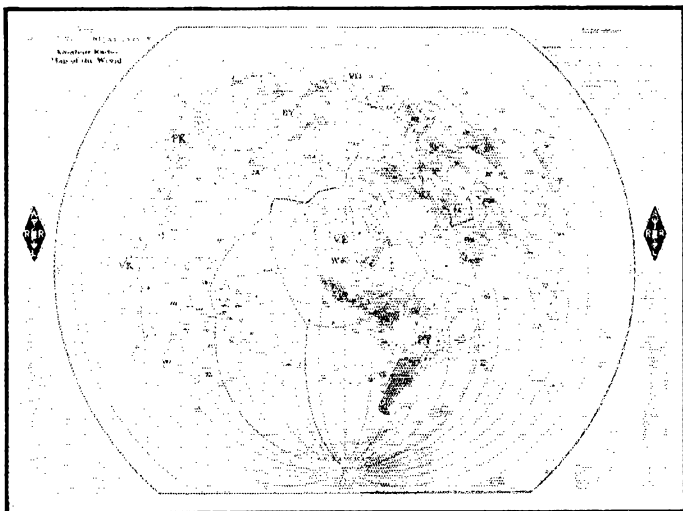
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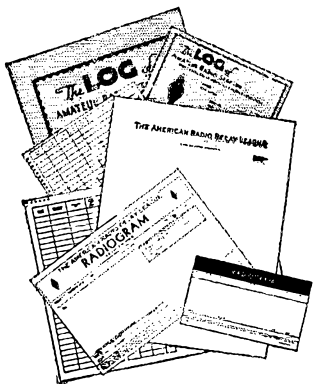
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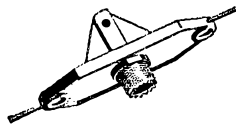
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## Operating the RTTY Station

(Continued from page 50)

far as they are known. The object has been to suggest methods and circuits which should work best the majority of time, rather than to force the reader to choose between circuits with which he may initially have no experience. Later, he may wish to try other ideas, or may gain enough experience to suggest improvements which will benefit us all.

The information in the series was obtained from many different sources, including personal letters to me asking for assistance or suggesting ideas which had not previously been considered. Much of the information has never been published elsewhere, and we hope this series will provide a firm foundation upon which not only the newcomer to the field can build, but may also solve some of the problems that the old-timer has long had.

Particular thanks go to K3NIO, who encouraged me from the first to undertake this monumental task and has provided much sound technical advice not available from any other source known to me. The almost daily autostart contacts with him on 3637.500 have materially assisted in the quick and accurate testing of the ideas discussed.

Special thanks also go to W8SDZ, without whose substantial help probably few of the Main-line circuits would have been developed. It has been his continued stimulation that has led to our broadened knowledge and interest in the field, plus his clever innovations that have contributed so very much to all our enjoyment. His constant comments on 3637.500 autostart have also made this task more simple to accomplish.

My primary hope in writing this series has been to pass on to the majority the knowledge a few of us have tried to accumulate, while at the same time providing background upon which other authors may expand. Finally, thanks to all those who have expressed such kind comments on our combined efforts to present this material. **QST**

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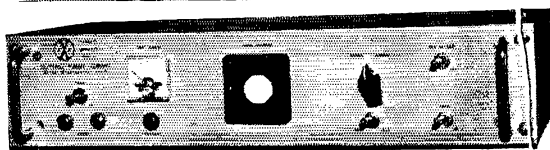
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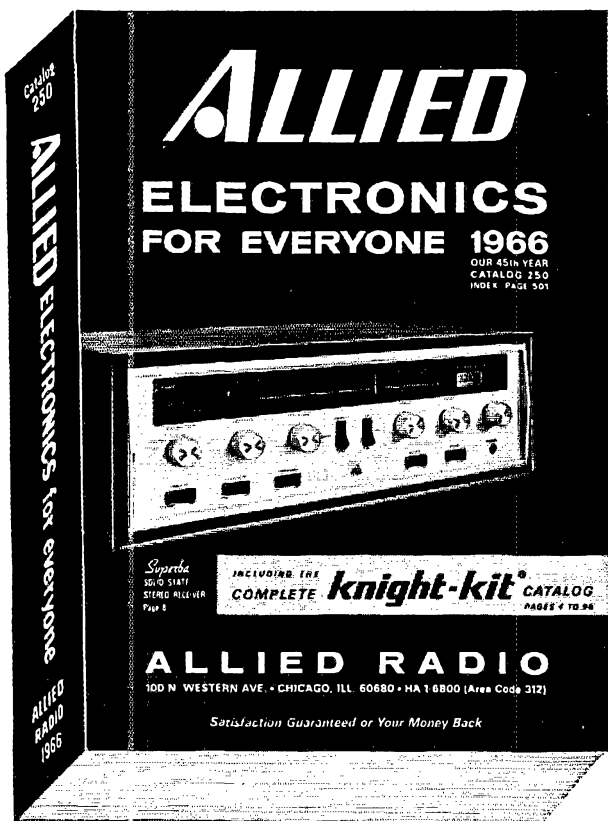
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## The Dipper

(Continued from page 28)

hairline will be the amount of capacitance required to tune an inductance of  $10\mu\text{h.}$  to 5 Mc. In this case your unknown capacitor will have a maximum value of 100 pf. Next, open the plates of the variable, find the dip, and check with the Calculator as before to determine the minimum capacitance.

It should also be apparent from the above that it is an easy matter to determine the frequency range of a tuned circuit using the dipper. In building transmitters or receivers a lot of time can be saved if you have a device such as the dipper to check each tuned circuit to make sure it is hitting the frequency range it is supposed to.

The dipper also comes in handy for checking antennas. Recently we ran into a case where a tri-band beam showed an extremely high standing-wave ratio on the line — so bad that it was apparent that something had gone wrong with the driven element. This antenna had split-dipole feed, so the two halves of the dipole were joined together with a short piece of wire and the dipper coupled to the antenna at that point. The dipper was then tuned through the 20-meter range looking for a dip. (There should have been one because a half-wave dipole is a resonant circuit and should show a dip). However, there was no dip in that region, but there was one about two megacycles higher. This indicated a poor connection or a bad trap in the antenna, and upon checking it turned out to be a corroded connection. Cleaning up all the connections quickly put the antenna back in working order. Here was a case where the dipper saved a lot of time in pinpointing a trouble source.

You'll find many uses for the dipper, and we are sure you'll like the compactness of this unit.

**QST**

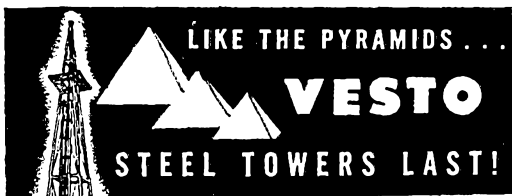
## ARPSC

(Continued from page 69)

TCC roster: Eastern Area (W3EML, Dir.) — W1<sup>st</sup> BGD EFW EMG NJM, K1YKT, W4<sup>2s</sup> BLY RUE UFI, W2<sup>2s</sup> AEJ HWB, W<sup>2s</sup> EML NEM PZW, K3MVO, W4DVT, K4<sup>s</sup> EHY/1 VDL, WA4PDS, W8CHT, K8<sup>s</sup> KMQ NJW QKY, WA8BQK. Central Area (W5PPE, Dir.) — W<sup>4s</sup> OGG ZJY, WA4AVM, W5PPE, W<sup>9s</sup> DYG JOZ VAY ZYK, WA9BWW, W0OHJ, K0GSY.

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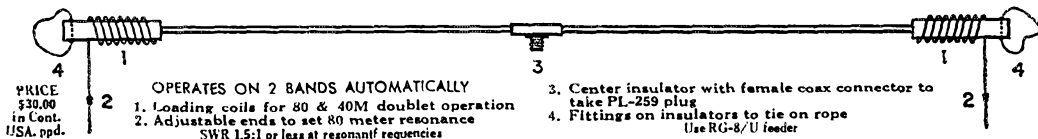
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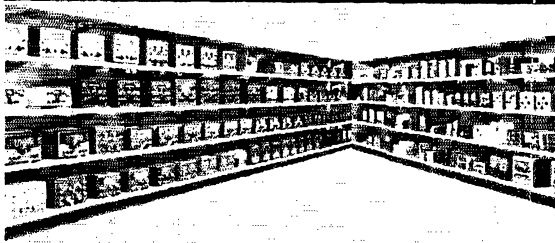
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75S3..... 469	AC SUPPLY..... 67	S118..... 67	VIKING VFO..... 32	NC155..... 129
32S1..... 439	DC SUPPLY..... 109	S119..... 27	ADVENTURER..... 37	NC183D..... 177
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AC SUPPLY..... 64	VENUS AC..... 79	SK122..... 229	HQ170C..... 207	HR10..... 77
DC SUPPLY..... 109	SSB BOOSTER..... 59	CRX1 30-50MC..... 69	SP600JX17..... 249	RX1..... 159
VOX..... 29	APOLLO LINEAR..... 189	CRX2A 152-174MC..... 69	HX50..... 259	TX1..... 159
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SWAN240..... 239	KNIGHT T150..... 79	HT32..... 279	G66B8AC..... 77	HW20..... 179
SBE34..... 539	AMECO CMA CONV..... 49	HT33..... 199	GONSET3 6MTR..... 149	HW10..... 169
SR21A..... 209	EICO 722VFO..... 37	HT37..... 279	GONSET4 6MTR..... 199	TWOER..... 49
GPR90..... 249	HE45B..... 79	HT41..... 239	HICKOK 539A..... 79	H010..... 59
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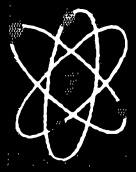
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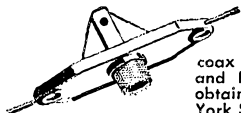
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## World Above

(Continued from page 104)

caught the opening of August 1 to the east and says there was considerable c.w. activity in Pa.

Another interesting report that we can't let slip by even though we received it late. W0HHG in Missouri writes: "July seems to have been the best month by far for skip this summer. I observed skip openings on the 3, 5, 6, 7, 8, 13, 14, 15, 20, 27 and 31. Near the end of the 6th and beginning of the 7th was one of the best openings I've ever had on six. During this opening I worked West Virginia and Maine for the first time. Signals were much stronger and steadier than they would be during a normal opening and it was possible to ragchew with a station for over an hour. I neither worked nor heard any foreign stations then but other stations reported working Japan, Africa and the French Riviera. (Please let us know who reported these stations and who the DX stations were.) The other item I have to report is rather strange and I hesitate to mention it. On July 18 I started to receive a foreign language station on a.m. at 0145 GMT. It was on 50.22 Mc. and peaked 6 S units above the noise level with severe fading. At 0148 it dropped in strength so that I could just barely detect a carrier on that frequency. I was unable to detect it at all after 0155. I checked for i.f. feedthrough by turning off the converter for a second when I first heard it, but this check showed that it was not i.f. feedthrough. This was the only unusual signal heard that evening. Did anyone else hear it?"

QST

## How's DX

(Continued from page 109)

Pacific patter via the clubs press: Macquarie's VK0TO, 14,175-kc. a.m. around 0500 GAIT, will respond to s.a.b. plights. . . . W9WNV, K7LAIU & Co.'s W9WNV/8F3 Bali enterprise bombed the WAE Test in mid-September with Collins gear on the heels of their proxy BY1SK fusillade. VS0J is another lately mentioned in connection with prospective BY activity. . . . W4BIC/DUI indicates that qualified W/Ks are granted ham privileges in the Philippines now. . . . September's KG6SZ was first stop for W6KG and Iris on their world whirl under Yame Foundation auspices. They have Collins apparatus and a Hy-Gain beam along, using the same frequencies designated for W9WNV-K7LMU undertakings.

EUROPE — "DLs 4QH on a.m., 4QV on s.a.b., and 5QB with c.w.-a.m.-s.a.b. represent all the "GI" activity in Berlin right now," writes ex-DL5QS, formerly of BV1US and KJ6FAA, returning to the Gulf coast as K4UBR/5. "I enjoyed more than 1500 QSOs from Berlin. The DL7 gang there is quite active, of course, led by the old master, DL7AA." . . . WA2TGL, touring Europe this summer, discovered why HV1CN is so scarce. Operator Domenico suffers QRM problems with Vatican point-to-point radio equipment in the same building. HV1CN occasionally pops on single-sideband Saturday evenings his time, sometimes trying c.w. as well. . . . OH0VF (OH5VP), who works for the wire-printer exchange in Mariehamn, tells W1TS of Hq. he hopes to bolster his c.w. activity with s.a.b. doings soon. "If someone wants Alands skels on 80, 40 or 15 meters I'll be glad to give it a try," says Andy, welcoming letters with suggested times. . . . The DMCA diploma is yours under certain conditions, mainly by contacting five, eight or ten DM stations of a specified category. Check with OM DM2ACB for scoop. . . . Need the Shetlands for your WAE (DARC) credentials? Watch for GM3s ANG HTH KLA RFR RHK SJA SKX SOM and STU.

QST



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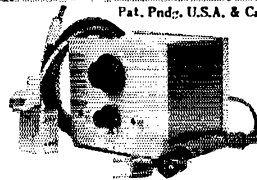
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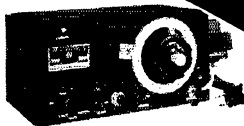
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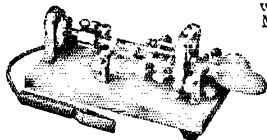
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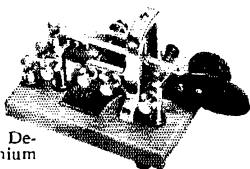


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(Continued from page 26)

of the antennas. The latter is recommended.

For point-to-point communications, the more common linear polarization may be desired. By feeding a left- and a right-hand helix in phase, as illustrated in Fig. 8, linear polarization will result. By rotating *one* of the antennas on its axis 180 degrees, vertical or horizontal polarization may be secured. A feed-line switching system could no doubt be conceived to enable the user to select either bay of the antenna for right- or left-hand circular polarization. The versatility of such an antenna system would certainly qualify it as an all-purpose array.

**In Conclusion**

The antenna system outlined in this text should not be construed to represent the ideal array, as such. Although the signals from KP4BPZ, via the earth-moon-earth (e.m.e.) path on 432 Mc., were copied Q5 during most of the July 24, 1965 tests, while using the antennas in Fig. 3, better results would have been possible if four helices per bay had been used. A single 8-turn helical antenna is a practical starting point for the beginner and represents the minimum starting point for space communications. The enterprising v.h.f./u.h.f. enthusiast can exploit the helical-beam antenna far beyond the possibilities listed in this article. In this regard, multibay arrays of helical antennas have been used successfully for radioastronomy work during the past decade — offering undisputed evidence of their value in space communications.

Although the dimensions of a helix are somewhat larger when applied to 2-meter use, a 4- or 5-turn driven element (either right- or left-hand polarity) would be useful for satellite monitoring because of the circular polarization mode. With increased array dimensions, the helical antenna should serve quite well for both transmitting and receiving in connection with 144-Mc. satellite work. So if you're a space-communications buff, and are interested in "rolling your own" at a minimum of expense, the helical beam may be your answer. And even nicer still: the hardware store just around the corner from you has the material you will need to build your helix!

I wish to express my gratitude to W1QMR and K1TKZ for their efforts in building the antennas shown in Fig. 3.

**QST**

**Boston or Bust**

(Continued from page 86)

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**QST**



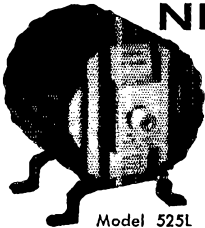
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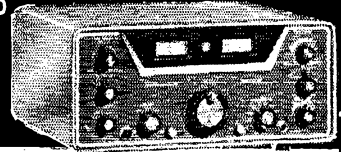
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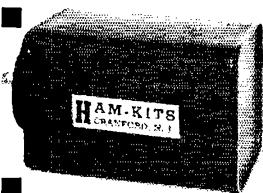
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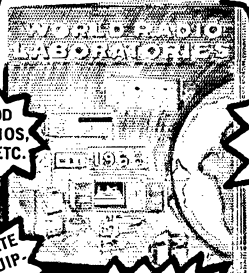
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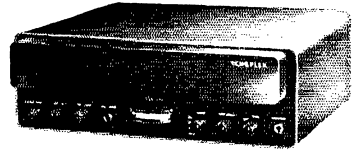
It is with deep regret that we record the passing of these amateurs:

W1GHQ, Herbert G. Randall, Allston, Mass.  
K1JGF, Lewis E. Webb, Narragansett, R. I.  
W2CTJ, Stanley R. Lokay, Auburn, N. Y.  
W2DFU, James C. Tompk ns, Suffern, N. Y.  
WA2NIN, Ensey M. White, Jr., Red Bank, N. J.  
W2QQ, Winfer E. Jones, Bowmanville, N. Y.  
W3FIR, David P. Gullette, Drexel Hill, Pa.  
W3RPK, Clarence A. Cronk, Philadelphia, Pa.  
W3TYK, Warren M. Kitter, Philadelphia, Pa.  
W3WB, Joseph A. Hunter, Baltimore, Md.  
W3YJ, Frank J. Gilmartin, Philadelphia, Pa.  
W4AXF, Carrie J. Collins, Pensacola, Fla.  
W4FWX, James B. Haddad, Somerville, Tenn.  
K4OZN, William E. Ferguson, Memphis, Tenn.  
K4PYC, J. Spencer Ripley, Paducah, Ky.  
K4RMP, George H. Buchanan, Maitland, Fla.  
W4SXJ, Robert C. Henry, Leesburg, Fla.  
W5ADA, Carl P. Emerson, Tulsa, Oklahoma  
ex-W5BPN, Frederick J. Fabre, Gretna, La.  
K5KMG, Moltkie E. Nelson, DeRidder, La.  
W5KVV, Earl S. Herndon, Paris, Tex.  
W5NZE, Robert H. Folmar, Austin, Tex.  
K5QFS, Ernest W. Luksa, Rosenberg, Tex.  
W6COI, Darroll D. Shafer, National City, Calif.  
W6COV, Joseph A. Conn, San Francisco, Calif.  
K6DWW, Munro M. Ikemura, Los Angeles, Calif.  
W6EYX, Henry J. Hamm, Los Angeles, Calif.  
W6IUW, Fred Stahl, Pomona, Calif.  
W6QVO, David L. Mack, Menlo Park, Calif.  
ex-WN6RUP, Charles Waugh, Whittier, Calif.  
K7HICJ, Virgil C. Brown, Bremerton, Wash.  
W7ORM, William W. Benson, Rawlins, Wyo.  
W7QAK, Arthur B. Neyland, Brady, Mont.  
K7QWN, James M. Babcock, Mercer Island, Wash.  
W7SRT, Cecil L. Ray, Newman Lake, Wash.  
W8DG, Daniel C. McCoy, Centerville, Ohio  
W8MR, Hubert W. Livingood, Luzerne, Mich.  
W8QXG, Walter Ermer, Jr., Cleveland, Ohio  
W8RIO, Arthur J. Grapentine, Youngstown, Ohio  
K8TVW, Clarence W. Zwayner, Toledo, Ohio  
W9ABZ, Thomas L. Rowe, Chicago, Ill.  
WA9EIV, Carl E. Dald, Chicago, Ill.  
W9GN, Ralph S. Davis, Des Plaines, Ill.  
ex-W9MV, J. P. Moore, Huntsville, Ala.  
W9ZA, Fred J. Marco, Des Plaines, Ill.  
K8FGX, William H. Rabe, Hopkins, Minn.  
W8KVD, P. Arthur Smoll, Albuquerque, N. M.  
W8QDQ, Ellis B. Babbit, Prairie Village, Kan.  
G3GGZ, John P. Ryrie, Crawley, Sussex, England  
ex-ON4CSL, Carroll R. Stegall, Asheville, N. C.  
VE3GS, Charles C. McDonald, Port Arthur, Ontario  
XE1PJ, Arnold G. de Jager, Mexico City, Mexico

## Fred J. Marco, W9ZA

We regret to report the death of Fred J. Marco, W9ZA. Fred, who was first licensed 9CD in 1919, held the calls 9CD, 9SBA, 9KW, and 9FM, and authored several QST articles in the twenties on amateur receivers and transmitters. He will be remembered by many old timers for his low-power experiments in the 1920s when he worked Australia and New Zealand with a 199 tube running a few hundred milliwatts input. He will be missed by his many amateur radio friends.

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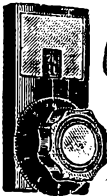


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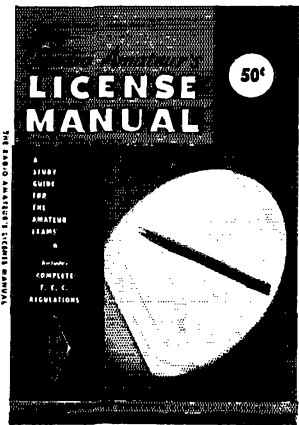
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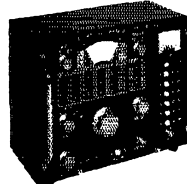
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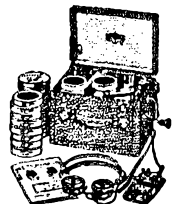
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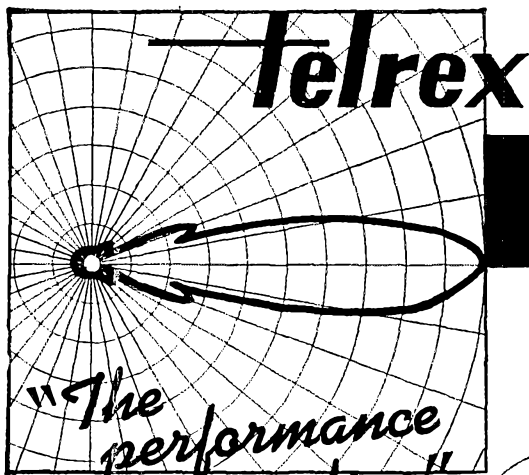


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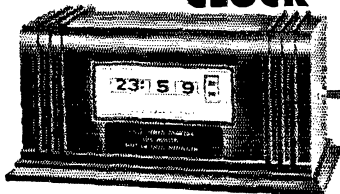
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QSLs. 18 samples, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

HUNDRED QSLs: \$1.00. Samples, dime. Holland, R3, Box 649; Duluth, Minn. 55803 (formerly Meininger, Jesup, Iowa).

"GOLDEN Calls" (Only QSL) crafted by Samco for 1965. Sample 10¢. "Compare if you care". Samco, Box 203, Wyanantskill, N.Y. 12198.

QSLs. Free offer with samples, 10¢. "Jack", W3PRU, Rice's Lane, Baltimore, Maryland 21207.

SRY, Fellas! Your orders are coming in so thick we have to hold up our ad for a while. Volpress, Box 133, Farmingdale, N.Y.

RUBBER STAMPS \$1.00. Call and address. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

NOVICE Xtals, 80-40M, \$1.05 each, others 75¢. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

TOOBES: 6CW4-\$1.40; 6146-\$2.55; 6146B-\$4.75; 6360-\$3.45; 5894-\$15.00; 417A-\$3.95. New, boxed, guaranteed. No pulls, seconds or I.A.N. Free catalog of hundreds more. Vanbar Dist., Box 4442, Stirling, N.J. 07980.

CASH For Callbooks. U.S. Government Amateur Callbooks wanted. W8EH, 801 Lakeshore, Grosse Pointe 36, Mich.

CANADIANS: Heath receiver SB-300, with three filters; Transmitter SB-400, brand new checked by factory at cost. \$950.00. First certified check. Collins receiver 75A-3, \$425.00; BC-221, \$60.00; Telrex Beam 10-15-20, \$75.00; Transmitter DX-100 \$150.00, L. Houle, 675 Fontainebleau, Duvernay, Montreal 40, Que., Canada.

ANTIQUE Radio tubes in original cartons OIA's, peanut tubes and others. Mohawk Radio Electronic Supply Ltd., 483 Water St., Newark, Ont., Canada.

CANADIANS: Sell Hallicrafters HT-37 sideband transmitter, like new, no modifications, \$450.00. Dud Meakin, VE7RV, 630 Howe St., Vancouver 1, B. C.

HAM Discount House. Latest amateur equipment. Factory-direct cartons. Send self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 170 Lockwood Ave., Stamford, Conn.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J., Tel. Garfield Area code 201-471-2020.

FOR Sale: Plate Transformers, 3600-0-3600 VAC @ 1000 ma. CCS, with 120/240 VAC primary. Commercial quality units carry one year unconditional guarantee. Price \$35.00. 4-1000A filament transformers 7.5 V.C.T. @ 21 amps., pr 110, 117, 125 VAC @ 60 cps, fully enclosed unit fits under 4" chassis, net wt. 9#, \$12.00. Write us for free estimates on any of your special transformer needs. Dummy loads, 32 ohm 1000 watt capacity. SWR below 1.3 to 1 from D.C. to 34 Mc. \$8.95 plus post net wt. 7#. Peter W. Dahl Co., 401 4th St. S.E., Minneapolis, Minn. 55414.

CASH For Your Gear We buy sell and trade. Send for free bargain list. H & H Electric Supply, 506 Kishwaukee St., Rockford, Ill.

WANTED: FR-2409 bandpass filter, State price. Pete Chalmant, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107.

CASH, Sony Transistor TVs, etc., swapper for G-R, H-P, L&N, etc. equipment, special tubes, manuals, military electronics. Engineering Associates, 434A Patterson Rd., Dayton, Ohio 45419.

75A-4 SN3956 w/vernier, \$375.00; 4-1000A linear w/ 3600 v. l. aps. \$295; Milten GDO, \$35; EV664, \$33.00; Dumont 304A DC-4C laboratory microscope, \$75; Tektronix 511 \$95; 513 \$175.00. KVV continuous linear w/power supply, \$115.00; Bogen BD-20 hi-fi amplifier, \$32.00; 250V 500 Ma. regulated p.s. \$19.00. All perf. condx. Tom Perera, K2DCY, 410 Riverside Dr., NYC, N.Y. 10025.

DXer Beware: A real bomb, York 5000 transmitter, 1 kw. using 4-1000A, bridge power supply, vacuum tuning condenser. Size 33" wide, 24" deep, 6 ft. high. Further details. Bill Brown, W6SYK, 28 Marine Lane, Hazelwood, Mo. Tel.: HEMPstead 4-5440.

SELL: Eimac 4X250B tubes. Guaranteed sud. \$6.50 each. \$10.00 pr. Prepaid in U.S.A. Send check or m.o. Everett Stidham, Jr. W5TLO, 72 South 30th, Muskogee, Okla.

FOR Sale: Hy-Gain HT-18 Hxtorner, \$50.00; Hy-Gain model 203, 3-el. 10" beam, \$25.00; Telrex 8-el. 2-m. beam, model 2-m. 814, \$8.00. W2UGM, 66 Columbus Ave., Closter, N.J. HT-32B, \$450. SX-115, \$375; Gonset Linear, \$250. Like new condx. K2HEA, 12 Elm, Lynbrook, N.Y.

PHASEMASTER Jr., SSB exciter with mike, HB-700 and 300V silicon power supply, 100 watt, 3000 Hz. work. \$43.00; 4X-250B tubes, new \$22.00 pair, excellent, used \$15.00 pair. 4X-100A tubes, \$5.00 pair, excellent; used, all tubes guaranteed. 2 1/2 in. Unicorn telescope, tripod and accessories, inc. camera. Cost \$360.00. Consider trades. C. M. Cy\* Pruett, Star Rte. C, Flamingo Bay, N. Ft. Meyers, Fla. 33903.

STILL Have Apache, SB-10 (together only) \$200.00. 75A-1 (cabinet perfect), \$175.00. Ron Samson, W0DCB, 3301 Mt. Vernon Rd., Cedar Rapids, Iowa.

COLLINS Owners: AM Kit, \$5.00! State model! KWM-2 independent receive control, \$15.00. Kit Kratt, B-763, Harlan, Ky. RITY Gear for sale. List issued monthly. 88 or 44 myb toroids, five for \$1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

4000 Radiowords for hams, German-English. Send one dollar bill to Christian Zangerl, OE9SZ1, Dornbirn, Austria.

HIGHLY Effective home-study review for FCC commercial phone exam preparation. Free literature. Cook's School of electronics, Box 100, Riverhead, N.Y. 11902.

SELL: Collins KWS-1 serial No. 644, 75A-4 serial 2036, \$1000; used very little. W2EQV, 17 Kenosha St., Albany, N.Y. 12209.

LINEAR, Coasts at 2 kw. P.E.P., 1 kw. AM or CW; 4000 v. power supply, 4-1000A tube, cabinet 5 ft. 9 in. x 22 in. You pick up, \$215.00. W8EW, 949 Maxwell Ave. S. E., Grand Rapids 6, Michigan.

C-E 600L linear. One owner, in mint condx. and in original shipping case; \$225.00. W4LEN, Box 257, Norcross, Ga. 30071.

UN-UGLY American desires responsible position for U.S. firm in Europe. Dev., Prod., planning and systems. Engineer for W.E., T.I., LMSC, NSL and NAA, knowing both European and U.S. policies, procedures and protocol, spricht gut deutsch, francais aussi, svenska okso, some English, also interested in market research, marketing and P.R. Bien obligé d'attendre de vous, messieurs, would sell soul to the company store. Otto, 118 Sapphire St., Redondo Beach, California.

COLLINS Station, like new, original cartons. KWM-2, \$750; PM-2 p/s, \$110.00; CC-2 case, \$55.00; SM-1 mike, \$24.00; 312B-3 spkr, \$21.00. All f.o.b. Santa Ana. First check for \$940 for lot, I pay shipping, W6AHC, J. Schwella, 1071 Foothill Blvd., Santa Ana, Calif.

R-390A receiver for sale, excellent, \$750, or trade for Model 28 ASR. John Siehra, Box 5512, China Lake, Calif.

SALE: HW12, SB200, SB300, SB400, DX-60, HR10, SX-101, GR64. Name the kit you want. Wired or repaired. Lan Rich-131 Florence Dr., Harrisburg, Penna. 17112.

HT-37-HT-41, T-O-Keey, HA-1 Vibroplex paddle. Estate W2KSL, WB2JIT, Tel: 212-543-3016 New York City

FOR The Builder! We stock Bud, Johnson, LMB, Triplett, Spector, Air-Dup, Miller, G.C. and others. Electronics, Inc., 227 North Santa Fe, Salina, Kans.

COLLINS 75S-1; Has Watts Q-multiplier, recently aligned, in xcmt condx. First \$300 money-order takes it. Robert Aldrich, RD #3, U.S. States Island, AGB-5, c/o F.P.O. San Francisco, Calif. 96601.

SEND Your QST back-issue want lists to Mrs. Conrad Beardsley, 119 Wythburn Road, South Portland 5, Maine 04106.

HT-37, in factory mint condx, used less than 2 hours. Never even had lid lifted. \$450.00. Also HT-33A, 2 Kw. linear, PL-172 final, used very little. Mint condx, \$525.00. Merle Newton, K2KVV, 64 Bristol Road, Clinton, N.Y. 13323.

HOUSE, Custom-built estate home, ideal ham location, 400 ft. high point in Stamford ridges 35 miles from NYC. 3 bedrooms, den, 2 full baths, solarium, terrace, 2-car garage, sundeck, large kitchen, privacy. On landscaped acre: \$46,000. Two additional acres available. Financing arranged. WITZK, Erich Quast, Skymeadow Drive, Stamford, Conn. 06903.

MEASUREMENTS Model 801/467B, \$250.00; EICO 221 VTVM, \$20; TG-10, \$12.00. McElroy ink recorder, \$40. Need Bird Wattmeter and SG-66. W8RMH, 1910 Longpoint, Pontiac, Mich.

COLLEGE Round: Selling entire station: HT-32A, \$375.00; SX-111, \$150.00; HA-1 T-O keyer, \$45.00. All are in xcmt condx and no scratches! K9VKH, Rick Carstens, 435 S. Lincoln Lane, Arlington Heights, Ill.

NATIONAL NC-270 receiver, slight usage, like new. \$159.00. Wayne Hall, W3PBO, 1400 Owens Road, S.E., Washington, D.C.

SELL: KQ-170. In fine condition, with clock-timer, speaker, \$199.00. Performs like new. James Mortellaro, K2SPG, 4031 Wickham Avenue, New York, N.Y. 10466. Tel: 212-3244693.

SELL: Swan 350, \$325.00; 117C, \$65.00; DC-412, \$95. Complete deal; \$475, all new April, 1965. Trade for 75A-4 and Ranger. William Pettee, K9WYX, Princeton, Ill.

VHF Bonanza: Heath Seneca, \$135.00; Eico modulator, \$35.00; Heath Twoog, Series 00 WA2RAT, 3110 Kingsbridge Terrace, Bronx, N.Y. Tel: 212-543-5719.

MARAUDER HX-10, in perf. condx, \$210.00. Will deliver within 150 mile radius. K4DCX, 449 Wausau, Okemos, Mich.

SELL: Cush Craft 10-meter beam, like new condx. Pick-up deal only. Sry. \$15.00. Vignali, Tel: 212-721-4514.

SELL: Drake 1A, \$115.00. In xcmt condx. DX-60 with many extras, \$75.00. Jeffrey Feld, WA2ZWF, Tel: NI 9-9441. Brooklyn, N.Y.

RTTY Extra clean Telex Reconditioned Model 19, \$175.00. Model 14 typewriter repeater with keyboard and 14-TD; \$125.00. Sry. no shipping. New tested ML-6C21 tubes, \$15.00 each. W8CEG, Tel: 513-542-3643.

GETTING Married. Must sell: Hallicrafters SR-160, w/110 v.p.s. Xcmt condx. No scratches. Will ship. Asking \$275. K6PON, 6490 Cecilia Circle, Buena Park, Calif. Mail: P.O. Box 134 La Mirada, Cal.

KILOWATT Power supply for sale. Alum chassis and 19" rack panel, voltmeter, milliammeter, relay, FW bridge silicon rectifiers, 3000V 350 Ma. Sealed transformers and choke, oil capacitors, DeLuxe home-built. \$90. Collin A. Campbell, W1PFD, 9 Laurelmont Ave., Danbury, Conn.

WANTED: Collins mechanical filter F-455C-08 or F-455C-05 for 75A-3 recvr. W2AAU, 85 Coolidge Ave., Spencerport, N.Y.

HEATH DX-60 and HG-10, perf. condx, \$75.00. W2MOT, 16 Raynor Ave., Mt. Vernon, N.Y. 10552.

NOVICES! Knight T-60, LC-1; Heath GR-64, HD-11, manuals, low-pass filter, phones, key, cable log, 1965 Handbook, Q-dial. Equipment in perfect condx, \$90.00. Shipped RR express collect. Rex Brown, 17948 Beardsley, Castro Valley, Calif.

COMPLETE 6-volt mobile; TBS 50D; 100 amp. Lece-Neville alternator; Gonset Triband converter; Gonset noise-clipper, antenna. Everything \$95.00. George Jones, 25 Willard Street, Melrose, Mass.

WANTED: At a reasonable price: Johnson KW Matchbox with VSWR meter and T-R relay. Also pair of 4-400A tubes. K2AGU, 309 Cherry Hill Blvd., Cherry Hill, N.J. 08034.

MUST Sell: SB-33, SB1-DCP, SB1MB, CM9P mike. Hustler with resonators for 75 and 20 cables, manual, like new. Will deliver within 200 miles for positive cash sale. All for \$250.00. K1VBF, Murray Ritcey, Central St., Ashburnham, Mass.

COLLINS 32V-2: TA-33 Jr., Make reasonable offers. HM-11 refl. power meter, \$10.00. Dow-Key DK-60-G2C relay, \$8.00. Steve Ames, K3MZZ, 6909 Brook Mill Road, Baltimore, Md. 21215.

FOR Sale: Hallicrafters SX-100, \$150.00. Want: Mechanical filter F455D-12 for Collins 75A-3. John Rutley, K3BYV, 2703 Harmon Rd., Silver Spring, Md. 20902.

SELL: Johnson 750W P.E.P. Matchbox with SWR unit. Like new condx. \$50.00. Old QSTs. CO. 73. PE: \$2.00 a year. Cash and carry. K6ARE, 206 Gregory St., Fairfield, Calif. 94533.

FOR Sale: Heath HW-32 (like new), with Gimbal mounting bracket; speaker, mike. All new parts, instruction book, to convert to 20/40/80 meters included. Delivered free: \$146.00. K3AJM, 3117 Jeffrey Road, Baltimore, Md. 21207.

ANTIQUE Collectors attention! Selling my accumulation of Western Electric VT-1 tubes. These are World War I types. Unused, \$2.00 each postpaid. Samkofsky, 201 Eastern Pkwy, Brooklyn 38, N.Y.

PRAWNEE. A steal! New, factory engineer-wired transceiver, used only 8-10 hours for tests. Includes internally-wired Nu-visor preamplifier, mobile mounting, and 8-element Hy-Gain 2 mtr. beam. First check for \$195.00 takes it express collect. W81Q, Benton Harbor, Mich.

SELL: T-150-A, \$80; NC-155, \$100.00. Both FB. Complete, \$150.00. Call 69-589-1983. Write WB2FJE.

WANTED: SW-240 or Heathkit Marauder, Trade B & K T-V analyst model 1076, new condx. W2ZBK, C.C. Reed, Box 17, Allen Junction, West Virginia.

GOING Overseas. Must sell NCX-5 and NCX-A. \$15.00 for them both. Also Adcom 250 mobile power supply. Like new condx. \$55.00. WA7RCL, 1757 Gregory Dr., Layton, Utah.

SELL: SX-101 Mk IIIA. \$170.00; D-104, \$17.00; TB-50. \$30; AR-22, \$20.00; 40 ft. Spaulding Tower, \$60.00. K9VLM, 404 S. Lincoln, Urbana, Ill.

SELL: Perfect HT-41 for any reasonable offer. P.O. Box 3332, Lafayette, La.

SB-300 Kit, \$210.00. K3JFV, Crumrine, Jr., 18 W. Front St., Media, Penna.

HAMMARLUND HQ-100, \$100.00; Lafayette Crystal converter, HE-56, 6-meter 7 Mc.-11 Mc. input, \$20.00. Nathan Rosen, 2945 White Plains Road, New York 67, N.Y.

SELL: SX-101-A, spkr., \$220.00; Viking II. VFO, JT-30-C mike, \$120.00; 275-watt Matchbox, separate SWR Bridge, \$45.00. R1SEB, 28 Allin St., Mystic, Conn. 06355.

DX-100B, in xcint shape, with low-pass filter, mike included, \$99.00. G. Perhac, W3WRQ, Lehigh Plaza Apts. D-8, Bethlehem, Pennsylvania 18018.

HAMMARLUND HQ-170-A receiver, \$280.00. In xcint condx. WAOPY, Herman Friedsam, 1019 Greenwood Dr., Perry, Georgia 31069.

KWM-2, high serial number perfect rig but have too little time to operate it. \$710. W9NYS, R 2, Medford, Wis.

FOR Sale: Clegg Zeus and Interceptor. Reasonable. C. Doby, 110 Lafayette St., Copiague, N.Y.

SR-150, first \$425.00 buys SSB for Xmas, AC and DC power supplies plus 10-C mic. included. W2IAB, 302 Bear Ridge Road, Pleasantville, N.Y.

SELL: Warrior, \$150.00, HT-32, \$255.00. Both in mint condx; more SASE. Want: Heath color generator. Cecil Phelps, 44Hill, Box 47, Delco, N.C.

HQ-129X Hammarlund receiver with Heath Q-multiplier, \$100. Terafit 2-meter converter, \$20.00. All in xcint condx, with instr. manuals. W2NDJ, 215 Tyrconnell, Massapequa Park, L.I. Tel: 516-PY-8-8664 Evenden.

HEATH DX-60, \$55.00; HR-10, \$55.00; Q-Multiplier QF-1, \$5.00; HW-32, used for only 10 hours, complete with new HP-23 AC p/s and PTT mike, will sacrifice at \$140.00; Globe Deluxe VFO 6-160 M only \$45.00; Mosley V-4-6 10-40 M vertical w/guys, \$15.00, WB2HGN, 76 Woodland Ave., Summit, N.J. Tel: 201-273-7878.

FOR Sale: SX-101A, \$200. HT-37, \$250.00. J. Roseman, K9UKJ, 12th St., Moline, Ill.

WANTED: Commercial or military, airborne or ground. Equipment and test sets. Collins, Bendix, others. We pay freight. Ritco, P.O. Box 156, Annandale, Va.

KWM-2 and AC supply with single band KW finals, all bands HV supply sale or swap for travel trailer or aluminum boat with outboard motor K3VLL. Telephone 33441, 583 Arch St., Meadville, Penna.

COMPLETE Station for sale: Heath Apache with instruction book, \$185. RME 6900 rcvr, less spkr. with instr. book, \$200. Both in A-1 condx. Low hours operation. W2IXH, RD 4, Newton, N.J. Tel: 383-2437.

CHRISTIAN Ham Fellowship now being organized for Christian Hams for fellowship, tract ministry among hams, missionary efforts and testimony. Christian Ham Callbook, \$1.00. (donation). Free gospel tract for hams. Write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Mich.

SELL: SX-99, DX-20, WRL-Modulator, Johnson VFO, Mike, Stals, Q-Multiplier. Take all for \$125.00. In xcint condx. K3AVV, Marc Egnal, 5223 Diamond St., Philadelphia, Penna. 191.

PARKS, 2-meter converter, 29 Mc., I.F. \$37. Postpaid, George Wall, 22 Ritchie Rd., Lynn, Mass.

ELMAC AF-68, PMR-8, M1070 AC-DC supply, almost new, in xcint condx, \$345.00. Dale M. Johnson, K9VUJ, Ettrick, Wis.

SELL: Mint DX-100B, \$110.00; want HT-37, HX-10, HX-500, InVander-200, Lavern Smith, 3104 Catherwood, Indianapolis, Ind.

COLLINS 755-1 with 500 cycle filter, 32S1, 516F-2, 312B4, 10-D mike with PTT stand, used less than 10 hours, will ship in original boxes: \$950.00. W. C. Dewberry, 314 Interbay Ave., Pensacola, Fla. 32507

HALLICRAFTERS SR-150, AC and DC/PS, mobile mount, spkr. mike in mint condx, original cartons and manuals: \$500. WAA4EB.

SACRIFICING: Complete station due to marital problem: 2 KW P.E.P. 1-4 KW AM home brew rig. 7 ft. rack "commercial looking." Pr. 4-400A final. Pr. 810 mod. Modern design. High qual. comp. throughout. HT-32B exciter and SX-101A rec. late models. Prov. for straight-thru oper. Will install ready to go at your OTH pick-up deal only. Tot. orig. cost over \$2,500. (Ex. labor) Must be seen to be appreciated. Comp. price \$1190.00. Tel: 516-CA-1-2404. WA2EBS., Formica, 1300 Greenbriar Lane, No. Bellmore, L.I., N.Y.

WANTED: 75A-4 high serial nr. with noise-blanker, 3.1 and 800 cycle filters. Sell Paragon regenerative receiver Model III3, Bob Baird, W9NNS, 524 Crestwood Drive, Des Plaines, Ill. 60016.

FOR Sale: HT-37, \$270; P & Ld. scope, Model DI-1 w/TT-1, two tone oscillator, \$45.00. B. C. Huckleberry, 1021 Ruppel-Apt. 48, Pueblo, Colorado.

SELLING Station: Will accept best offer above minimum. Call or write for list. Examples: BC-221 frequency meter with calibr. book, minimum \$25.00; Ameco 6M converter, minimum \$10.00; Howard Mark, WA2TNZ, 1460 Beach Ave., N.Y., N.Y. 10460. Tel: SY-2-2651.

RECEIVER: NC-183 in mint condx. Includes narrow band FM adapter and 100 Kc tail calibrator, \$100. K3SJJ.

NC-303 Receiver, \$235.00; Ranger I, \$110.00; Knight R100A rcvr., \$60.00; Matchbox \$40.00, 36 in rack, \$10.00. W2FNT, 18 Hillcrest Terrace, Linden, N.J. Tel: 201-486-6917.

MOBILEERS: Warn thieves, prowlers, vandals, etc. away from your car. Attractive \$2, 4, 3 color, dual read as follows: Warning: The Electronic Equipment installed in this vehicle is licensed and supervised by an agency of the Federal Government of the United States. Tampering with this equipment, including antenna, is a Federal offense, punishable by fine and imprisonment. Mobile emergency disaster communications, 3 decials, \$1.00. Quantity discount on request. J. Brinsley, WA2LPV, 18 Carlisle Place, Merrick, N.Y. 11566.

SELLING Out: Drake R-4, HT-37, HT-41, WA2ZVJ, Leviton, 2115 E. 27th St., Brooklyn, N.Y. Tel: SH 3-2525.

SELLING Collins 75A-1, \$150.00, 32V-3, \$175.00. Overvender, K7URP, 4012 N. 54th Place, Phoenix, Ariz.

10% Discount from WRI's Blue Book prices on quality used gear without trade-in. HT-32, \$275.00; Communicator III (2 or 6), \$169.00; Communicator IV (2 or 6), \$219.00; SX-101A, \$219.00; SX-117, \$269.00; PSA63 250-watt Universal p/s, \$19.00; Mosley CM1, \$95.00; NC-300, \$175.00; NC-303, \$269.00; SBE-33, \$249.00; Galaxy 300, \$219.00; CE-200V, \$429.00; Valiant, \$199.00. Free catalog. We buy for cash. Inquire. Write Leo, W0GQ, WRL, Box 919, Council Bluffs, Iowa.

MANUALS for surplus electronics. List 106, S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

SALE Or Trade: Johnson Messenger, CB, Lincoln CB, Connor Novice rcvr., Mon-Key keyer, H-B linear, F.D. 80, 4M, 100V, 200V, regulator, 6M pre-amp, Mobile antenna, I looking for cheap transceiver. K9RGH, 9600 S.W. Highway, Oak Lawn, Ill. 60453.

SELL: National NC-109 rcvr. clean, in gud condx, just factory rep. aligned, \$87.00. Preche TX-1, in xcint physical and electrical condx, \$162.00. Offer local sale. Will deliver to the Philly area. Want: gud, reasonably priced Drake 2A or 2B, K3UI W, 286 N. Spring Garden St., Ambler, Penna. Tel: MI 6-7086.

COLLINS 755-3B in mint condx, s/n 16773 manual, wrenches and pliers, \$490.00; also SX-96 R-46B spkr. and calibr. \$100. Dave Peterson, WA5AWW, 11305 Garfield Ave., South Gate, Calif. Tel: 213-630-1791.

WANTED: A & F coils for National HRO-50T rec. R. Rasmussen, 1927 S. 90th St., West Allis, Wisconsin 53219.

SELL Apache transmitter in gud condx; \$140.00 or will trade for Drake 2B, Joseph Holstein, 103 1/2 Lincoln, Mount Clemens, Michigan 48043.

APACHE, \$160.00; SB-10 SSB Adapter, \$65. Both for \$200. In mint condx. Steve Getelko, Rte. 1, Box 405X, Redwood Valley, Calif.

SELL: Heath HX-20 transmitter, \$160.00 and HP-23 p/s, \$30. Both for \$185.00. WA2ZSM, 67-48 181 St., Flushing, L.I., N.Y. 11365. Tel: OLR-0837.

ANY Fair offer, mint condition. Johnson's Viking Vallant I, Matchbox, filters, Hallcrafters SX-101A, RME ant. booster, Hy-Gain Tri-Beam, CDR Ham-M, Trans-Code osc.; code monitor, Ameco 2 & 4 meter converters, ant. multi switch, electr. switch, mike Atlas DS-10, Webster, Ekotape #11 recorder (needs work). Jerry Barr, 3130 Brighton 6 St., Brklyn, N.Y. 11235.

FOR Sale: DX-40 and VF-1, hardly used. Elmac A54-H mobile xmtr, 50 watts all bands, Heath HP-1 p/s, 12 VDC to 500 VDC, 150 mls. Will consider trade on a Ranger II, G-76 or 4" reflecting telescope. Roy Welter, KOCNI, Olivia, Minn.

ATTENTION Foreign hams. DX Clubs, make extra money for ham equipment by swapping with me used stamp mixtures which you gather. Send for details. Bob Murphy, Box 57732, Webster, Texas 77598.

EIMAC new 4CX1000A; first \$100. W1TK, J. E. Wilkinson, Box 162, Westport Point, Mass.

FOR Sale: Thordarson T16P02 power transformers, 3130 center-tap 500 mls, \$15.00; 300 watt Class B modulator, complete with Thordarson "HT Multi-Match input and output, less meter and tubes, \$25.00. W2PTI.

MODEL 15 Teletype complete with stand, etc. Gud condx. \$150.00. Will not ship, sry. W2SAD, 196 Madison Ave., Mt. Holly, N.J.

COLLEGE: Wanted electric typewriter, selling: RCA Vidicons, 1575 kc. xtal, 432 mc. preamp; 2-ART26 transmitters, UHF Ham TV converter, Waters dummyload wattmeter, Radar Sentry, Gonset 2 meter Sidewinder, Clegg interceptor, Heath HX-30, GPL camera, color TV, Heath test equipment, 4-8 element Telrex 2-meter beams, plus more. Write for list. WB2GKF, Stan Nazimek, 506 Mt. Prospect Ave., Clifton, New Jersey 07012.

SELL: NC-183D, matching speaker. Select-O-Ject, absolutely mint condx; \$170.00. DX-100, xcint, 370.00, Fred Martin, WB2AZX, 445 Division Ave., Hicksville, L.I., N.Y.

LATEST Model Hallcrafters SX-101A with matching speaker. In factory fresh condx. \$275.00, K1DYT, Mackenzie, 85 Lawyer Lane, Norwich, Conn. Tel: 887-8392.

EIMAC 4-1000A air system socket. Cast aluminum, Mounted by-pass condensers. A rare item. \$15.00. K2EGL, 5 Stratford Pl., N. Babylon, L.I., N.Y.

WANTED: TM-11-692B-1 for ART-13. Dienes, WA3BNH, RD #1 Rochester Mills, Penna.

SELL: HE-45B 6M transceiver, \$65.00; 6M Squalo antenna, \$10.00; Coax, misc. connectors, Todd, WA4IPB, 1902 Queens, E-5, Winston-Salem, N.C. 27103.

SB-200, factory carton, best offer. K9TZZ, 4617 Maryland, Gary, Indiana.

EXCELLENT Condition: DX-100, \$75.00; HQ-110, \$115.00. Many more amateur, test gear items, books, etc. Send SASE for list. Frank Dahm, 91 Aluminum City Terrace, New Kensington, Penna.

SX-111 Hallcrafters receiver in like-new condx, \$145.00. K3PSW, 640 Trephanny Lane, Wayne, Penna. Tel: 215-687-3194.



GUARANTEED A-1 reconditioned equipment on approval. Terms: Central 600-L, \$179.00; 100-V, \$345.00; Collins 75S-1, \$299.00; 30L-1, \$349.00; 75A-4, \$395.00; 75S-3, \$449.00; 30S-1, \$795.00; KWM-2, \$795.00; Hallcrafters SX-99, \$79.00; SR-42, \$149.00; HT-41, \$199.00; SX-101A, \$219.00; National NCX-3, \$239.00; NC-2000, \$395.00; NCX-5, \$445.00. Other equipment. Write for lists. Henry Radio, Butler, Mo.

SELL: NC-190, general coverage receiver, manual, original carton, in exc. condx., \$145.00; R-22 rotor with new hard ware, \$22.00; enclosed relay rack, 56 panel space, \$20.00; Heath Model 0-11 scope, manual, little used, \$50.00. George Rulfs, Jr., K1FRF, RFD 1, Rte 113, Sebago Lake, Maine. Tel: 207-642-2442.

FOR Sale: GST 1946-1960 with seven binders, \$35.00; CO 1952-1962, with two binders, \$20.00. Panoramic indicator 455 kc., 0-200 Kc sweep, 115v, 60 cycle, \$60.00. G-R wavemeter, #75A, 55-400 Mcs., \$7.00. W8RJG, 640 Snowhill Blvd., Springfield, Ohio 45505. All F.o.b. Springfield.

NEW Eico 753 Tribanders custom-wired and tested, \$229.00. W8FAX, Box 182, Allen Park, Michigan.

HEATH Warrior kilowatt linear amplifier, \$175.00; Numechron Call-Indict 10-minute Timer, \$5.00. Max Burch, 342-10th Ave. North, Fort Dodge, Iowa.

DRAKE TR-1, one and one half years old, \$400. Roger M. Handy, W7BXE, Det. 12, 11th KBSSW, P.O. Box 5, Babbitt, Nevada.

SWAN 350 with power supply, barely used, \$385.00; SP-600 receiver rack mounting, aligned, \$325.00; perf. condx. receiver Zenith Transoceanic transistors like new, \$170. K7SPH, Box 4099, Tucson, Ariz. Phone 623-1278 evenings.

SELL: DX-40 xmitr, \$35.00; NC-109 rcvr with matching spkr, \$95.00; HG-10 VFO, \$30.00 or all for \$150.00. Stuart Leiman, WB2OMH, 78 Fallon Ave., Elmont, L.I., N.Y. Tel: 516-GE7-4147.

VIKING 6N2 with 6N2 VFO and spare 5894 tube, \$110.00; Heathkit Twoer with 12V DC supply and Hy-Gain Halo antenna, \$40.00. Frank Seaverns, K0MNQ, 9190 Ogden St., Thornton, Colorado 80229.

NC-300, in mid condx., \$125.00; Apache, in wkg condx. and SB-10 SSB adapter, \$110.00. You pay freight. Radio Club, Maryknoll Seminary, Glen Ellyn, Illinois 60137.

SWAN-400, 420 VFO, 117B AC supply, Spotless, w/manuals. Best offer over \$90.00. WB2NDQ, Doyle, 30 Omaha Drive, Cranford, N.J. 07016. Tel: 201-276-2302.

WANTED: 1500 cycle Collins mechanical filter for 75A-4. W5EDX, 645 East Woodlawn, San Antonio, Texas.

MOVING: Excess gear parts, instruments. Bargain List, SASE. W2OE, 55 E. Redell, Freeport, L.I., N.Y.

JOIN Our Amateur Thrift Club. Pay cash and save. Write for details. Joe DiMare, Box 20672, Dallas, Texas 75220.

HEATH HR-20 with homebrew power supply; DX-40, make offer for all or part. Don Kutz, #12 Glen, Oglesby, Illinois.

COLLINS KWM-1, 56F-1 AC supply. Top shape, \$295. Get ready for the sunspots! 500 kc Heath Q-multiplier (for 75A-1), \$7.00. You need it! C. Jaeger, 2735 Mission, San Francisco, Cal. 94110.

HY-GAIN Topper, 75M, complete, new, \$12.50. Hy-Gain 40M traps, \$7.50. Brass chassis, capacitors, instructions for 432 Mc. British converter, Robert W. Curry, W9UYM, 5227 E. 21st St., Indianapolis, Ind. 46218.

HALLCRAFTERS SX-101A, HT-32, HT-33, in exc. condx.; \$600. Will separate. Tom Leach, K9ROR, 4616 Wilson Ave., Downers Grove, Ill. (Chicago suburb). Tel: WO-9-1185.

FALL Specials: 75A-4-\$395.00; 75S-1-\$295.00; 75A-1-\$135.00; 32V-1-\$125.00; 370 Slicer-\$69.00; NC-155-\$159.00; NC-188-\$98.00; SX-140-\$89.00; S-40B-\$59.00; HQ-170-C-\$185.00; HQ-129X-\$99.00; HQ-116-\$129.00; SW-240 (date) \$35.00; AF-68-\$425.00; C-4ME69-\$85.00; CSB100-\$210.00; AF-68-\$99.00; PMR-8-\$99.00; AF-67-\$49.00; Invader 200-\$85.00; Valiant-\$139.00; New HT-37-\$350.00. Howard Radio, Box 1269, Abilene, Texas 79604.

COLLINS 32S-1, 75S-1, 516F-2 with speaker. Immaculate, without a scratch. Guaranteed in perfect condx. \$750.00. Firm. K5BZW, 2098 B Falcon Place, Kirtland AFB, N.M., 87118.

HALLCRAFTERS SR-160, in mint condx., \$195.00. Swan SW-120. All factory modifications, slip-in mobile mount. Gud condx., \$110.00. Swan DC supply, Runs either unit, \$65.00. Hustler with 40 and 80 resonators; \$17.00. W4FPS, 657 N.E. 151 St., North Miami Beach, Fla. Tel: WI-7-7863.

SELLING 20A with VFO, \$130.00; HT-40, \$55.00. Waters Clippcamp, \$15.00; VFO HG-10, \$28.00. postpaid. W3EPV, 817 Hamilton Bl., Hagerstown, Md. 21741.

QSTs For sale: 1936 thru 1963, in perfect condition. Also for sale: Complete station, ready to go on air, better than good condition. HT-32 with HT-31 500 Watt Linear and SX-101 Mark III. Reasonable. H. C. Kranich, 390 Riverside Drive, New York N.Y. 10025. Telephone: MO-2-9822. Area Code 212.

FOR Sale: HT-37, in perf. condx. in every respect; \$265. K1VOL, 595 Main St., Cromwell, Conn.

FOR Sale: Mobile Elmac AF-67, PMR-7, M1070, complete, \$135.00; DX100, \$125.00. CE-20A VFO \$135.00. M. Schwartz, 166-36 24th Road, Flushing, L.I., N.Y. 11357.

GOING 160. Swap broadcast Command receiver for 1.5-3 Mc. unit W0BHA, Robb, Box 17, Bird Island, Minn. 55310.

SIX Meter package! New, never used; SR-46, MR-40 mobile kit, Hy-Gain IH6BK Halo, Turner 350 mike, Hy-Gain 63B beam, complete, \$150.00; Hallcrafters HA-10 LF converter, \$15.00; Eico 430 3" scope, \$35.00; WRL SN1 mike and stand, \$5.00. F. S. Brestert, 1133 Wisconsin, Detroit, Mich. 48204.

TRADE Offer: TR-1X 500 transmitter for quality telescopic lens for Hexax Spotmatic. Box #16 and so forth. W9OKM, 1207 Oneida St., Joliet, Illinois 60435.

CLEGG 99'er. In perf. condx. Any reasonable offer. Also D-104 mike, portable beam. Hugh Rodman, 6525 Sheridan Road, Chicago 26, Ill.

FOR Sale: DX-60 mint condition, \$65.00. Building SB-400, Lyle, WA8PYD, 1120 W. Green, Hastings, Michigan.

STATION DX-60, \$75.00; HG-10, \$32; Johnson Bug, \$15.00; all in perfect shape. Write WA5IBV, "Matt", 422 Rutema, Harlingen, Texas.

APACHE TX-1 transmitter, \$149.00. National NC-173 receiver and speaker, exc. condx, \$95. K4JIF, 1204 Evans Road, Aiken, S.C.

15s and 19s-60 Wpm and tested. Waiver deal. Also typing units, baskets, XDS, tables, covers, etc. Will ship anywhere, well packed. Send SASE and your needs for quotation. Leslie Johnson, WA9HDG, RR 1, Tinley Park, Ill. 60477.

VIKING II and VFO, \$85; HQ-150 and spkr, \$90; 3-el. Tri-bander, \$30.00. Stiffler, K6CZK, 1501 Spencer, Santa Rosa, Calif.

SPECIAL Gear made up to order from magazine or Handbook articles. 8 kits wired. Your own ideas worked out. Morgan, W5-KRC, Box 88, Keithville, Louisiana 71047.

THUNDERBOLT For sale. Sorry, no shipping! Contact W8OF, 495 Swanson Road, Saginaw, Mich.

WANTED: Hammarlund HC-10. Give details. W9ZDO, 420 Exchange, Crete, Ill.

CRYSTALS Airmailed. MARS, Marine, SSB, Nots, Novice, etc. Custom finished circuit stabilized F1-243 any kilocycle .017-3500 to 8600 \$1.90, (five or more \$1.70) (Ten or more same frequency \$1.35 each). 1700 to 3499 and 8601 to 20,000 \$2.50. Overtones supplied above 10,000. Add 50¢ each for .005%. Add 75¢ each for HC-6/4 miniature above 2000. ARRL kits; Crystals for "DCS-500" "IMP" \$9.95. Low frequency filter and oscillator crystals, SSB and other kits and crystals. Airmailing 100 crystals \$1.00. (Includes 100 crystals). Crystals since 1913. C.W. Crystals, Box 2065-0, El Monte, California.

SYLVANIA Percent Modulation Meter, \$15.00. W5ALA, 4531 Fairway, Dallas, Texas.

PRINTED Circuit materials. Three sample pieces and details, one dollar. Betty Nolin, 35 Arbor Drive, New Hartford, N.Y.

RANCH House QTH in quiet professional neighborhood near Bell Labs and Fort Monmouth. Trees and open area on 3/8 acre. Seven rooms, 1 1/4 baths, attached garage. Ham shack study and tower, with beams. R. Silberstein, WA2UZO, 38 Knollwood Drive, New Shrewsbury, N.J. 07724.

LATE Model SX-101A, plus R48-A speaker, used sparingly, perfect, \$250.00. Factory wired Eico 720, never used, perfect, in carton, \$85 or best offer. Eico 723, mint condx. \$35 or ur best offer. J. Czar, K1PWO, Poutney, Vt.

DRAKE 2-B, used less than 2 hours, like new condx. \$199.00; crystal calibrator \$13.00. Elvin Miller, 3845 Kipling Ave. So., Minneapolis, Minn.

MOBILE Rig complete: Johnson Viking mobile transmitter and VFO, 5 bands, 600 watts, Elmac PMR-8 receiver. Transistor power supply powers receiver, amplifier, exciter. Mike antenna, relay, cables, filters, antenna, manuals. In exc. condx. All for \$190.00. Marv Polan, W2MVS, Tel: IN-14919, 140-39 34th Ave., Flushing, L.I., N.Y.

CV-57 RTTY converter. In exc. condx. but minus most tubes except oscilloscope; \$39.00. John Lonsley, W2ANB, 1623 New Scotland Rd., Slingerlands, N.Y.

KWS-1, exc. condx. clean, \$750; KWM-2, 351D-2, 516F-2 with speaker, and Adcom mobile supply for KWM-2, never mobilized, \$895. Motorola 45 ampere alternator, transistorized regulator, universal mounting brackets, new, \$40.00. Inquiries answered. Offers considered. C. Jacobsen, 2001 W. Cone, Greensboro, N.C.

GPR-90, used less than 10 hours. Will sell or trade for tape deck, mono or stereo. A. Bruno, 185 Hall St., Brooklyn 5, N.Y.

TR-4 \$480.00; AC-3, \$66.00; DC-3, \$108.00. All factory sealed, never opened. Warranty, naturally. Sell separate. G. M. Palmer, K4LGR, Box 10021, Greensboro, N.C.

KWS-1 top serial #775, with all accessories, blower, cables, etc. In exc. condx. original owner. \$325.00. W4KLS, 1006 Seaway Drive, Ft. Pierce, Fla.

TELEPRINTER Parts. Fast service. WANYF, Schmidt.

COLLINS 51J3-3888UR, perfect, \$400.00; NCL-2000 5 hrs. time, \$550.00, perfect. Prefer local deal. Will ship. William E. Lyons, W7WRS, 4200 Lorna Place, Las Vegas, Nevada.

SELL: HW-22, HP-13, and HP-23, mint condx throughout. Best offer. W0QNB, Norm Coenen, Dunlap, Iowa.

SWAN 240 Transceiver with manual in original container. Swan SW-117AC and Adcom 250-12 DC supply. Now stored. All like new condx. Will ship F.o.b. to first certified check or money order over \$325.00. Robert Thomas, 406 Irving Ave., Glendale, Calif. 91201.

NCX-5, NCXA, mobile bracket, all 10 Mt xtals, brand new condx. Warranty still good. \$600. WB2QFR, Joe Heffler, 2200 Morris Ave., Bronx, N.Y. Tel: 295-1694.

COMPLETE Collins S/Line: 32S-1, 75S-3, 30S-1, 312B-4, and 516F-2. All in perfect operating condx and appearance. Will sell 30S-1 separately, \$1700 buys all or \$750 takes the 30S-1. Fred Watts, WA5SB, 2516 Sheridan, Laramie, Wyoming.

HEATHKIT SB-15 plus power supply, \$50.00; 2-#13s, good, \$4.00 each; Dow-Key OK-HOC coax antenna relay; \$6.00. W4KC, 2392 Eardley, Cleveland 18, Ohio.

K1LOWATT Amplifier, Loudspeaker Mark IIA, factory 3000 WDC p/s, in exc. condx, spare rectifiers, manual. Perfect condition. QR-150/160 or similar exciter; \$325.00. Joe Loconsio, K5CJT/6, 1485 N. Beale Rd., Marysville, Calif. 95901.

HW-32 Transceiver, in gud condx, \$105.00; HP-14 DC-W p/s for Heath compact linear (HA-14), never used, in beautiful condx; \$90.00. Leece Neville alternator, 12v. 60-100 amp., \$30. W6BMF, John Permen, 11861 West St., Garden Grove, Calif. 92640.

KWM-2 and 516F-2 AC supply, \$650.00, certified check. H. L. Parrish, W5PSB, P.O. Box 9915, El Paso, Texas 79989.

DRAKE 2-B, in mint condx, factory carton, \$185.00; Novice station; Heath HR-10, 30 watt xmitr, multimeter, ant. tuner, etc. \$75.00. Myron Adams, 644 Riverside Dr., New York, N.Y. 10031.

SELL: 32V-2, manual, exc. condx, \$130.00. W9CJR, Rte. 1, Mt. Sterling, Ill.

SELL: New HI-32B, \$475; new E-Z Way RBX-60-3-G tower, \$400.00; rec'dt. SX-101A, R-47, \$250.00; MM-2 "scope", \$65; Televue #26. Table, relay, \$75. VTM, \$25. WA2WMP, 86-91 188th St., Jamaica, L.I., N.Y. Tel: 212-SP-6-8163

HALLICRAFTERS HT-37, 144 watts of 599 and signals, \$270; Matching SX-111, extremely sensitive and stable, \$160.00; combination only \$400.00. Write to Jesse J. Tepper, WB2KYV/2, 83-20 98th St., Woodhaven, L.I., N.Y. 11421.

WANTED: QSTs 1916 to 1920 inclusive. Government Call-books, Fleming, de Forest, Moorehead, Audiotron tubes. Marconi and Wireless Specialty receivers. Private collection. Top prices. John Cain, 1101 Belle-Meade Blvd., Nashville, Tenn. 37205.

WANTED: Swan 120, SBE or 2 mtr. Sidewinder. Please state price and condx in your first letter. Trade or sell SP-600JX10, AF-67, PMR-7, M-1070. Will Nishimoto, 208 Haight St., Menlo Park, Calif.

MUST Sell: Knight T-150A xmtr, \$85.00; R-100A receiver with S-meter and speaker, \$90.00. Johnson 1-R switch, \$10. Knight SWR meter, \$10. All in like-new condx. Will ship. K0IQD, Box 387, Ordway, Colorado.

LATE 75-A4, serial #5717. Three filters, .6, 3, and 6 kc. Vernier knob. Recently lab checked and aligned. First cashier's check or money-order for \$450.00, takes. Bill Moore, K5HTF, Box 5344, Oklahoma City, Okla. 73105. Tel: SJU-9-2893.

CLEAN Equipment works better, sells for more! Vacuum cleaner nozzle, 3/8" x 8", \$1.50. Spitzer, Box 4095, Arlington, Va. 22204.

USH CRAFT A50-5 6M beam. Unused, \$13.00. F.o.b. QTH. WA1BFK.

SELL: 75A-3, exclnt condx, \$245.00; 75A-4 (.5, 3, 6 kc filters), \$420.00. G-E voltage stabilizer, 1.5 kw. (230 v.), \$35.00. 4-250As, \$10 each. W0AIIH, 814 4th St. S., Virginia, Minn. 55792.

HQ-170C, speaker, mint condx \$195. WA1FAV, 150 Chace Ave., Providence, R.I.

SELL NCX-5 and NCX-A PS, \$590.00; 75S-1 receiver, \$275.00. Both units in mint condx w/original boxes. George B. Lagaly, WSNTL, Rte. 3, Box 79c, Oklahoma City, Okla.

HAMMARLUND HQ-129X with Heath O-multip., \$125.00. Also Globe Scout 680-A, \$45.00. Both are in exclnt condx. Dave Ford, Box 546, Patagonia, Ariz. 85624.

SELL: SX-117, only five months old; extra xtals, \$320.00; HA-10 tuner, \$18.00; Lysox 600 xmtr, \$25.00; 833 tube, \$15.00. Riders manuals, \$5 each. Ben Hass ell, W8VPC.

KWM-2A, 516F-2, 312B-4, MP-1, 30L-1, 180S-1, MM-1 package, 5114 separate. Best offer. Call WB6BLF, tel: 408-422-2903.

SELL: DX-100, Knight R-100, tall calibr., spkr, \$165.00; HD-11, O-multip., \$9.00. All in kud condx. Bob Cummins, WA5-GAW, 612 Huguenin Dr., Beaufort, S.C. 29902.

VALIANT F/W with blower, \$185.00 or will consider reasonable offer. In exclnt condx. Make sked to hear. K3ONI, Fritz, Royersford, Penna. Tel: 215-948-8544.

CIRCUITS from ARRL Handbook, OST, CO, etc. constructed. All work guaranteed. Free information. WA6IKV, Whitmore, 3240 Machado Ave., Santa Clara, Calif.

TRI-EX 4-section 72 ft. tower, \$125.00; SX-42 receiver all-bands, up to 108 Mc, base, reflex spkr, like-new, \$125.00. Ham-M rotator, \$70. WA6MSE, 6803 Amestoy Ave., Van Nuys, Calif. Tel: D-4-1736.

HT-44, SX-117, AC/PS, EV664 mike, \$500.00 cash and carry. W2NVX, Fair Lawn, N.J. Tel: 797-9652.

SELL 2-meter SSB Hallicrafters transverter HA-2 with Ameco Nuvistor preamp, \$175.00. W2OJC, Bob Dzula, 54 Charles St., Clifton, N.J. Tel: 201-779-0639.

FOR Sale: APR-4 receiver with pulse analyzer and Panoramic adapter, tunes 40 to 1000 mc. Tuners available to 4000 mc. TV projection tubes, Donneau, W1YIX, 11 Blanche Ave., Cumberland Hill, R.I.

NEED Cash. Must sell: HQ-110C, Knight T-150A. B&W low-pass filter, Knight SWR/PWR meter, bug, JT-30 mike and phones. \$225.00 plus shipping costs takes all. Original cartons and manuals. WA1AHI, Jennings, 47 Allen Rd., North Haven, Conn.

SUPERB Fidelity Stereo components: (2) ARC-A speakers, \$40.00; Dyna-Stereo 70 amplifier, \$85.00; Dyna PAS-3 pre-amp., \$62.50; Dynatuner FM-3, \$85.00; AR Turntable-880P cartridge, \$65.00. Guaranteed perfect. Less than one year old. H. Martin, Box 1275, Bluefield, W. Va. 327-9234.

CENTRAL Electronics 100-V, like new condx, \$325.00; Drake 2B with calibrator and T-R switch, \$135.00; G-E 60-watt taxicab 6-meter transmitter and FM receiver with AC supply and controls, \$20; 2-meter ARC-5 receiver with modulator, less 832 tubes, \$7.50. Command transverter 2.13 mc less cover, \$2.50; 3.47 mc less tax, \$3.50; Telectra 2-meter converter, 10.1 mil. meters, \$1.50; tubes 813—\$5.00; 3B2B, \$1.50; 2E26, \$1.00; 3E29, 416B, \$3.00. New 6-meter Halo \$6.50. You pay shipping costs. W2TJZ, 101 Christie St., Tenatlay, N.J. Tel: 201-568-1267.

BOOST Reception—3.4—30 megacycle SK-20 Presselector kit, \$18.98. Boost modulation, AAA-1 clipper-filter kit, \$10.99. Postpaid! Literature free. Holstrom Associates, Box 8640-T, Sacramento, Calif. 95822.

BARGAIN: Spotless SX-101 Mk III, including manual and original carton. Modified for Heath Ham-Scan. Only \$135.00 cash. W6FRB, 1011 Oak Grove Ave., San Marino, Calif. 91108.

ANTIQUE Freed-Eisemann Neutrodyne, \$38.00; Radiola #18, \$28.00; Goose-neck horn, \$10.00; Edison cylinder machine with morning-glory horn, \$160.00. Columbia 1898 cylinder gramophone as is, \$28.00. (Trade). Par-Metal enclosed rack, 4 ft. \$11.00. W2FZR, 28 Whitson St., Forest Hills, L.I., N.Y. 11305. Tel: BO-3-4806.

COLLINS 75A-4, speaker, xclnt, \$350.00. Tardc for 30L1. Paco scope S-35. \$60.00. DeBard, 3384 Heights Dr., Reno, Nevada.

VHF, Heathkit Seneca. Like new condx, \$135.00. Robert Wolfe, W3HDT, 19 Virginia Ave., Baltimore 36, Md.

SELLING OUT: SASE for Goodies list. K9RGH, 9600 S. W. Highway, Oaklawn, Ill.

CLOSEOUT: Discontinued full-size beams, new 7/8" and 1" aluminum; three-element, 20-meter, \$22.00; two element, \$16.00; three element 15-meter, \$16.00; two element, \$12.00. Shipped express collect. Gotham, 1805 Purdy Ave., Miami Beach 39, Fla.

"HOSS-TRADER", Ed Moory offers demonstrator equipment at fantastic bargains on Cash & No Trade Deal: SR-500, \$319.00; SB-2 Linear, \$199.00; Swan-350, \$339.00; KWM-2, \$839.00; TR-4, \$459.00; TR-3, \$399.00; SBE-34, \$329.00; 30L-1, \$399.00. New A-33 Beam and Demo HAM-M Rotor \$169.00; Drake R, \$319.00; T-4X, \$329.00; NCX-5, \$549.00; NCL 2000, \$539.00. Reconditioned Gear: SB-33, \$199.00; Swan-240, \$209.00; TR-3, \$389.00; HT-37, \$239.00; 2-B, \$189.00; Johnson Ranger 2, \$149.00; HQ-140-X, \$89.00; Galaxie 300 transceiver, \$179.00; SR-160, \$199.00; 20-A, \$89.00; 200-V, \$389.00; GSB-100, \$159.00; 30L-1, \$339.00; HAM-M Rotor, \$79.00; 32S-1, \$399.00; 75S-1, \$289.00. Ed Moory Wholesale Radio DeWitt, Arkansas. P.O. Box 506 Phone Whtney 6-2820

HEATH HW-32, 20-meter transceiver, with HP-13 mobile power supply. Like new condx, factory aligned, \$160.00. WA4ITK, 4031 Woodridge Rd., Miami, Fla.

VIKING Kilowatt amplifier including spare tubes. Will consider any reasonable offer. Dr. Paul Haus, 25 Upland Drive, Channahua, N.Y.

WANTED: Hy-Gain 18 Mt. Hy-Tower or Johnson "Matchstick". Will dismantle and pick-up within 100 mile radius. Call or write A. J. Bertolisi, W2ALT, 382 Fulton St., Farmingdale, L.I., N.Y. Tel: 516-CH-9-0923 anytime.

GLOBE Scout 680, \$35.00; Globe LA-1 linear, \$70.00; NC-18D, \$100.00; Globe Hi-Bander, 6-2, \$70.00. Real bargains exclnt condx. ARS, WB2LIX, Mike Aloia, 6130 Fieldston Rd., Bronx, N.Y. 10471. Phone K1-9-8884.

GALAXY III Transceiver with A.C. supply, in new condx. F.o.b. Lincoln, Nebr. \$275.00. Dean Hofer, W0LXP, 1420 West Avon Lane, Lincoln, Nebr.

BRAND New Drake R-4 receiver won at Hamfest. First certified check for \$300 gets it. George Frazier, Sebago Lake, Me.

WANTED: Converters and cabinet for NC-300. Send frequency and price to Bill Dawson, 1412 Smoketree Ave., Las Vegas, Nev.

SELL: Clegg 99'er, \$89.00; Shure 440 mic/stand, \$10.00. Kellersman, Stonybrook Road, Darien, Conn.

TV Monitor for sale or swap. General Radio for TV channel 5. Five u.v. tubes, one frequency modulator, monitor, two frequency deviation meters, one visual transmitter frequency monitor, one frequency monitor. About \$3500 original price. Write for details, make offer. Gene Hubbell, W9ERU, Box 350, R.R. 4, Rockford, Ill.

DESPERATE: Need 800 cycle filter for 75A-3. K6CNV, 6617 Rocklawn Avenue, San Diego, Calif. 92111.

1965 USA Callbook, \$2.75; 1965 DX Callbook, \$1.75 postpaid. Sept-Dec. 1964 QSTs, 25¢ each. Sept-Dec. 1964, CO 25¢ each. 1965 QSTs, 30¢ each. COs 25¢ each. Postpaid, W21BL.

COLLINS 30S-1, late serial, complete with spare new, unused 4CX1000A, 400; 75S-3, latest serial 14386, in original carton, \$400; 312-B4 in sealed carton, \$125; 5113, serial #6597, absolute mint condx with gear ratio knob, \$55.00. All F.o.b. W9VY, 400 Blomington Rd., Ithaca, Illinois. Tel: 312-773-1123.

WANTED: Collins 800 cycle mechanical filter, F455C-08 for 75A3 receiver. W2CUS, J. Meadow Lane, Roseland, N.J.

400 QSTs, 1917 to 1955. Putting out to highest bidder. List furnished on application. SASE plz. Broken runs, singles, etc. Condx xclnt to fair. Many desirable issues. Sold as a lot only. No bids received after December 15th, sry. Fred A. Jeswine, Ex/W7BIZ, 547 N.E. 105th St., Seattle, Washington 98125.

COLLINS 75A owners, tuning knob 6 to 1 reduction, \$7.00 postpaid. J. W. Wenzelarc, W4VOF, 1517 Rose St., Key West, Fla. 33040.

WANTED: Two metal cabinets for SP600JX. State size, price, condx, etc. K6QQL, 4725 Bridle Trail, Santa Rosa, Calif.

WANTED: 400 pf. 5 kv. and 1000 or 2000 pf. 3 kv. vacuum variables; counter dials. H. J. Wayt, 4021 Villa Nova Ave., Balto., Md. 21207.

WANTED: Collins mechanical filter F455JO5 for 75A-4 c.w. W4LGU, 7024 Gail Drive, Norfolk, Va. 23518.

SELL: HW-12 transceiver, PH13 DC supply, GH12 mike, speaker, \$170.00; Johnson 275 Matchbox, SWR, directional coupler, \$65.00; DX35 transmitter, VFL VFO, \$50.00. WB2JFE, Levine, 19 Jackson Ave., Washington, New Jersey.

HQ-170C, spkr; both in mint condx, \$225.00. K2BUS, Tel: 516-CU5-8589.

DX-100, modified for SSB. Gud condx. Hy-Gain vertical with loading coil. PMK6, W2GUB, Marty Snyder, W2UGB, 154 Springdale, Buffalo, N.Y. 14226.

FOR Sale: To raise money college tuition: National NCX-3, \$225; NCXA ac power spkr, \$75; Heath Sixer HW-29-A transceiver, \$40; Matching 6/12 vdc supply, \$40. All in xclnt condx. Curtis, K3RKK, P.O. Box 102, Centre Hall, Pennsylvania 16828.

COLLECTORS! "HFL nine in line Superhetrodyne" receiver, in fair condx. Telemeagone Magnovox spkr, patented 1913 and 1920 to P. L. Jensen and E. S. Pridham, no horn. Tubes: Cunningham CX12, CX301A, CX22, CX201A, CX171A. Radiotron, WX12, UV201A, UX226, O1A, De Forest Audio 447, Magnovox type A Permatron (3 volt), Invader 200, \$250. 75A-4 Ser. No. 4527, 3.1 Kc. filter, \$375. Both \$600. Chuck Camp, Box 40, Peyton, Colorado.

COLLINS VFOs, new, unopened cartons for direct replacement. 70E-24 for 75A-4 \$49.00; 70E-23 for KWS-1, \$39.00; 70E-12 for 75A-2-3, \$39.00; 70K-1 for KWM-1, \$29.00; 70J-3 for R390A/BFO, \$29.00; 399B01 DX adaptor for KWM-1, \$19.00; 399B-3 Noise adaptor, \$9.00. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

NC-300, recently aligned, instruction book, speaker, asking \$150.00; local sale preferred. Gary Foskett, W1ECH, 1 Marlon Place, Cromwell, Conn.

SIXER, \$30.00. K3JFV, 18 W. Front St., Media, Penna. 19063.

FOR Sale: Heath HD-11, O-multiplier, \$10.00; Knight KG-650 Signal Generator, \$15.00; BC-453 and 117 volt power supply, \$20.00, also, uncompleted VHF-114F (27-176 Mc.) receiver. Needs only about \$5.00 worth of capacitors and coils to work. Invested \$35.00. Will sell for \$20.00. Gregory Gebelc, 421 Second St., Lakewood, New Jersey, 08701.

HEATH DX-60, HG-10-VFO, \$85.00; HR-10 receiver, \$65.00. New condition. Addison E. Wilson, Box 393, Pineland Park, East Brewster, Cape Cod, Massachusetts.

COLLINS 32S-1, \$350.00; 75A-4, \$350.00; Telrex 4-element optimum spaced 20-meter beam, \$100.00. Dick Mitchell, W9KOK, R. 1, Box 59, Winnebago, Ill.

WANTED: U. S. Navy Panoramoscope (Panadaptor) Model OBH, unmodified and with cable and plug. J. W. Peiffer, W2TNS, RFD Southampton Court, Southampton, L.I., N.Y. 11968.

HELP Me rid my closet and basement of surplus amateur, CB and Marine equipment. Send for free listing. K9DNR, Box 183, Cicero, Illinois 60650.

QSTS: Complete, in good condition: January 1952 through December 1964. Am asking \$30.00 plus shipping charges. No singles sold. Will not break up run. K2AUC, 16 Sunset Terrace, Tenafly, New Jersey. Tel: 201-568-2669.

JOHNSON Ranger II, factory-wired, like new condition, \$200.00. K4AOZ, 572 Park Avenue, Bluff Park, Birmingham, Alabama 35226.

263 KILOWATT rated amplifier plate-circuit, 2-18 Mc., vacuum capacitors, variable coils, digital dials, R.f. current meter, \$150.00; R-55A receiver, \$50.00. Ned Westman, Route No. 4, P.O. Box 78, Wausau, Wisconsin 54401.

FOR Sale: Collins 75S-3B, 32S-3, 516F, 2 A.C. supply. Late serial Number, less than 5 hours operating time; \$1200.00. Perfect condition. Please send money or your certified check. Also: 1H6LX Beam, new, in carton, \$100.00. William Edgar Lyons, Sr., 4200 Lorna Place, Las Vegas, Nevada.

HV Supply 0-3200 with Variac, -150 v. bias, 7 v. 21 amp. silicon rectifiers, 21 mf. filtering, 127 meter; \$60.00. Also, all parts for 2 KW including \$175, \$50.00. Both for \$100. WASJLR, "Speedy" Peacock, 1211 Hillcrest, Jacksonville, Texas. Will ship collect. Richard S. Peacock, 1211 Hillcrest Dr., Jacksonville, Texas.

HAMMARLUND, Hallicrafters, Johnson, Eico, National, Bud, Illumitronics, Newtronic, others. Free reconditioned list. Electronics, Inc., 227 North Santa Fe, Salina, Kansas.

572B's-Matched set of 4—unused and guaranteed 2000 hours by Sineco, \$39.50 postpaid. Need mobile supply for YR-3, WA5DAJ, Len Maline, P.O. Box 1222, Garland, Texas.

FREE Delivery in the New York City area. QSTS 1947-1964; CQ 1957-1964, 73s, 1960-1964, 372 issues. Best offer. W2BJR, Vic Gomes, 47 Meritoria Dr., East Williston, L.I., New York 11596.

FOR Sale: Multi-Elmac, complete package AF-68 PMR-8 (ACDC power supply) Frame for mobile mounting, cables, antenna, mike. After reconditioned at factory, used only one hour. Looks and operates like new, \$275.00. Firm, Kenneth S. Johnson, K1APW, 13 Wetherell St., Worcester, Massachusetts. Telephone: 752-8102.

DB-23 Preselector wanted, K1JPR, Norman Feitelson, 22 Darbrook Road, Westport, Conn. 06880.

690V @ 450 Ma. plate transformers. No C.T. 117V primary. Unused. Sealed. Fine for bridge or doubler supply. \$3.95 plus postage. Weight 19 lb. A.R.C. Sales, P.O. Box 12, Worthington, Ohio.

EICO 723-Gud for Novice or as standby transmitter. Very fine condx. \$34.00. I will pay shipping. Al Togut, 5 Meadow Woods Rd., Great Neck, L.I., N.Y.

SELL: Brand new Eico Triband SSB transceiver, \$200 wired and tested, and Central Electronics 600L linear amplifier, \$175.00. Gerald Williamson, K4LXT, P.O. Box 203, Williamston, N.C. Phone: 792-2446.

HEATHKIT HX-20, \$180.00; HR-20, \$80.00. Both for \$250.00. HP-10, \$25.00; 100-watt 6-meter SSB Transverter with 5894 Final, \$25.00. Complete. 75-watt 6-meter transmitter, internal VFO, \$50.00. WA2FQA, J. Friedman, 246 Kenwood Ave., Elmsford, N.Y.

MAYDAY! College expenses forces student off the air. Humbly appreciate any equipment donations. WASAAO, 302 (three zero two) White Hall SHCS, Huntsville, Texas.

SELL: SX-28, Lysco 600 w/plate modulator and ant. tuner. Both are in excellent condx. Best offer over \$30.00 each. Bob Ensminger, 712 Locust, Lodi, Calif.

SALE: Collins 75A-1 and B&W slicer; \$160.00. W. Cecil, W5AAH, 4102 S. Troost Pl., Tulsa, Okla.

COLLINS KW-1 Deluxe transmitter, 1,000 watt AM or CW. Would make a fine SB linear, \$1400 or make offer. George F. Norton, W4EEE, Georgia University Station, Athens, Ga.

FOR Sale: Apache, Hallicrafters SX-100, virtually unused; will deliver within 50 miles radius of New York City or Ithaca, N.Y. Price: your best offer. Peter Narins, 107 Cayuga Heights Road, Ithaca, N.Y.

LAFAYETTE HE-45A 6-meter transceiver, with AC and DC cords, \$55.00; Gonset Super-6 converter, \$15.00; 12V transistorized mobil power supply. (See QST April 1958) \$25.00; home brew 10-meter "Single Bander" amtrr, \$20.00; "Gimix", \$4.00; all in good condx. Complete with manuals. Package deal for \$10.00. You pay shipping. Wanted: early gear made by Western Electric. Send complete description and price in your first letter. WA8COC, 3017 Hudson Dr., Cuyahoga Falls, Ohio 44221.

SELL: SX-140, \$70.00. Rebuilt Knight T-60, \$25.00. Both are in excellent condx for operation. WB2PAR, Tom Bellamore, 1090 Arlington Rd., New Milford, New Jersey.

WANTED: Heath IP-10 or IP-22 isolation transformer; Heath 10-10 DC 'scope; Heath GR-41 auto FM receiver; Heath Mo-hican receiver; Heath AA-1 or IM-22 audio analyzer; Collins FL-1 filter. Part No. 526-9337 or 526-9427. R. Arrowsmith, 1204 N. Evergreen St., Arlington, Va. 22205.

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that

*Lasts All Year*

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He won't turn up his coat collar to hide it.

He won't have to exchange it for one with longer sleeves.

He won't read it once and shove it out of sight.

It won't shrink.

And he'll like it whether he smokes or not.

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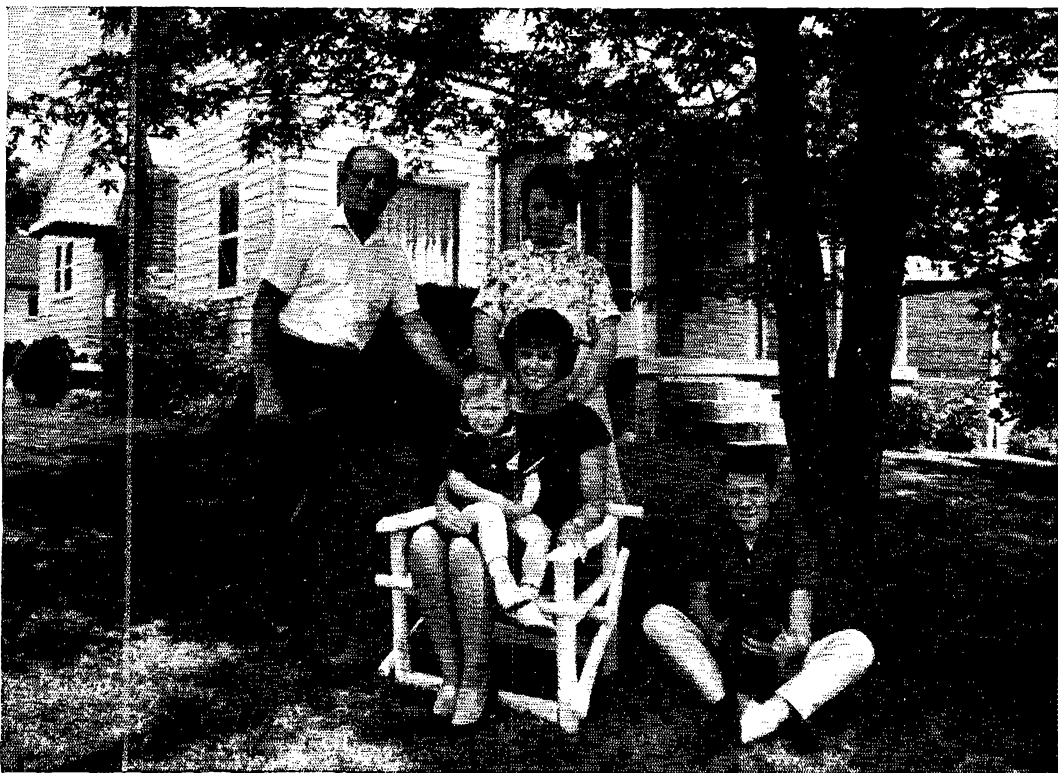
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## **How Herb Stephens (who couldn't save a cent) paid off a 12-year mortgage in less than 5 years**

Herb Stephens of Dayton, Ohio, is a great booster of buying U. S. Savings Bonds on the Payroll Savings Plan. For several reasons.

Herb has been on the Plan for a number of years. In that time he has used his Bond savings for a down payment on a new home, and then paid off his 12-year mortgage in less than 5 years.

Saving on the Payroll Plan is a real boon for people who find it hard to save at all. You simply tell your payroll office to set aside a small amount each payday, toward a Bond. You don't see the money so you don't miss it.

"I don't think I could save money any other way," says Herb, who is still on the Payroll Plan, saving for his children's education.

But there's more to Herb Stephens' story—because he is saving more than money. While Savings Bond dollars are growing, Uncle Sam uses them to help make sure the U. S. remains "the home of the free."

Look into the Payroll Savings Plan where you work. If you're like most Payroll Savers, you'll find you feel pretty good about it.

## **Buy U.S. Savings Bonds**

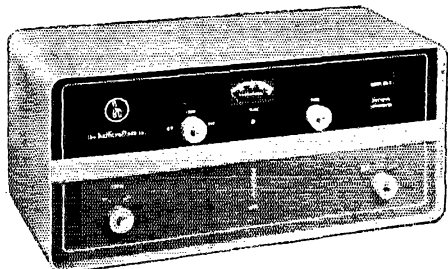
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FOR ALL AMERICANS



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# NOW! YOU CAN ENJOY SIX METER SSB/AM/CW WITHOUT TVI!

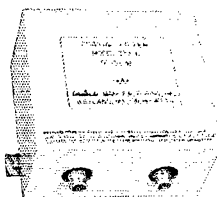
## OR YOUR MONEY BACK!



Whatever mode you are using — SSB, AM, CW, RTTY, etc. — this superbly engineered piece of equipment will do a perfect job of converting both received and transmitted signals for operation in any part of the 50 to 54 MC band. Broadband design, you QSY with your regular receiver/transmitter tuning controls. Nuvistor front end gives excellent sensitivity with low noise figure. RF output indicator facilitates easy tune-up for maximum power — up to 120 watts input!

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### *Waters* VHF COAXIAL FILTERS



New, resonant cavity band-pass filters. Double-tuned and preset at factory.

Absorbs practically all out-of-band spurious frequencies in output of transmitter. Improves reception by rejecting QRM from high-level out-of-band signals.

Insertion loss in 52 ohm line less than 1.5 db. Will handle up to 100 watts peak power output.

Model 373-6 (50-52 MC) .....\$32.50  
Model 373-2 (144-148 MC) .....\$29.50

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Get away from the QRM! Have fun on six. It's FB for VHF DX, local QSO's, rag-chews!

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Hallicrafters HA-6 Transverter, Brand new, fully guaranteed. Original Amateur Net .....\$349.50  
Matching P-26 Power Pack ..... 99.50  
Waters new 373-6 band pass filter..... 32.50  
Drake TV-300-HP filter. (To convince that neighbor with early vintage TV receiver!)---- 3.97

**\$300<sup>00</sup> OFF!** TOTAL — \$485.47  
**YOURS, FOR ONLY \$185.00**

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Buy the package, at the bargain price of only \$185.00. Try it out thoroughly in your shack.

If, for any reason, you are not completely satisfied, just return it prepaid within 15 days after you received it.

I will promptly send back your full \$185.00.

Fair enough? Send your order today, OM. TNX.

73 *Bil Harrison* W2AVA

OK, BIL:

Here's my \$.....

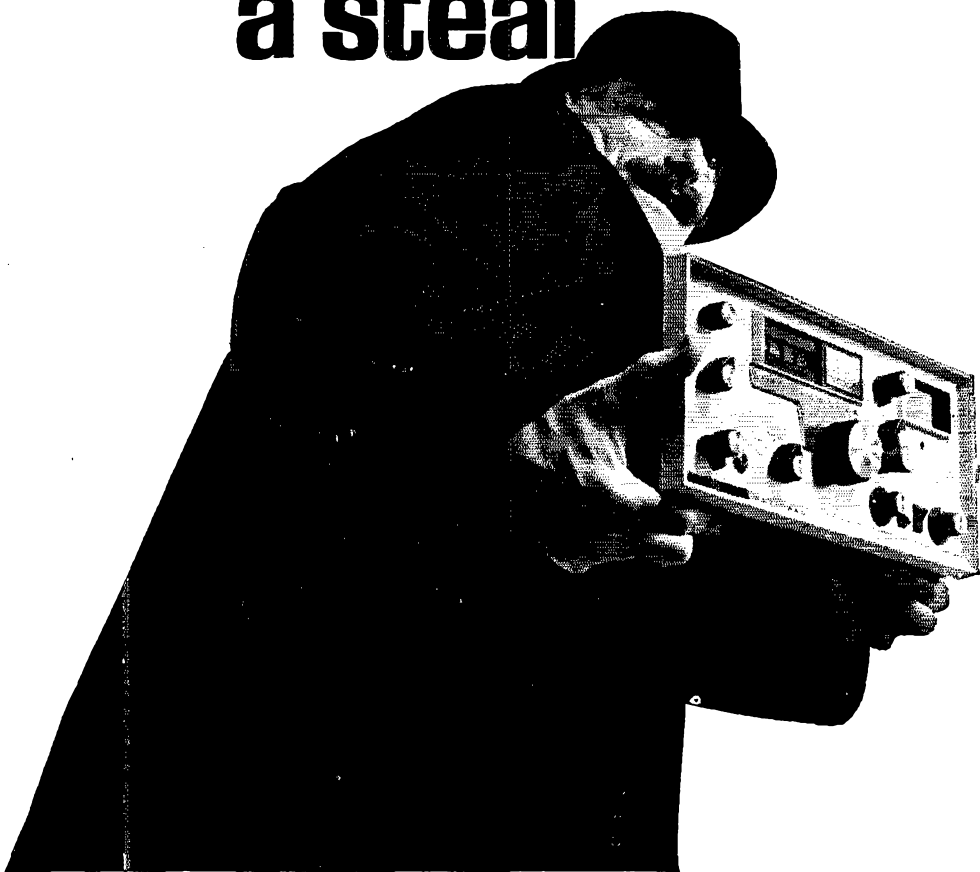
Rush your "Happy Ham/Happy TV Neighbor" Six meter bargain package to me.

I understand that for any reason I may return it prepaid within 15 days in original condition for full refund.

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# a steal



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- SK-3007 pnp type, RF, IF, and Converter Stages of ALL-WAVE Receivers
- SK-3008 pnp type, RF, IF, and Converter Stages of Auto Radios

SK-3009 pnp type, Audio Output Stages of Auto Radios

SK-3010 npn type, AF Driver and Output Stages of Broadcast Receivers

SK-3011 npn type, RF, IF, and Converter Stages of Broadcast Receivers

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SK-3017 Silicon Rectifier for color, B/W TV, Radios, Phonographs

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