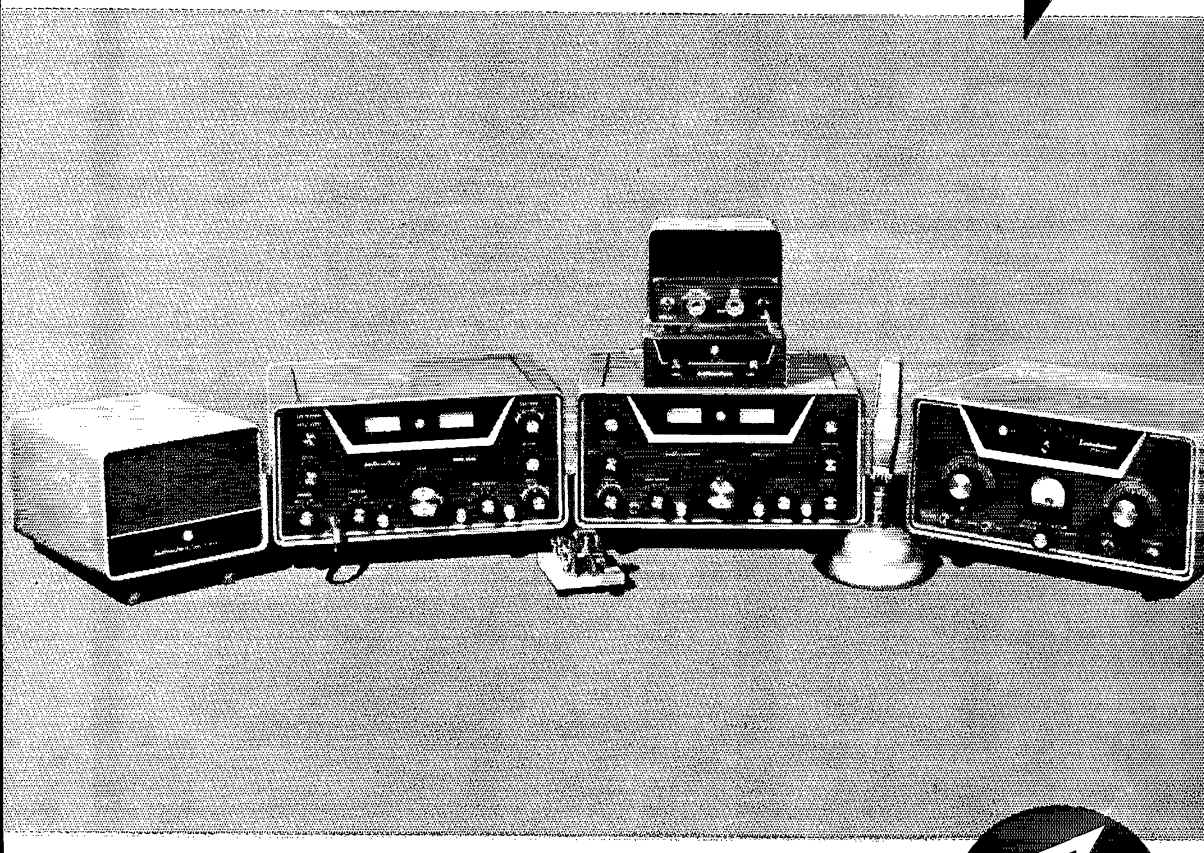

QST
amateur radio
50
List of Stations
American Radio Relay League
First Edition, 1914.
INTERNATIONAL MORSE CODE
GALENA
To Hiram Percy Maxim
A.R.R.L.
COMMEMORATING
50 YEARS OF A.R.R.L.
HARRY R. HICK

In amateur equipment, the only thing that counts is the fine print. So we've made the fine print big enough to read



hallicrafters

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Export: International Div., Hallicrafters

SX-117 TRIPLE-CONVERSION RECEIVER. Exceptionally versatile and compact triple-conversion, super-heterodyne communication-type receiver. Selectivity: Variable in 3 steps, 0.5—2.5—5.0 kc. Crystal-controlled 1st and 3rd oscillators. Selectable sidebands, constant tuning rate. Sensitivity: less than 1 μv on AM, less than ½ μv on SSB/CW. T-notch for up to 50 db. attenuation to unwanted heterodyne in I.F. pass band. I.F. type noise limiter. Audio inverse feedback. **Crystals** provide for 3.5—4.0, 7.0—7.5, 14.0—14.5, 21.0—21.5, 28.5—29 mc. Four addt'l. crystal pos. for 500 kc. segments between 85 kc. and 30 mc. 100 kc. crystal calibrator included. **Size:** 15″ x 7⅛″ x 13″. Net wt. 18 lbs. Amateur net price: **$379.95.**

HA-10 Low freq. tuner adapts SX-117 for 85 kc.—3 mc. **$24.95**

HT-44 TRANSMITTER. Versatile compact amateur band transmitter *for independent operation or **transceiving** with SX-117 receiver. SSB, AM, on CW on 80 through 10 meters. Features Hallicrafters **stabilized phasing system** for sideband generation with —40 db. of sideband suppression @ 1 kc. and carrier suppression of —50 db. Distortion products, —30 db. **VOX/CW break-in and PTT operation.** Panel-adjusted VOX/CW delay for maximum Phone-CW flexibility. **Exclusive AALC** gives greater talk power with speech compression up to 12 db. Power input 200 watts DC on CW and SSB, 50 watts AM. **Same size and style as SX-117.** Furnished with crystals for 3.5—4.0, 7.0—7.5, 14.0—14.5, 21.0—21.5, and 28.6—29.0 mc. Less transceiver cables, **$395.00.** P-150AC power supply, **$99.50.**

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P-150AC POWER SUPPLY. For use with HT-44 Amplifier. 5 silicon diode rectifiers, built-in speaker. **$99.50**

Note: We thought this phrase should be a LOT bigger

*for independent operation or transceiving with SX-117

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DXPEDITION: Gus Browning, W4BPD • NUMBER OF CONTACTS: Over 150,000 • PARTIAL LIST OF CONTACTS: Monaco, 3A2BW • Seychelle Is., VQ9HB • Seychelle Is., VQ9A • Assumption Is., VQ9A/AN • Cosmoledo Is., VQ9C • Aldabra Is., VQ9AA • Mobile at Sea, VQ9A/MM • Aldabra Is., VQ9A/7 • Chagos Is., VQ9A/8C • Diego Is., VQ9A/8C • Rwanda, Africa, 9U5BH • Burundi, Africa, 9U5ZZ • South Africa, ZS6IF/ • Swaziland, Africa, ZS6IF/7 • Basutoland, Africa, ZS6IF/8 • South Africa, ZS10U • Tristan Da Cunha, ZD9AM • Bouvet Island, LH4C • Durbin, So. Africa, ZS5JY • French Somaliland, FL5A • Reunion Is., FR7ZC • Reunion Is., FR7ZI • Comoro Is., FH8CE • Comoro Is., 5R8CE/FH8 • Tromelin Is., FR7ZC/T • Europa Is., FR7ZC/E • Glorieuses Is., FR7ZC/G • Juan De Nova Is., FR7ZC/J • Aden, VS9AAA • Kamaran Is., VS9KDV • Yemen, W4BPD/4W1 • Bhutan, AC5A • Tibet, AC5A/4 • Sikkim, AC3PT • Nepal, 9N1MM • Afghanistan, YA1A • Aden, VS9ASS • Bhutan, AC7A • Kenya, VQ4ERR • Malagasy Republic, 5R8CM • Mauritius, VQ8AI • Yemen, MP4QAR • EQUIPMENT: Collins S-Line: 32S-3 Transmitter, 75S-3 Receiver, 30L-1 Linear Amplifier, CC-2 Carrying Cases for each, PM-2 AC and MP-1 power supplies.

COLLINS

QST

MAY 1964

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—CONTENTS—

Happy Anniversary A.R.R.L.!

1964 marks the 50th anniversary of the founding of the American Radio Relay League. Eitel-McCullough, Inc. (30 years young in 1964) salutes the A.R.R.L. on the occasion of attaining the half-century mark in noteworthy achievements and leadership in amateur radio.

The vision and direction provided by the American Radio Relay League has strengthened and fostered the spirit of amateur radio at home and abroad. Continued mature leadership in the best interest of the Radio Amateur Service by the A.R.R.L. will insure that this unique avocation will prosper and grow during the coming years. All radio amateurs of good will salute the American Radio Relay League and join us at Eimac in wishing "Happy Anniversary A.R.R.L.!"

W1KKP
W1NZX
K1PRD
K2MTQ
W2UXY
W3YQM
W4TO
K4AIM
W5CGR
W5EYZ
W5FPV
W5SKL
K5QZC
W6ADK
K6AFH
WA6ANY
K6BAJ
WA6BAN
W6BAX
K6BCM
W6BDN
W6BHI
W6BMU
W6BZ
W6CEO
W6CDT
W6CHE
WA6CNL
W6DJI
WA6DPN
W6DVB
W6EXX
W6FBR
W6FJN
W6FKS
K6GJF
W6HB
W6IOH
W6IVZ
W6JBC
W6JFV
WA6JTZ
W6KEV
W6WWD
W6KM
W6LOZ
K6MIT
W6MJG
W6MUC
W6SC
W6AY
W6MWT
W6NBD
W6NGP
WA6NWR
WA6NXB
K6OAZ
W6ODT
K6OUS
W6PHS
WA6PMX
W6PUB
W6QD
W6RWI
W6RXW
W6SAI
W6SDD
K6SMM
W6TKJ
K6TNK
W6UF
K6UHC
W6UOV
K6VRQ
W6VW
W6OS
W1FEA
W6VYH
K6VQO
K6YEM
K6YKD
W6YSX
W6ZIU
W6ZLB
W6ZVV
K7BYQ
K7BZA
K7CQP
K7ELO
K7LFZ
K7OUM
W7SLC
W8QDI
W9IEU
W9RHV
WØAZY
WØAZT
KØGWH
KØIUN
WØNWW
VE3AHR
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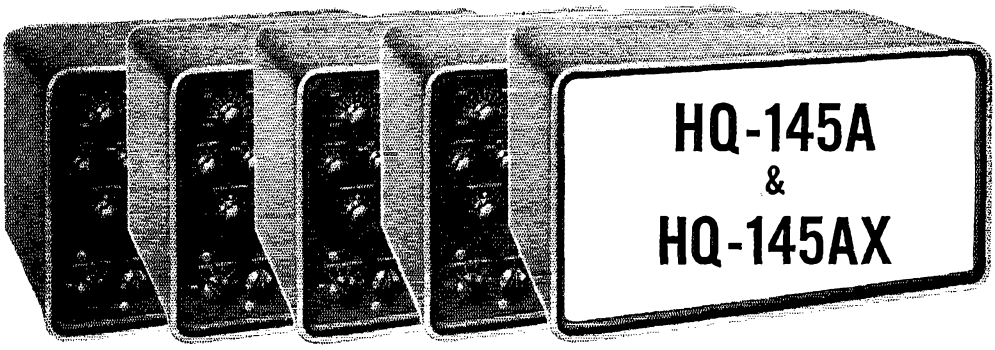

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A GIANNINI SCIENTIFIC COMPANY

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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members holding Canadian or FCC amateur license, General or Conditional Class or above. These include ORS, OES, OPS, OO and OBS. SCMs desire applications for SEC, EC, RM and PAM where vacancies exist. OES, v.h.f. bands appointment, is available to Technicians and Novice, as well as to full-privilege amateur licensees.

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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.

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VLF • LF • MF

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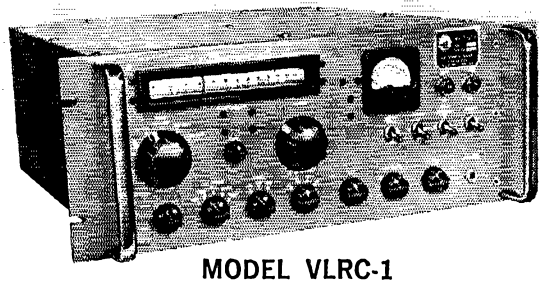
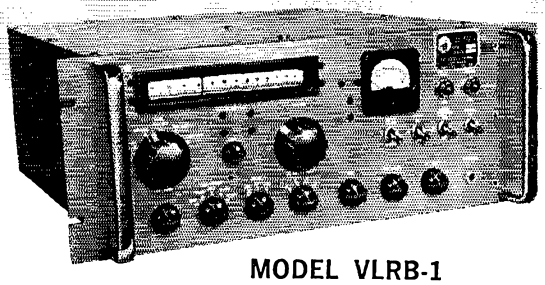
SOLID STATE

RECEIVERS



MODEL VLRC-1



MODEL VLRB-1

10 to 40 KC • 30 to 600 KC

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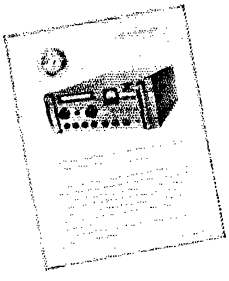
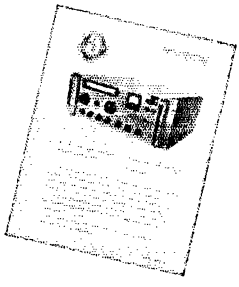
IN TODAY'S ERA OF ATOMIC WEAPONS, FREQUENCIES AT THE LOWER PORTION OF THE RF SPECTRUM (BELOW 600 KCS) ARE LEAST AFFECTED BY ATOMIC DETONATION AND ARE THEREFORE VERY IMPORTANT FOR COMMUNICATION PURPOSES. THESE FREQUENCIES ARE ALSO PROVEN TO BE A VERY RELIABLE RADIO COMMUNICATIONS MEDIA DURING PERIODS OF HIGH SUNSPOT ACTIVITY.



FOR VLRC-1
REQUEST
TB 3017

- CW, FSK, FAX, AM, AME
- 0.3 MICROVOLT FOR 15db $\frac{S+N}{N}$
- RF, IF and AUDIO OUTPUTS
- VARIABLE SELECTIVITY
- PERMEABILITY TUNING
- AVAILABLE SYNTHESIZED OR UNSYNTHESIZED



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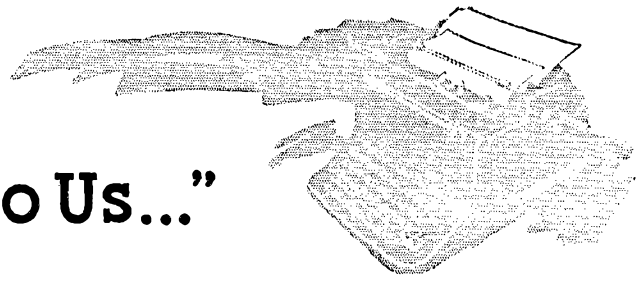


"It Seems to Us..."

1914-1964

WITH this issue of *QST* we commemorate the fiftieth anniversary of our American Radio Relay League. A span greater than the years of most of the amateurs of to-day, it offers an impressive opportunity to reflect upon the high estate to which team-work has carried us. In 1914, with amateur radio in its swaddling clothes, with the handful of amateurs a feeble voice crying in the wilderness of despair, ARRL existed only as a grand idea in the mind of our founder-president, its only asset his will to see the idea through. To-day we can look back upon fifty years of accomplishment during which we have builded our own unique coöperative association, healthy, mutually-owned, self-supporting, enjoying recognition as our spokesman, prestige as our representative before the world.

We like to tell the tale of how ARRL came into being. With the crude apparatus of those early days, amateurs could not talk from one town to the next. But an intermediate amateur could *relay* for them, if only there were some mutual understanding that each amateur would willingly so aid his fellows. Organization to supply this mutual need would work wonders, and if this spirit of one for all and all for one could help in practical operating, how much greater its opportunities in the realms of fraternalism and protection! And the organization should be owned by the amateurs themselves, not run for profit but for their common good.

This was the Maxim vision of 1914. How the idea took form is an enthralling story of coöperative accomplishment. Early birds remember the little brown callbooks, the map of relay stations with a dot for every member, the little blue-backed *QST*s mailed from the "office" in the attic of Tuska, our first secretary-editor, himself a college youth. Those were the beginnings. How richly the idea has succeeded is attested by the *QST*s of the years, and by our numbers and strength to-day, and is, we hope, reflected in this present birthday number of our magazine.

We hams of America owe something to the men who have built up ARRL. First and always is the Old Chief, Hiram Percy Maxim. And there is Tuska, founder of *QST*. Then there are the several hundred amateurs who during the years have sat as members of our Board of Directors, giving from their hearts of their time and thought that ARRL might advance. We always think with particular pride of that Board back in 1923 that deliberately voted itself out of office that ARRL might enjoy a truly representative form of government. And then there were those amateurs who lent the League thousands of dollars as working capital for the first two years after the war, with no security except their firm faith in a non-commercial amateur-owned society. These are but typical examples of the amateur spirit that has built our League.

Let us not forget to-day that we have achieved these things by mutual forbearance, by the control of selfishness, by team-work. We have created something that is without parallel in American life, representative of all that is fine in a good clean game. We may all be proud of it. Let us not be misled by those who, actuated by greed and jealous of our success, seek to take the control of our hobby into their hands and by planned misrepresentation are endeavoring to weaken our faith in our own selves. We have come a long way in fifty years, shoulder to shoulder. Together we have worked these marvels. We know that amateur radio has a rich destiny. Arm in arm we go on towards it.

K. B. W.

(Reprinted from May 1934 *QST*, updated only as to figures.)

ARRL 50th Anniversary Message – May 17th

W1AW and Others to Transmit Message of President Hoover to All Amateurs on Anniversary Occasion.

FIFTY YEARS AGO the American Radio Relay League was formally organized. The first ARRL application blanks were printed in May 1914. Each membership then was in effect a station appointment! League President Herbert Hoover, Jr., W6ZH, in an over-the-air commemoration of this occasion on May 17, 1964 will direct a special radio message to *all radio amateurs.*

W1AW	*C.W.*	*Phone*
Frequencies (kc.)	1805, 3555, 7080, 14,100 21,075 28,080 50,700 and 145,800	1820, 3945, 7255 14,280 21,330 29,000 50,700 and 145,800.
Times (GMT)	May 17 at 2100, 2300 May 18 0100, 0300, 0500, 0700	May 17 2000, 2200, 2400 May 18 0200, 0400, 0600.

Station (c.w.)	*Local time* (P.M.) *2:30*	*6:00*	*9:30*
VE3CYR (Ont.)	14,060	3535	1805 or 3535 kc.
VE2ALH (Que.)	14,080	7050	3530 kc.
W9HPG (Ill.)	14 Mc.	14 Mc.	3.5 Mc.
WØHXB (Colo.)	7060	3550	3550 kc.
VE7AC (B.C.)	14,025	7025	3525
W6ZF (Calif.)	14,040	14,040	3540

Station (Voice)	*Local time* (P.M.) *3:00*	*6:30*	*10:00*
VE3CFR (Ont.)	14,125	7190	3770 kc.
VE2ALH (Que.)	14,125	7190	3795 kc.
W9PRN (Ill.)	14 Mc.	14 Mc.	3.8 Mc.
KØKUP (Colo.)	14,300	7260	3940 kc.
VE7ALR (B.C.)	14,125	7190	3795
W6ZF (Calif.)	14,240	14,240	3900

All radio amateurs as well as all League members are invited to copy. Besides W1AW's transmissions we have arranged with stations in Canada, on the Pacific coast and in the central area to participate. This will permit c.w. transmissions in each area. These will be made at 2:30 P.M., 6:00 P.M. and 9:30 P.M. local time and voice transmissions at 3:00 P.M., 6:30 P.M. and 10:00 P.M. local times.

W1AW will send this message on c.w. (18 and 7½ w.p.m.) and voice, each hour all evening May 17. Starting with a voice transmission at 4 P.M. EDST and c.w. at 5 P.M. EDST, the official communication will be carried on all our frequencies. C.W. and voice will be used on alternate hours until station closing time.

Additionally W7BA (Seattle, Wash.) or an alternate, will follow a schedule as follows. 1000 PDST 14,275 kc. s.s.b.; 1015 PDST 14,275 kc. s.s.b.; 1030 PDST 3840 kc. a.m.; 1045 PDST 3970 kc. a.m.; 1300 PDST 14,275 kc. s.s.b.; 1900 PDST 3840 kc. a.m.; 2000 PDST 14,275 kc. s.s.b.

VE2ALH will transmit the Anniversary Message in a French language bulletin, the suggested frequencies as listed. VE3CYR will choose 1805 or 3535 kc. for evening use depending on conditions. VE3CFR will follow his 14,125 kc. s.s.b. schedule fifteen minutes later with an a.m. transmission on 14,175 kc., also by a 9 P.M. local time s.s.b. transmission on 3790 kc. KØKUP will make the official message transmission first at 9:00 A.M. MST on 3890 kc. s.s.b. with later schedules per the above table. W6ZF also plans additional transmissions. 1985 kc. c.w. at 2000 PDST, 1985 kc. voice a half hour later, and 144.2 Mc.

(Continued on page 28)

The Reason Why

By Hiram Percy Maxim, President A.R.R.L.

(Reprinted from September 1927 *QST*)

Sitting back in the old arm chair, with the last issue of *QST* read from cover to cover and with everybody else in the house asleep hours ago, I fell to thinking of amateur radio today and amateur radio of other days. As the blue smoke curls slowly upward from the old pipe, visions of early ARRL Directors' Meetings float before me. I see those old timers grappling with problems of organization, with QRM, with trunk line traffic and rival amateur leagues. I see sinister commercial and government interests at work seeking to exterminate amateur radio. They were dark days, those early ones.

Today I see Amateur Radio an institution, recognized by our American government and on the road to recognition by the other governments of the world. I see a fine, loyal ARRL membership of 20,000 standing shoulder to shoulder and believing in each other and still blazing the way in radio communication. I see a rapidly developing world-wide amateur radio brotherhood taking shape, in the form of our IARU.

And as the last embers of the old pipe turn to grey ash, I ask how it all came about; that the ARRL should have succeeded and all its opponents failed. The answer is clear. It is because with our opponents there was always some kind of a selfish motive to be served for someone, whereas in our ARRL we insisted from the beginning that no selfish motive for anybody or anything should ever prevail. Everything that ARRL undertakes must be 100% for the general good. That policy bred loyalty and confidence. With those two things an organization can prosper forever.

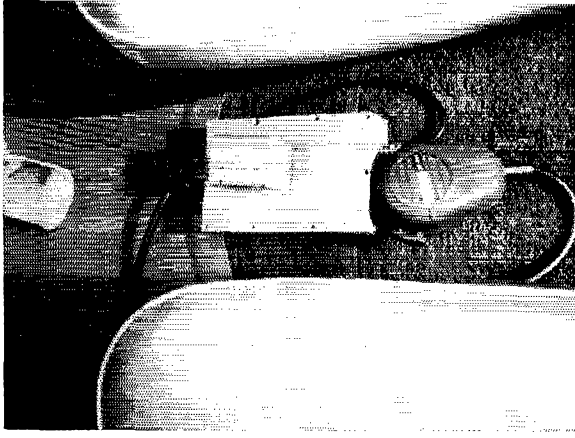


Fig. 1—The Mighty Midget 50-Mc. transmitter resting, with room to spare, between the front seats of the author's car. Its push-to-talk microphone is the only operating control.

An All-Transistor 50-Mc. Station

Transmitter, Modulator and Converter for Mobile or Low-Power Fixed-Station Use

BY EDWARD E. EWALD, JR., K2HXE

220 Beecher St., Syracuse, N. Y.

FOR the v.h.f. enthusiast desiring a transmitter with very low current drain and truly small size, yet having enough power to communicate effectively, let me present "The Mighty Midget," an all-transistor transmitter capable of up to 2 watts input on 50 Mc. A companion 50-Mc. converter is also described. Used with a 12-volt car broadcast receiver, the transmitter and converter make an effective mobile station, or they may be used for portable work with a lightweight 12-volt battery and a transistor broadcast receiver. The equipment has also been used for home-station work, using a 12-volt d.c. supply.

Convenience and ease of operation were the first considerations in the design of the Mighty Midget. There are no external controls, and once the unit is adjusted no further tuning is necessary. Because of its small size it can be completely hidden under the dash or in the glove compartment. The converter is similarly unobtrusive, and may be installed alongside the car broadcast receiver. The net result is a complete v.h.f. station that is a far cry from the mobile setups of a few years ago in both neatness and battery economy.

The Mighty Midget is complete in itself. With the use of 12-volt transistors a power supply becomes obsolete; power is taken directly from a 12-volt battery. The modulator is built into the transmitter, and push-to-talk circuitry is incorporated. The microphone switch turns the transmitter on and off, and it could also be used to control an antenna relay. The only external connections are for the battery and microphone.

Mighty Midget Circuitry

The transmitter crystal oscillator is a 2N706 n-p-n transistor in a modified Colpitts circuit, using a 50-Mc. third-overtone crystal. It has proven to be reliable and stable in operation. The base of transistor Q_1 is biased at about 2 volts by the voltage divider consisting of the 18,000- and 4300-ohm resistors. There is a voltage drop from base to emitter of around 0.7 volt, so the voltage at the emitter must be 1.3 volts. Now we can determine the emitter current to be about 3 ma. (1.3 470). The 5-pf. mica capacitor and the 50-Mc. crystal establish the feedback path, while the amount of feedback is controlled by the 43-pf. mica capacitor. The collector circuit, L_1C_1, is tuned to 50 Mc. Output is coupled to the next stage with a 91-pf. capacitor.

The first amplifier, Q_2, is run Class A, so that the oscillator will see a high impedance and will not be loaded down excessively. Class A opera-

Since the transistor first appeared on the radio horizon we've had many requests for v.h.f. gear using transistors exclusively, for both transmitting and receiving. Until recently, it has been possible to fill these requests only with extremely low-powered equipment, unless the builder was willing to spend a considerable amount of money. Now moderately-priced v.h.f. transistors capable of handling appreciable amounts of power are becoming available, as are r.f. amplifier and mixer types that will provide excellent receiver performance in the v.h.f. range. The transmitter described by K2HXE runs up to 2 watts input, and the converter has a noise figure comparable to that obtainable with tubes. The two units combined draw less current from a 12-volt battery than many vacuum-tube converters.

tion also gives high voltage gain. This stage is biased for about 40-ma. collector current. The 47-ohm series resistor will prevent transistor burnout due to excessive voltage from a car alternator or generator. Output is link-coupled to the following stage.

The driver, Q_3, also a 2N706, is mounted in a heat sink (Thermalloy No. 1107) to increase its permissible collector dissipation from 300 to 600 milliwatts. This stage runs Class C, and draws current only when being driven. Its output is link-coupled to the final amplifier, Q_4.

The output stage, a 2N2219 transistor, runs Class AB at a maximum input of about 2 watts. This transistor also is in a heat sink (Thermalloy No. 1101A) in order to permit it to operate safely at this power level. In air it would dissipate only about 0.8 watt safely. The transistor is biased to draw about 60 ma.

The modulator is simple and straightforward. It is the simplest form of modulation possible with transistors that will give good results and near 100 per cent modulation. The collector of Q_4 is modulated, and to a lesser extent its base. With a controlled-reluctance dynamic microphone, only one preamplifier stage, Q_5, is needed to drive the modulator, Q_6, 2N1306 and 2N1507 transistors, respectively. The modulator transistor is mounted in a Thermalloy No. 1101A heat sink, making it capable of a maximum dissipation of 2 watts, and more than enough output for modulating the final-amplifier stage.

Transmitter Construction

As the equipment is designed primarily for mobile and portable operation, it is important that solid construction be used throughout. Each unit was first built on a sheet-brass base, and then mounted inside an aluminum case made especially for it. The modulator portion of the transmitter was built on a printed-circuit board, though peg-board construction could be used. It is mounted in the final-amplifier compartment, as seen at the right side of Fig. 3.

The crystal-oscillator section is at the left. The crystal, upper left corner of Fig. 3, is held in place by a clamp of brass. It is wired directly into the circuit, but a socket projecting through the top can be used if ability to change frequency is desired. The 2N706 transistor is mounted on its associated components. Output is carried to the next section on a Teflon feedthrough bushing inserted in the brass partition.

The larger of the two center sections is the first amplifier stage. Its 2N706 transistor is upside down, to facilitate connection. One turn of wire (L_3) around L_2 couples the output to the next stage, also on a Teflon feedthrough.

The upper-center section is the driver stage, with its 2N706 transistor in its heat sink. Output is coupled by means of two turns, L_5, through the partition to the final amplifier. The various coils do not show clearly in the pictures, because of their small size and bright finish. The final-amplifier transistor, a 2N2219, and its heat sink

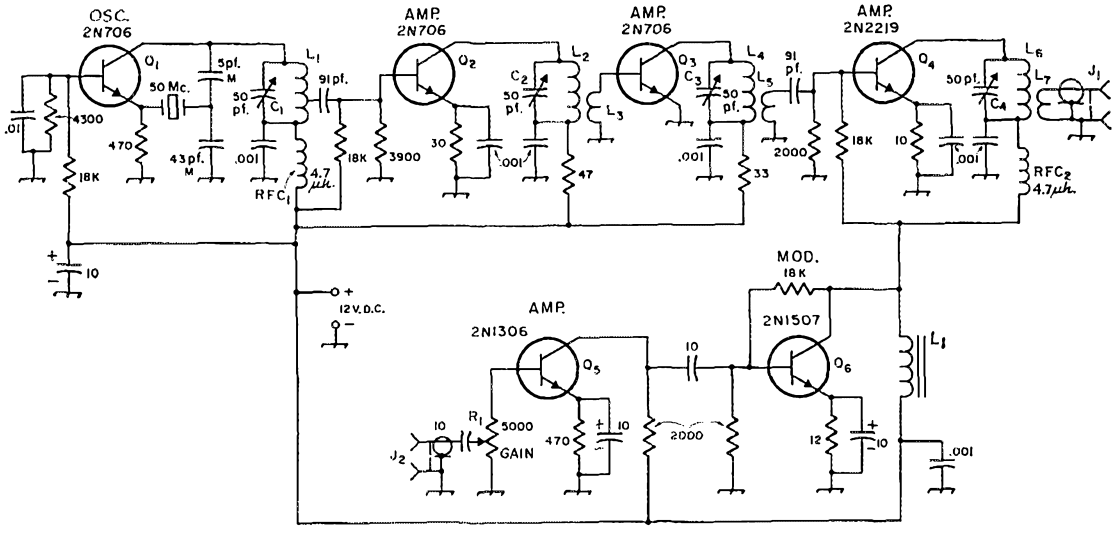


Fig. 2—Schematic diagram and parts information for the 50-Mc. transistor transmitter. Unless otherwise indicated, values of capacitance are in μf. High-value capacitors are small 20-volt tantalum types designed for transistor service. 0.001-μf. capacitors are standoff type. M indicates mica capacitor. Other low values are ceramic. Resistors are ¼-watt composition.

C_1, C_2, C_3, C_4—8- to 50-pf. ceramic trimmer.
J_1—Coaxial receptacle, miniature.
L_1—5 turns No. 20, ⅝-inch diam., 16 t.p.i. (B & W No. 3007). Tap at 1 turn.
L_2—4 turns like L_1.
L_3—1 turn No. 20 enam. over cold end of L_2.
L_4—3 turns No. 20, ½-inch diam., 8 t.p.i. (B & W No. 3002).
L_5—2 turns No. 20 enam., between first two turns of L_4.
L_6—2 turns like L_4.
L_7—2 turns No. 20 enam., wound over L_6.
R_1—5000-ohm miniature control (Trimpot 3067P-1-502).
RFC_1, RFC_2—4.7-μh. r.f. choke.
T_1—Small filter choke, about 10 hy., or audio transformer with one winding used.

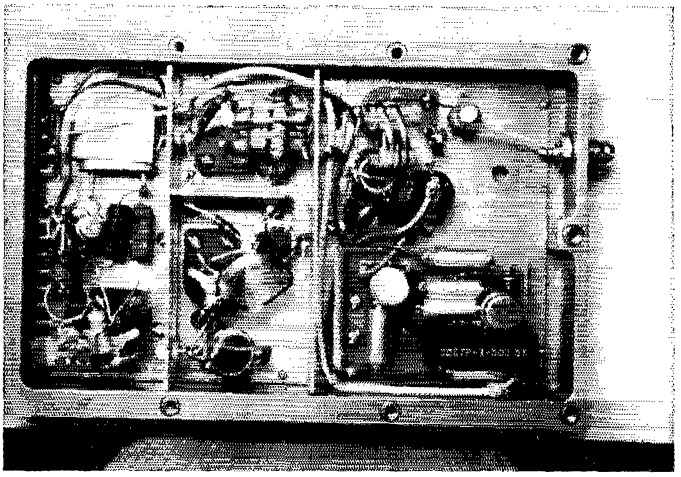


Fig. 3—Interior view of the 50-Mc. transistor transmitter. The crystal oscillator section is at the left, the amplifiers in the center, and the final stage and modulator at the right. Modulator components are mounted on a printed-circuit board

are in the upper left corner of the compartment, with the modulator in the lower portion of the picture. The large dark object in the lower right corner is the Trimpot gain control, R_1.

Adjustment

Power should be applied first to Q_1, Q_2 and Q_3, with Q_4 disconnected. Insert a 300-ma. or higher-range meter in series with the 12-volt input, and if more than 200-ma. drain is observed, disconnect power immediately. Check for a short, or a bad transistor.

Now check the oscillator by listening for the signal in a 50-Mc. receiver. Oscillation will occur only when the circuit L_1C_1 is tuned to the desired overtone frequency. If the crystal will not oscillate, check the tuning range of the circuit with a dip meter.

Adjust the second stage by means of C_2 for maximum current, and the third stage by C_3 for minimum current. Now we're ready to connect the modulator and final to the 12 volts.

Capacitor C_4 should be dipped for minimum current, and C_1, C_2 and C_3 repeaked for maximum current. Hook up a microphone and an r.f. load, and we're in business. Adjust the Trimpot, R_1, for optimum modulation at the desired voice level.

The transmitter has been used for some time by the author. It never fails to amaze and amuse the high-power enthusiast, who finds it hard to believe that an S-9 signal can be produced with one watt or less. The Mighty Midget has more than earned her name!

The 50-Mc. Converter

Here is a crystal-controlled converter of excellent performance. It may be used for fixed-station operation with a broadcast receiver as the i.f. amplifier and audio, or in mobile work with a car broadcast receiver. The converter draws only 8 ma. at 12 volts, so if the receiver is an all-transistor job as well, the total drain will be very moderate.

The converter output frequency chosen was 1000 to 1600 kc., so as to permit direct reading of received frequency from the receiver dial. (50 Mc. is 1000 kc., 50.6 Mc. is 1600 kc.) Coverage of more than 600 kc. of the 50-Mc. band can be obtained by using a higher crystal frequency, though the direct-reading feature is sacrificed. Coverage up to 51.1 Mc. may be obtained with a single converter crystal.

Reception on 50 Mc., even at a quiet home-station location, is limited by noise picked up by the antenna, so the ultimate in low noise figure is not required in a 6-meter converter. Ignition noise, from other cars if not one's own, imposes a further limit on mobile reception. Use of transistors keeps the current drain down to a point where it is not a serious concern, so operation with the motor off is possible for extended periods. The sensitivity of the converter is more than adequate for the best possible weak-signal reception, when external-noise conditions permit DX attempts.

As with the transmitter, the construction is solid. The converter is also built on a brass plate, with brass partitions, and then mounted inside an aluminum case.

Circuit Details

Use of an r.f. amplifier in a mobile converter may seem superfluous to some, but it helps to isolate the oscillator from the antenna, and its selectivity is helpful in keeping down spurious responses from f.m., TV and other out-of-band signals. It also provides some improvement in sensitivity and noise figure over that obtainable with a mixer alone.

The converter transistors are all 2N706s. The r.f. amplifier, Q_1, is operated in a common-emitter configuration. The low input impedance of the transistor makes necessary the tapping of L_2 to keep down the loading of the circuit. The voltage divider (18,000 and 2200 ohms) sets the bias to about 1.3 volts, for Class-A operation. Transistor voltage drop from base to emitter is 0.7 volt in silicon transistors, so the emitter voltage is 0.6. Now that we know the emitter voltage and resist-

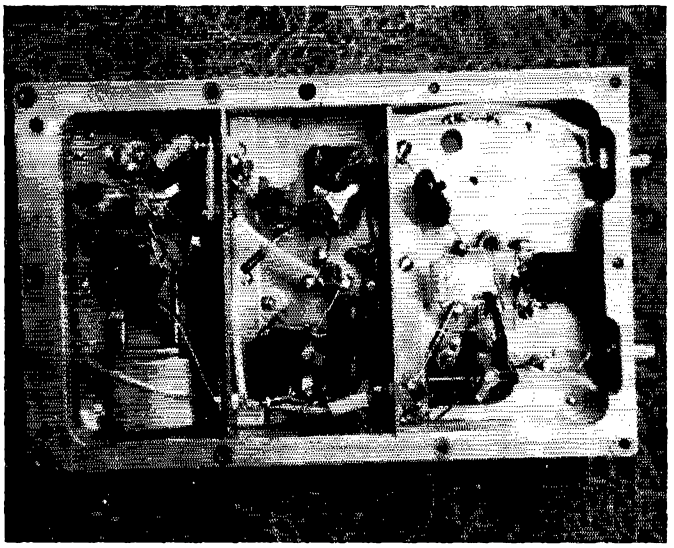


Fig. 4—Interior of the 50-Mc. converter. Crystal-oscillator portion is at the left, mixer in the center, and r.f. amplifier at the right. The antenna connection is at the lower right. Mixer output is taken off through shielded cable in the upper right portion of the picture.

ance (470 ohms) we know that the emitter current will be around one ma.

As in the r.f. stage, the loading effect of the mixer transistor must be taken into account, so link coupling, L_3L_4, is used between stages. Transistor Q_2 is biased by the divider network connected to the bottom of L_4. The 1000-ohm emitter current-limiting resistor is in the oscillator compartment, at the cold end of L_6. The collector of Q_2 is tuned to the broadcast band with a low-Q circuit, to give uniform response across the upper 600-kc. portion of the band. The output in this frequency range is coupled to the broadcast receiver through a miniature coaxia fitting.

The converter oscillator is similar to that used in the transmitter. As in the transmitter, it is important that the oscillator tuned circuit, L_5C_4, tune *through* the desired frequency of oscillation. Oscillator injection may be controlled by the number of turns in L_6, or its coupling to L_5.

Construction

The circuit is not critical, and reasonable construction techniques are sufficient. It is impor-

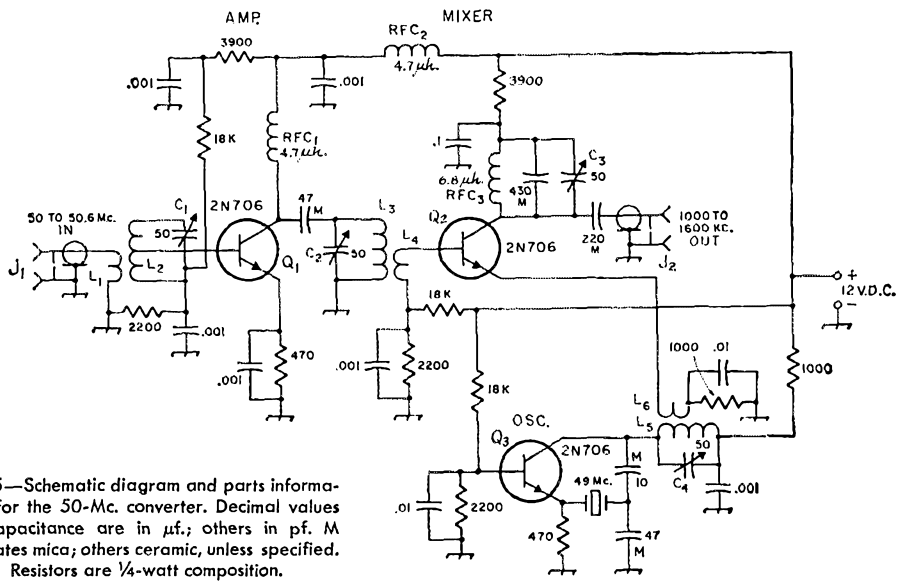


Fig. 5—Schematic diagram and parts information for the 50-Mc. converter. Decimal values of capacitance are in μf.; others in pf. M indicates mica; others ceramic, unless specified. Resistors are ¼-watt composition.

C_1, C_2, C_3, C_4—8- to 50-pf. ceramic trimmer.
L_1—2 turns No. 20 enamel, wound over L_2.
L_2—5 turns No. 20 tinned, ⅝ inch diam., 16 t.p.i. (B&W No. 3007). Tap at center.
L_3, L_5—Like L_2, but no tap.
L_4—One turn No. 20 enamel wound over L_3.
L_6—One turn No. 20 enamel, wound over L_5.
RFC_1, RFC_2—4.7-μh. r.f. choke.
RFC_3—6.8-μh. r.f. choke.

tant, however, to shield the individual circuits adequately. The converter is built on a brass plate 4¾ by 3 inches in size, with brass partitions ¾-inch high. To keep size down, ¼-watt resistors and small low-voltage capacitors designed for transistor circuitry were used. Ceramic standoffs ¼-inch high are used for supports where needed.

In Fig. 4, the oscillator section is at the left. The crystal is held in place by a brass strap and is visible at the bottom left of the picture. The mixer section occupies the center portion of the converter. The emitter resistor and its bypass capacitor are in the oscillator compartment. The r.f. amplifier is in the compartment at the right side. The antenna link, L_1, is close-wound on L_2, at the end connected to the bias resistors. The input and output connectors are on the right side of this section. IPC connectors are used because of their small size. The i.f. output comes from the mixer section to the output jack on small coax or shielded wire.

After the subchassis was completed it was mounted inside an aluminum case, the outer dimensions of which are 5½ by 3½ by 1 inch.

Adjustment

The converter oscillator should be checked first. With 12 volts applied, adjust C_4 while listening for oscillation at 49 Mc. in another receiver. If no way of monitoring 49 Mc. is at hand, a 10-ma. meter may be connected in the 12-volt line. Current will rise when the crystal goes into oscillation. Adjust C_4 for maximum current.

Next, peak the r.f. and mixer tuned circuits for maximum signal strength, using a signal generator set for low output, or a relatively weak 50-Mc. signal coming from the antenna.

The converter has been compared with several commercial 50-Mc. converters as to sensitivity and stability, and it has shown up well. The converter and the Mighty Midget make a fine pair, capable of good 50-Mc. coverage, at a power drain that poses no battery problems. QST

Strays

John Clarricoats, O.B.E., G6CL, long-time General Secretary of the Radio Society of Great Britain and Editor of the *RSGB Bulletin*, has retired, effective the first of the year. Miss May Gadsden, affectionately known as "G1YL" though she is not actually a licensed amateur, also left RSGB at year end after 34 years as Assistant Secretary.

—...—

It seems that complaints about garage-door interference are on the increase lately. Relief is available, depending on the ability of FCC personnel to find time to check on such matters, through sub-part 15 of the FCC rules which states, in part, that "the operator of a radio receiver, regardless of tuning range, date of manufacture, or of certification, which causes harmful interference shall promptly take steps to eliminate the harmful interference." If you are among those blitzed by neighbors' door-opening units, document a report with time, date, frequency and specific instances of interference to amateur operation, and send it to your FCC area office.

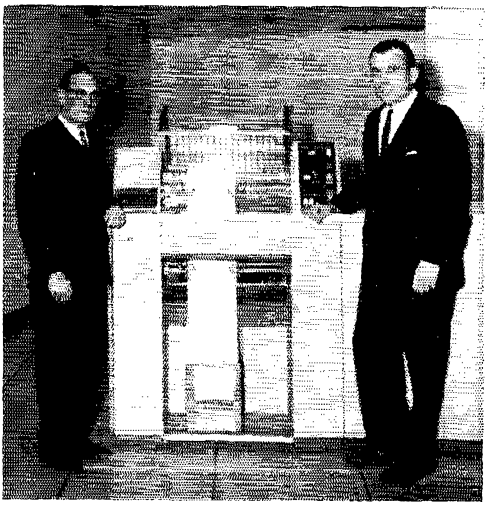
WØYZD and WØHUF QSOed seven times, on seven bands, in ten minutes' time in March. They used s.s.b. on 75 thru 2 meters. Looking for the m.u.f., fellas?

—...—

K1YSD would like to discuss the TVI problems of trailer camps (where window frames and trailer bodies are one side of the a.c. line, and TV antennas are just a few feet apart) with other hams who have lived in or near such camps. Contact K1YSD, Lot #5, NUTES TR CT, Portsmouth, New Hampshire.

—...—

WB6IGH would like to contact ham DeMolays.



Ivan H. Loucks, W3GD, Chief of the FCC's Amateur and Citizens Division (left) and FCC Chairman E. William Henry at the initiation of the new electronic data processing equipment's first task: issuance of CB licenses. For more about FCC's EDP, see "Automation at the FCC", page 38.

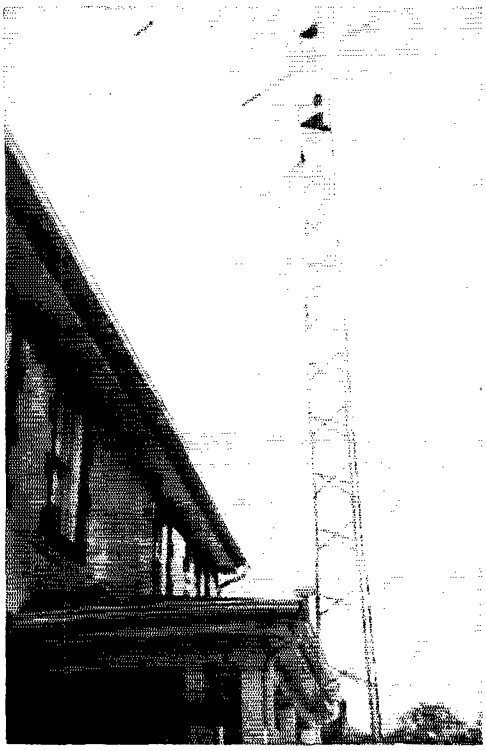


Fig. 1—The hoisting pulley is fastened to the roof overhang. A second pulley fastened to a porch-roof timber guides the cable around the porch eave.

Folding a Rigid Tower

Inexpensive Homemade Winch Mechanism

BY WILLIAM R. ANGELL,* K3KAU

Rigid towers are less expensive than crank-ups, but they are a disadvantage when antenna trouble develops. Here's how you can convert a medium-height fixed tower for crank operation.

ABOUT three years ago, I purchased a 32-foot Spaulding Spire tower which has served me well. However, when trouble developed aloft, I decided that I needed some convenient way of lowering the tower, since I am averse to the idea of one man trying to handle a beam antenna and rotator at that elevation. It is hoped that at least the general idea involved in my solution of the problem will be of interest to others. One attractive feature is that the modification for lowering and raising the tower can be made without disassembling or even lowering the tower.

The principle involved is quite simple and may be easily recognized in the photographs and sketches. A set of heavy hinges is installed near the base of the tower. The tower is then raised or lowered by means of a winch and a cable passing through a pulley attached to a high point on the house. A tree might alternatively be used as

*904 Kennebec St., Pittsburgh, Pa. 15217.

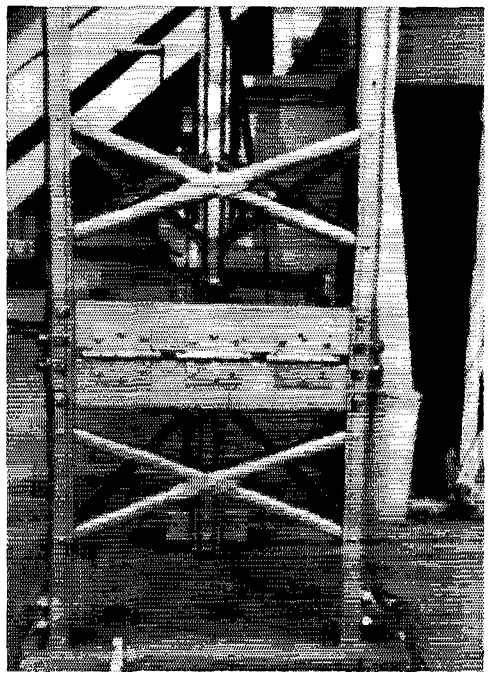


Fig. 2—The base of the tower pivots on three door hinges. The cleats on the tower legs, at the ends of the hinge assembly, are bolted in place after the tower has been raised.

an anchorage for the pulley, since the latter is needed only while raising or lowering the tower.

All of the structural steel stock needed was obtained from a local scrap yard. All pieces were cut to size with an ordinary hacksaw and the holes were made with an electric drill.

Mounting the Hinges

Referring to Fig. 2, the hinges are of the ordinary 3½-inch house-door type. They are mounted between lengths of 3-inch iron angle. The angles are cut so that they fit snugly on the inside of the tower between the two front legs, "front" being the side in the direction in which it is desired to lower the tower. The angles are oriented with the horizontal faces at the top and bottom to form a U inside the tower (see Fig. 3). Keep them absolutely parallel and separated sufficiently to clear the hinge barrels while the mounting holes for the three hinges are marked and drilled. Fasten the hinges in place with ¼-inch bolts. (All bolts used are cadmium-plated and fitted with lock-washers under the nuts.)

Scribe a line on all three tower legs at a distance of about 18 inches above the concrete foundation (or about midway between the first two pairs of cross braces), using a bubble level for accuracy. Using C clamps, fasten the hinge assembly to the two front legs, centering the hinge pins accurately on the scribed lines. Drill two clearance holes for ⅜-inch bolts through the

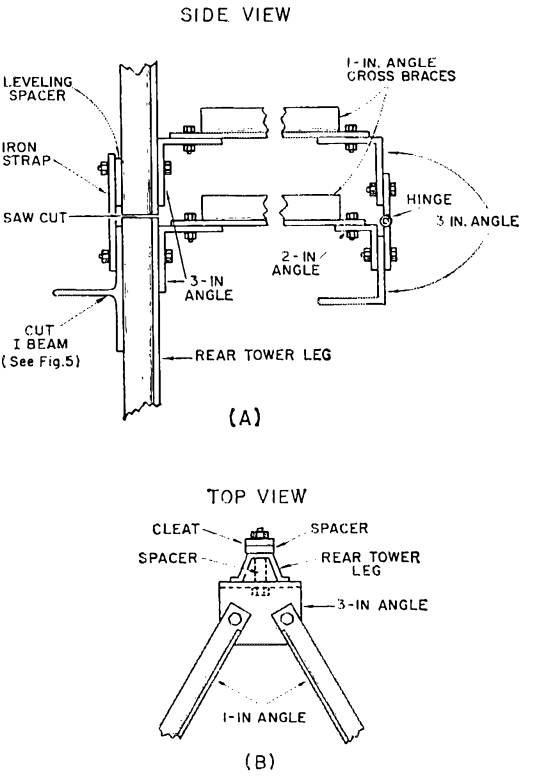


Fig. 3—Sketch showing how the two pairs of cross braces are mounted.

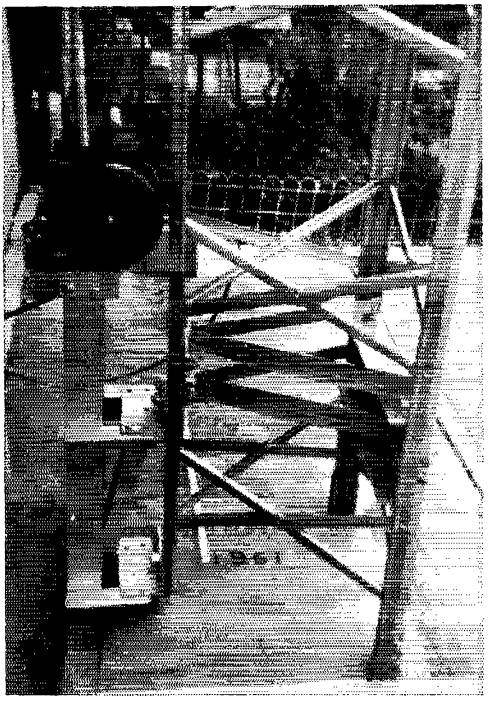


Fig. 4—Side view showing the cross bracing inside the tower, and the winch mounting.

tower legs and each end of each angle piece (a total of 8 holes). Bolt the assembly in place.

Referring to Figs. 3 and 4, two pieces of 3-inch angle should be fastened to the single rear leg, on either side of the scribed line. (I used a door hinge for the upper angle because I ran short of 3-inch angle stock.) These pieces are approximately 4 inches long, and are fastened to the leg each with a single ½-inch bolt. (The photo shows a U bolt that I used with the hinge.) The upper angle piece should line up with the upper 3-inch angle spanning the two front legs. The lower angle piece should be placed just slightly below the scribed line. In both cases, a spacer (stacked washers will do) should be used inside the leg channel to avoid crushing the channel when the bolt is tightened. A short length of 2-inch angle is mounted near each end on the inside of the lower 3-inch angle spanning the two front legs, making use of the hinge bolts for fastening. See Fig. 3. These angles should be mounted so that their upper surfaces line up with the upper surface of the lower 3-inch angle on the rear leg. Diagonal cross braces of 1-inch angle iron should then be fastened in place as shown, using ¼-inch bolts.

Mounting the Winch

I bought the winch from Sears Roebuck (Cat. No. 6G62415). It has a 1500-lb. capacity and a

5.1-to-1 gear ratio. Essential details of the winch mounting are shown in Figs. 4 and 5. The post is a 30-inch length of 4-inch I beam. Lengths of 2-inch angle are fastened to the top of the beam, as shown, to provide a mounting platform for the winch. Other sections of 2-inch angle are used to space the post away from the tower sufficiently to avoid skinned knuckles when the winch crank is operated. The mounting brackets attached to the rear tower leg are made of sections (about 7 inches long) of the I-beam stock from which one side, or flange, has been sawed. The upper bracket is mounted using the same bolt as the lower 3-inch angle. The bottom bracket uses the two foundation bolts in the rear leg. The bottom 2-inch angle should be placed so as to allow the post to rest on the concrete foundation. A short length of ¼-inch iron strap should be cut and drilled to match the mounting holes of the 3-inch angle pieces on the rear leg, and washers or other form of spacer used to compensate for the thickness of the I-beam flange at the lower end of the strap, as shown in Fig. 5.

The diagonal brace is a length of 2-inch angle with one lip sawed away at each end. The remaining lip is bent to fit between the bottom end of the I-beam fin and the under side of the upper bracket attached to the tower. I made a template of stiff wire to determine the length of the brace and the angles at which the ends of the brace should be bent. The brace is fastened at the bottom end with a ⅜-inch bolt, and a ¼-inch bolt is used at the top.

The Hoisting Cable

Figs. 1 and 6 show the pulley and cable arrangement that I used. The lower guide pulley is an overhead barn-door roller pulley that I picked up at the junk yard. This pulley would not be needed, of course, if there is no interfering porch to contend with. The upper pulley is a large awning pulley. However, the ¼-inch shaft was replaced with a ⅜-inch bolt as a safety precaution. For most satisfactory operation, this pulley should be anchored not lower than the mid-point of the tower. In cases where the house does not provide sufficient height, a tree might be found that would serve the same purpose.

I did not climb the tower to attach the cable to the top on the first trial run. I simply fastened it as high as I could reach from the porch roof.

Before the final operation, make sure that all bolts have been tightened up, and that there is reasonable tension on the hoisting cable. Use a hacksaw to cut the front legs at the scribed marks. Remove the iron strap on the rear leg and cut this leg at the mark. If the saw tends to bind, loosen up slightly on the hoisting cable and, if necessary, attach a rope to the front side of the tower and pull the tower forward slightly.

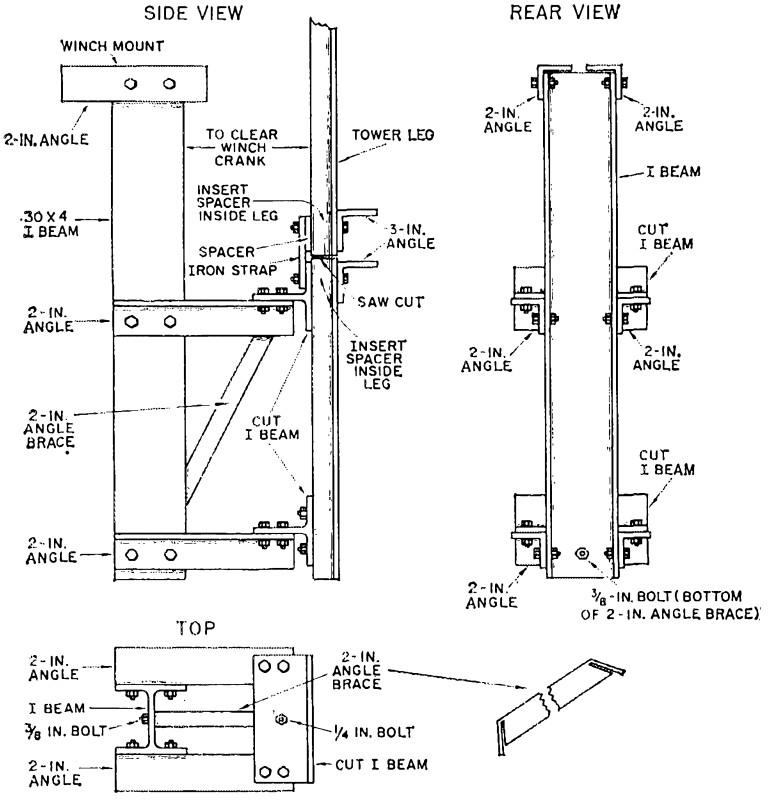


Fig. 5—Sketch showing how the I-beam winch support is fastened to the tower.

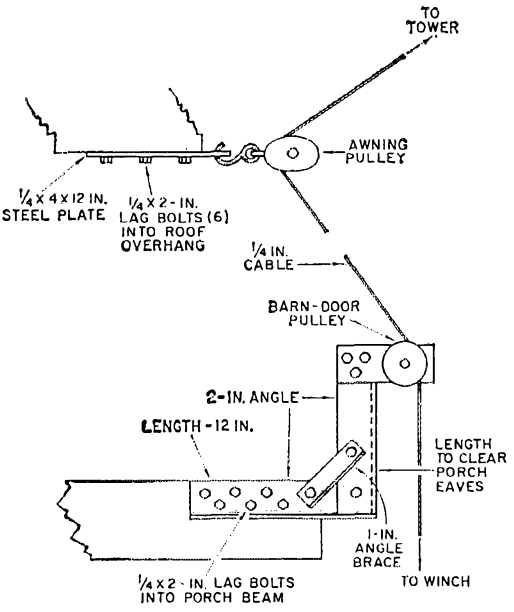


Fig. 6—This sketch shows how the pulleys are attached to the house. The lower pulley may not be required.

The tower may now be lowered. I found that the system works very smoothly and that the tower can be raised or lowered with one hand. After the tower has been lowered, the hoisting-cable attachment should be raised to within a few feet of the top of the tower. After the tower has been raised, be sure to replace the strap-iron cleat on the rear leg. Although they are not strictly necessary, I made cleats for the front legs also. In this instance they were made from a short section of the channel material supplied for leg anchorages in the concrete foundation. These cleats were fastened to the legs not only by two of the bolts mounting the 3-inch angles, but also by two additional bolts (½-inch) through adjacent surfaces of the legs, as shown in Fig. 2.

Using the house as an anchorage, I keep a slight tension on the hoisting cable, after the tower has been raised, to serve as a single guy. If a tree is used instead of the house, I would slack off on the cable a little, after the leg cleats have been secured, to allow for movement of the tree in the wind. QST

Hamfest Calendar

California — Banquet, mobile events, games, contests discussions of d.f. and semiconductors, and much more: all will highlight the Fresno hamfest at the Town & Country Lodge in Fresno, May 16. Tickets should be ordered before May 11. They are available for $6.50, including the banquet, from W6QJM.

California — A May MARSfest spotlighting both Field Day and Armed Forces Day is in the works. Contact W6EII.

Colorado — One of the state's biggest hamfests ever (so they say) will be held June 5-7 at South Fork.

Europe — The Third International Meeting of Radio Amateurs is slated for June 27 and 28 at the Lake of Constance. Temporary German licenses are available to visitors. Write DARC, Baden Distrikt, Sophienstr. 178, Karlsruhe, German Federal Republic.

Florida — Phillippe Park, near Safety Harbor, will be the site of the St. Petersburg hamfest May 17, rain or shine. Additional info: P.O. Box 4026, St. Petersburg, Fla.

Georgia — The Atlanta RC hamfest will be held June 6 and 7 at the Lenox Square Shopping Center in Atlanta. Between 1000 and 1500 hams are expected to attend. No charge for registration or admission. Mobile talk-in will be on 3995 and 50,550 kc. Homebrew and other contests, transmitter hunts, net and MARS meetings, and more, are planned. Be there for the dinner-dance June 6 and stay the week end. More information from K4MDC.

Illinois, Tristate — "Smorgasbord and hamvention" will be served up by the Western Illinois RC May 16 at Durst's Flamingo Room in Quincy. Contact Harold Peckinpaugh, % WIRC, 22 Parkview Drive, Quincy, Ill.

Illinois — The Starved Rock RC hamfest will be held June 7 at the LaSalle County 4-H Home and Penic Area southwest of Ottawa, Ill. Follow the yellow HAMFEST signs from the Ottawa end of the Ill. R. Bridge. Free coffee in the morning, food and parking amply provided all day. Advance registration until May 24 is $1.50; at the gate its $2.00. Contact W9MKS, R.F.D. #1, Box 171, Oglesby.

Kansas — Topeka's Kaw Valley RC will hold the annual hamarama, rain or shine, May 17. Activities at the Garfield Park shelter house in Topeka. WØWIZ has details.

Louisiana — The Southwest La. ARC will present its hamfest and fish fry May 16-17 at Prien Lake Park, southwest of Lake Charles, La. Preregistration is $2.50 for adults, $1.00 for the kids. This includes the the fish-fry supper and Sunday picnic dinner, and all the free soft drinks the kids can hold. Preregistration closes May 11. Contact Lou Fontenot, WA5ARV, who will also reserve hotel or motel space on request.

Maryland — The Anne Arundel ARC hamfest will be at Kurtz Beach, near Glen Burnie, June 7. No details available.

Maryland, D. C. — The National Capitol V.H.F. Society hamfest will be held May 24 at the Marshall Hall (Md.) Amusement Park, located on Bryans Road off the Indian Head Highway in southern Maryland. Talk-in on 145.1 and 50.3 Mc. using the call K3LUK.

Michigan — Old Timers Night will be May 30 at the Henry Ford Museum and Greenfield Village, Dearborn. Frank R. Davis, curator of the Department of Communications of the Museum, would like to hear from all OTs who were on the air during or before 1913.

Missouri — Don't forget the Mo. Net picnic at Jefferson City June 7. No other details available.

Nebraska — The Pine Ridge RC hamfest will be held at Chadron State Park June 7. Picnic lunch served family-style at noon. Full afternoon of events.

New York — The Western New York hamfest will be held May 23 at Vince's 50 Acres on Rte. 15 four miles south of Thruway Exit 46. Afternoon tech talks will be by W9AC, ARRL's W1HDQ, and K2LAF. Other features include a DX antenna forum, the annual WNY code contest, women's programs, exhibits, Novice awards, and the "flea market." Registration and banquet in advance $5.00, at the door $5.50. All events excluding banquet $2.50. Contact WA2JMH or the sponsoring Rochester ARA, P.O. Box 1388, Rochester, New York 14603.

Pennsylvania — The North Penn ARC will sponsor a dinner-dance at the Souderton Fire Hall, Souderton, Pa., May 23. Tickets $3.75 advance only; they will not be sold at the door. Contact KC ROK at 309 Prince Frederick St., King of Prussia, Pa., before May 16.

Pennsylvania — Western Pennsylvania's biggest hamfest, the Breezeshooters, will be held May 24 at West View Park, Pittsburgh. More than 1300 hams and their families will be there. Join 'em. Tickets available at the fest. Info available Wednesday evenings on 10 meters: the Breezeshooters Net.

New York — Ham Family Day of the Rome Radio Club, June 4. Adult admission is $4, kids under twelve $1.75 (in advance) which includes all the contests, transmitter hunts, games, and a chicken-and-steak dinner served family-style. Write for registration and/or information to W2MSM, P.O. Box 721, Rome, N. Y.

(*More on page 168*)

The Gus-O-Graph

BY JOHN G. TROSTER, W6ISQ

45 Laurel Avenue, Atherton, California.

"SO LIKE I SAID, club members, I've used this Gus-O-Graph with fantastical results to work Gus and them other DX fellas all over the world. But remember, this Gus-O-Graph is good for any QSO. You can use this exact same identical chart for DX, ragchews, traffic, RTTY, television, laser — any station you want. It'll tell ya your chances of working the station ya want. Kind of a technical chart for you nontechnical fellas. Understand?"

"Yeah, but by the time we draw a line through all them gobbledygook curves on that sloppy chart you drew, the station's QRTed!"

"Well, I drew the graph kinda fast — wanted to be sure you fellas got a copy. Yeeeah . . . but it's accurate — yessiree! Now look: it's easily self-explanatory. I'll go through it fast just once more.

"Now, see here where you 'Begin' the chart. Your first move asks you a question, 'Is your rig on? . . . *'da?'* or *'nyet'?* I added them foreign words for a little international flavor. If your rig is *'nyet'*, the Gus-O-Graph turns you around and says, 'Turn on rig, old boy!!' But if your rig is *'da'*, go straight to the first chart. Pretty neat, eh?"

"What's that 'A.T.T.' business?"

"That A.T.T. label above the first curve is the 'Antenna Tilt Trend' factor. This means you can use the chart if your antenna doesn't tilt more than 22½ degrees. That's kinda technical for some of you fellas who don't understand these scientific things, but it's tied in with the earth's rotation, inclination, sidereal ionization, galactic supernovae clouds — stuff like that us technical fellas know about.

"OK, after you find out if your rig is *'da'* or *'nyet'*, you move instantaneously to the 'H-M' curve — 'Height *versus* Megacycle' chart. First look up here. See we got a special 'OM' curve. That's for 'Oscar-on-the-Moon'. Real planning ahead, eh? Way out. Huh fellas? Get that one? Way out. . . .?? Hmmmmmm? Oh well, back to the average ham . . .

"Say you're on 14 megs and your antenna's up about 150 feet . . ."

"So when is a 150-foot tower so average?"

"Come on, fella — ya wanna work Gus or not? Now, on through the 'L' factor — and be sure you have the right quarter of the 'Lunar' . . . gotta look out the window — haw . . .

"Then on to the 'P' factor charts — that's the 'Power Input' . . ."

"Hey — there's no line there for less than 5 kilowatts."

"Ya wanna work Gus or not, fella? And on through the 'W' chart — that's the 'Number of stations calling the same station that you're calling — a reasonable estimate here is OK."

"Yeah, but the minimum on the chart is 50. Fifty guys calling??"

"Where were you when Gus hit YA1-land? Yeah — then into the 'C-D' chart — the 'Number of Lids Calling' 'CQ DX' dead beat with the station you're trying to hook.

". . . On through the 'B' chart . . . the 'Number of Beam Elements' ya got . . . say 6 . . ."

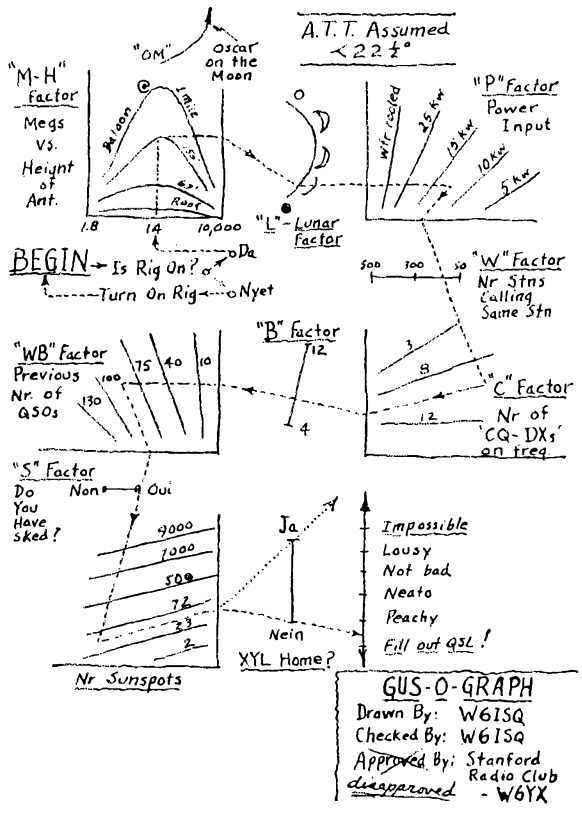
"Six???"

"Look, fella, you wanna work a new one or . . ."

"I know — I know . . ."

". . . And on into the 'WB' curve — 'Worked Before'. Our research proved that if you worked the station before -- say 50 or 60 times — the station will begin to recognize your call, and you got a better chance to raise him again! Neat, eh?"

"Then into the 'S' check point.



'*Oui*' or '*Non*' . . . 'Do you have a sked with the station?' Again research — your chances of working the station are much better if ya got a sked! Note them French nomenclatures there — *tres* bone, *oui*? Haw. Then through the sunspot curves.

"Now friends, the most vital point in the entire Gus-O-Graph! Is your XYL home . . . '*Ja*' or '*Nein*'??? Please notice that if the XYL *is* home, you *have* to have a sked, and the sunspot number has to be about 7000. My astrologer . . . ahhh . . . scientific friend says there won't be 7000 spots until the year 2037. So, the graph tells you that if the XYL *is* home, ya might as well QRT and get out your stamp collection . . . haw! See how the Gus-O-Graph can save ya time and electricity?"

"Now . . . are there any questions?"

"Yeah . . . that 'A.T.T.' factor back there at the beginning."

"I'm sorry old man. If you're not a technical fella, ya just can't understand the technical part. Much too advanced. Just accept what us technical fellas tell ya."

"Well, I guess I'm not a technical fella because I thought the 'A.T.T.' meant 'American Telephone and Telegraph' — I thought this was a stock market chart to tell me when to buy A.T.&T. stock."

"Well I'll . . . Now I've heard every . . . It just goes to show ya what happens when some of you nontechnical fellas try to out-think us technical fellas. How could you pull a stupid . . ."

"I'm not complaining . . . really! I just worked the chart backward. Where the Gus-O-Graph says 'Fill out QSL', I substituted, 'Get out your checkbook.' Then I waited until the XYL was away, on a day when the sunspot number was right . . . then went into the 'WB' chart on the 'Weekly Bottom' price of A.T.&T. stock. Used my birth date for the 'B' curve . . . and how much 'Cash' I needed for 'Credit' on the 'C' curve . . . and my 'Weight' on the 'W' curve (I gained a little lately — haw.). This gave me the 'Price' of the stock on the 'P' curve.

"Oh, nooo . . . this is awful . . !"

"Well, I wasn't sure if the 'H-M' meant 'Mortgage your House' or 'How Many' shares to buy, so I did both. First I Mortgaged the House to get the Cash I needed from the 'C' curve . . ."

"You're losing me in your nontechnicals . . ."

". . . Then when I looked out the window and saw a full moon . . . well . . . all I did was draw the line way up through the top . . . right through the full Lunar moon on the 'H-M' curve — 'How Many' — and . . ."

"And what happened?"

"My line cut the line that points toward the 'Oscar-on-the-Moon' curve — just where it went off the graph. So, I bought A.T.&T. . . ."

"H-M . . . errr . . . how many?"

"Well, the Oscar curve said thousands and thousands of shares, so I . . ."

"Ohhh me . . . ohhhh . . . look, ya can't hold us technical fellas responsible for your losing your house and all your money . . . you nontechnical fellas . . . ohhh. . . ."

"Nooo, no complaints. As a matter of fact, I made a fortune. Retired last week and chartered an airplane. Right now they're loading it with cases of Coke and I'm flying over tonight to meet Gus for a little DXpedition. You technical fellas keep that Gus-O-Graph handy — see if ya can use it to work Gus and me in AD6-land a week from Tuesday."

QST

Strays

The Navy's K4NAA, portable, will again provide communications for delegates to the annual Armed Forces Communications Convention in Washington, D. C., May 19–21. Three stations will be operating from the Sheraton Park Hotel, using c.w. and s.s.b. on 80-10 meters. (Part of last year's setup was pictured on page 25, Oct. 1963 *QST*.)

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The Foundation for Amateur Radio, Inc., is now accepting applications for the annual John Gore Memorial Scholarship. The award carries a $250 stipend and possible renewal for either graduate or undergraduate study. Applicants must hold a General or higher amateur license, be enrolled in a full or part-time degree program in an accredited college or university, and plan to make a career in electronics or related sciences. Requests for applications should be made before May 20, 1964, and addressed to the Chairman of the Scholarship Award Committee, FAR, Inc., 7605 Westfield Drive, Bethesda, Md. The FAR, a non-profit organization devoted to the advancement of amateur radio, is composed of trustees representing radio clubs in the Washington-Baltimore area.

The Amateur Radio Editors Association (AREA) has named its 1964 officers. W3KPJ is president of the board; W3ZXV president; K4URX, W1SAD, W4ID and W8CTZ vice-presidents; W8BAH secretary-treasurer and executive v.p.; and W4DKJ historian. Directors include K8MZT, K9VIE, VE3EXF, WA6AWY, W1GVT, K7KBY, W9YZE, K5FVB and Mrs. Helen Brick, XYL of W3SAO.

AREA is the national organization for better public relations between radio amateurs and the general public. It has more than one hundred members, including many prominent writers and public relations experts who help hams write for club and community newspapers.

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W2KJR, a civilian employed as an artist-illustrator by the Army at Fort Monmouth, N. J., designed the new Battle of the Wilderness commemorative stamp, issued this month. It is the fourth of five stamps in a series commemorating great battles of the Civil War.

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W7VZG was the prewar commanding general of the Czech Air Force. — *W6MLZ*

F.S.K. for the AN/ART13

Improved Method for RTTY Operation

BY JAMES H. FLYNN, JR.,* W4ISM/A4ISM

THIS transmitter had a past. I could tell by the tags that were attached to it before I started working it over for use on RTTY. It had been removed from a Navy patrol aircraft that flew the Far Pacific as its normal mission. I'm sure that when Collins designed and built the AN/ART13, they knew that it would serve the radio operator and the crew of this patrol plane as a trusted and faithful servant. I suppose I'll never know who operated it, and what messages it transmitted, but it's now resting in my radio shack in Northern Virginia and performing a noble job transmitting RTTY up and down the Blue Ridge.

In a way, it seems almost a crime to modify the precision oscillator in the transmitter to get it to shift frequency 850 cycles to the tune of the teleprinter pulses. It had to be done, though. Several articles have appeared in various radio magazines on "shifting" the ART13, and I suppose they all accomplish the objective. Many Virginia RTTY stations using this unit have simply tied the f.s.k. circuit to the grid of the 837 high-frequency oscillator tube (V_{101}). Performance has been satisfactory as far as getting the desired frequency shift, but the use of the transmitter in the a.m. position with the f.s.k. still tied to the grid of the 837 left something to be desired in the stability of the rig.

Circuit

In trying to develop the "last word" in frequency-shift keying of the ART13, I started off with a circuit that used a Varicap (a device in the diode family that changes capacitance in line with changes in voltage) as the main component. I could key the Varicap in and out of the oscillator circuit and get the required changes in frequency if I had a source of voltage for the Varicap. The point closest to the 837 where a suitable voltage could be taken was at the socket of the 12SJ7 (V_{201}) in the audio amplifier. This could be regulated with a simple VR tube and the proper value of voltage-dropping resistor. I was on the right track with this idea until I accidentally blew the only Varicap I had (a donated job).

Rather than give up, the next best thing was to use a regular diode in lieu of the Varicap, and take advantage of the voltage that I could steal from the 12SJ7 socket. The f.s.k. circuit in Fig. 1 is the result. Its uniqueness, if you can call it that, is the borrowing of the voltage from the 12SJ7 for use in activating the keying circuit to provide the necessary shift, but the main advantage of the arrangement is that the f.s.k. circuit is tied to the cathode of the 837, resulting in much improved stability.

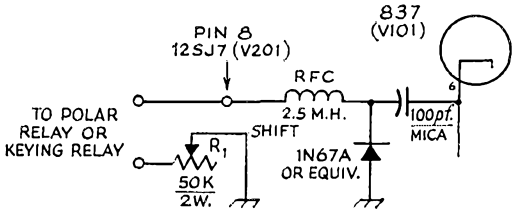


Fig. 1—Diagram of W4ISM's circuit for the AN/ART13. The shift control, R_1, is a 50,000-ohm 2-watt linear control.

Making Connections

The application of the circuit is not complicated. The connection to the cathode of the 837 is made by removing the tube from its socket and attaching a wire to Pin 6 on the tube and replacing it in its socket. The wire should be shielded, and the shield grounded to one of the many screws in the vicinity of the 837 base.

The connection to the 12SJ7 socket is made by removing this tube from its socket and inserting, in hole 8 of the socket, the connection as shown in Fig. 1. Again, this wire should be shielded and the shield can be effectively grounded through Pin 1 of the socket. A convenient way of making this connection is to use the base of an old tube that will fit the 12SJ7 socket. The diode, fixed capacitor, and the r.f. choke can be assembled and wired in the base (after removing the envelope, of course!). However you may want to do it, just try to keep the wires shielded.

The frequency-shift adjusting pot can be mounted on the front panel in the low-frequency-oscillator portion of the transmitter, or under the cover in any spot that is not in the direct vicinity of a hot tube.

The keying relay connections can be made in any number of ways. A good one is to remove all

* 1112 Drewlaine Drive, Vienna, Virginia 22180.

connections at one of the "side-tone" jacks on the front panel and rewire it to bring the pulsed teletype signals up to the f.s.k. circuit.

Adjustment

Adjusting the shift is an easy matter and is accomplished by adjusting the pot until the desired shift is obtained. The teleprinter need not be operated to make this adjustment because the make and break of the polar relay, or keying relay, can be simulated by shorting the keying input to the transmitter. The shift is measured in the normal manner by observing the pattern on a monitoring scope on the station's tuning unit (TU). The plate supply on the ART13 is not needed to make the shift adjustment, either. Low voltage applied to the plate of the 837 is sufficient to show up on the scope.

The circuit described above provides the mark pulse when the keying relay is open. Closing the relay provides the space pulse. If the opposite were true, the keying would be "upside down" and, of course, the shift would be in the wrong direction. Normal operation requires that the frequency be shifted downward; that is, to 850 cycles lower than the starting, or nominal, frequency. A keying, or polar, relay is necessary for this circuit to isolate the voltage taken from the 12SJ7. A tried-and-proven way to run this type of hookup is contained in the November 1961 issue of *QST*.[1]

When operating the ART13 on RTTY, it is necessary to remove the 12SJ7 from its socket and plug in the f.s.k. adapter in its place. When changing back to a.m., remove the f.s.k. adapter and reinsert the 12SJ7. This slight inconvenience is offset by the fact that you now have a first-class RTTY transmitter.

We can't help wondering sometimes if the ART13 designers would have ever guessed how many strange modifications to this most famous "Black Box" have been made by "grounded" radio amateurs. QST

[1] Flynn, "Single-Switch RTTY Control," *QST*, November 1961.

OREGON STATE CONVENTION

Klamath Falls, Oregon — May 22-24

An Oregon State ARRL Convention will be held Friday through Sunday, May 22–24, at the Winema Motor Hotel, Klamath Falls. Activities will include mobile hunts, c.w. contest, a YL tea, various group get-togethers, amateur equipment displays, swap shop and a tour of nearby Kingsley Field, including a look at the F-101 "Voodoo" jet.

The banquet Saturday night will be followed by a play, put on by the local theater group, and dancing. Various breakfasts (s.s.b., YL, RTTY, MARS and others) will be held Sunday morning.

Preregistration, until May 10, is $9.00 for hams and $7.00 for non-hams; after that date, rates go up to $10.00 and $8.00 respectively. All registrations should be sent to Ruth Lewis, K7RFO, OARA, 2433 Hope Street, Klamath Falls. Hotel reservations may be made directly, or $5.00 may be enclosed with convention registration and K7RFO will make the reservations.

Strays

Feedback

Although the April issue included the customary annual April Fool items, the connections to the beginner's antenna relay on page 60 was not intended to be one of them. Contrary to the last sentence of the article it *does* make a difference how connections are made. The antenna should go to J_2, and the transmitter to J_3 (not as shown). Both errors were inventions of the editor, not the author.

—•••—

In the circuit diagram of K1TVF's Novice transmitter, page 16 of the March issue, the 7-Mc. tap should be placed at 14 turns from the C_3 end of L_1.

—•••—

In Ted Crosby's article, "The HBR-11 To Date," April 1964 *QST*, the padder capacitor, C_4 in the HBR-11 schematic, was omitted from the list of components in Table I, page 37. It should be 100 pf. silver mica. The "dotted lines" mentioned at the top of the right-hand column on page 36 refer to the upper s.p.s.t. switch in Fig. 4.

—•••—

W8JYJ has been named the first Honorary Life Member of the Huron Valley Amateur Radio Association (Lansing, Michigan).

Anniversary Message — May 17

(Continued from page 10)

f.m. and 147.85 Mc. f.m. (by repeater) at 1900 PDST. We are suggesting that each c.w. transmission at 15 or 16 w.p.m. be followed by a repeat at 7.5 w.p.m. (for fills) and that a slow voice transmission of this Anniversary Message to facilitate copy be followed by a faster reading so the copy can be verified or completed.

Commemorative QSLs

Every amateur is cordially invited to participate in this over-the-air recognition of the completion of *fifty years*, five decades, of progress and fraternalism, relaying and operating in our Amateur Radio. Do this by tuning in one of the stations mentioned above. Copy down the message, filling in any rough spots on the repeat transmission. Then forward your report of this to ARRL indicating the time, call, and frequency on which you received the Anniversary Message. Report the text of the Presidential commemorative radio message to ARRL Hq., 225 Main St., Newington, Conn. 06111. In response to your participation you will receive a 50th Anniversary Memento, W6ZH's acknowledgment. QST

• QST *Article Contest Winner*

Rx A Prescription for Lid-itis

BY ELI STURGES,* WA5BEZ

THE HAM BUG usually bites the potential Novice during exposure in an active amateur's shack. The neophyte (let's call him Joe), with newly awakened interest but without knowledge, seeks advice as to how he can become licensed. Assuming the amateur who gives the advice is typical, the world, at this point, witnesses the conception of another inefficient and inadequate operator (or "lid", if you will). Why? Because the advice given emphasizes code and theory but neglects good operating procedure. Certainly code and theory are important, or the examinations would not be predicated on those two points — but without operating procedure these basics are almost worthless.

Let us follow Joe's progress a few months. The helpful General licensee (call him Dick) recognizes a hopeful addition to the ham ranks and eagerly begins sessions to teach our new devotee the code. Joe secures an ARRL *License Manual* and diligently begins memorizing the questions and answers. Whether or not he absorbs knowledge at this point is debatable. In the skull sessions with Dick procedure might be mentioned, but there is usually no specific emphasis or study since Joe is a long way from being licensed and the important thing at this point is to get the basics down pat. Joe observes his teacher's habits and, human nature being what it is, decides Dick's operating procedures are perfect, gospel, and cannot be improved.

After a reasonable length of time, the test is administered. Joe energetically copies code, without numerals or punctuation, managing to get a string of 25 characters in a row out of 125 sent over a period of five minutes and the completed Form 610 is mailed. Back comes the written portion. Joe answers the multiple-choice questions and Dick mails the papers to Gettysburg. Still no specifics on operating. Everyone now sits back to await the meshing of gears and the arrival of official notice from FCC. During the waiting period, Dick will probably assist in setting up the station and checking it out, making several nice contacts in the process. Joe, however, only sits and watches Jupiter-descended-from-Olympus placing his sacred hands on a mere mortal's key.

Finally, the great day arrives. The mailman brings a slip of paper which says Joe Blow, now better known as WN5LID, is permitted all operating privileges of the Novice Class licensee. Joe runs to the rig, turns it on, and (aping his General Class friend) twists knobs, peers wisely at meters and, somehow, gets a bit of r.f. into the antenna. (He has no conception of what he is doing, but Dick does it, so it must be right.) Then, with pounding pulse and quivering fingers, he belts out a string of 50 CQs at four times his copying speed, forgets to sign his new call and then wonders why no one answered him. He tries again, and this time he is answered, but he doesn't know it because the answering station is sending at the same speed.

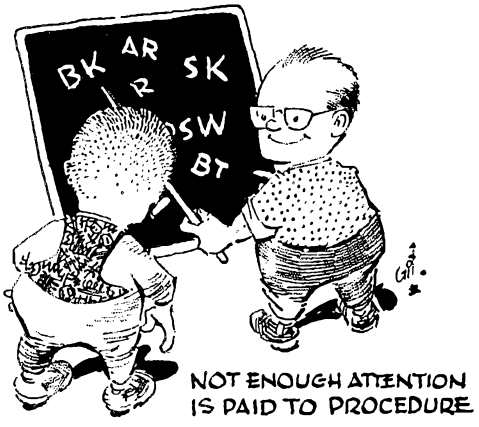
Sound familiar? It must, to a great percentage of hamdom.

Well, if WN5LID is not up on procedure, who is to blame? Joe simply does not know any better and is (1) aping his General Class friend or (2) aping some other Novice who is aping *his* General Class friend. The blame actually comes back to where it belongs — at the feet of the friendly General Class licensees who either do not know good procedure or neglect to teach their pupils what they do know.

The ARRL is embarked on a multipoint program, some parts of which are designed to improve conditions in congested bands. A few sessions on good operating procedure during the schooling of pre-Novices would, in time, pay great dividends in improved conditions in the amateur bands. After all, we are creatures of habit and today's Novices are tomorrow's full-privileged amateurs.

The rules of good operating procedure are basically simple and they make sense. The object of communications in any form is to convey intelligence from one point to another. C.w. is, essentially, a means of accomplishing this end. The human mind, in thinking, idles along at about 700 words per minute; the human voice

* 1415 Autumn Leaves Tr., Dallas, Texas 75241



NOT ENOUGH ATTENTION IS PAID TO PROCEDURE

communicates at 150 words per minute and more; so c.w., even at 30 or 35 words per minute, is slow by comparison. While it is manifestly impossible to approach the 700-word-per-minute capabilities of the mind, anything done to speed up the conveying of intelligence is worthwhile and valuable. Good c.w. operating procedures do just that.

Procedure can be broken down into several generalized categories. We do not propose to explore all of them here. The following deal primarily with novice c.w., but the same principles can be applied to any amateur c.w. operating.

1) The CQ: Keep it short. Remember, as long as you are transmitting, you cannot hear the other fellow. Nothing is served by a string of 20 or 30 CQs but to discourage those who might be waiting to call you. The old 3×3 or the 3×2×1 formulas for CQs are still best. Send CQ three times, your call three times, CQ twice, your call twice, CQ once and your call once. Then "K." Do not use AR or $\overline{AR}$ K. In all cases, the letter DE (Franch for "from") separate the CQ and your call letters. After standing by, listen; then listen some more. You will make many more QSOs with short CQs and long "listens."

2) Answering CQ: Since a Novice station must by crystal-controlled, chances of an answer right on frequency are rather remote. In answering a CQ, do not call anyone more than 10 kc. from your own frequency. Call the station you are answering twice plus some additional times if you are more than four or five kc. from his frequency, then DE, then your call twice, then AR. Do not send AR K or just K.

3) After initial contact. Assuming normal strength, it should not be necessary to transmit each call more than once during formal identifications at the beginning and end of each transmission. The formal first exchange might be the standard RST report, QTH, and name, in that order, and it should not be necessary to repeat any portion of this or any other transmission unless the word involved is unusual. Do *not* say, at the end of your transmission, "so bk to u." This is time-consuming and trite; the prosign AR says the same thing. Nor does the skilled operator say "so hw cpy?" If you are determined to be a lid, at least be original about it.

4) Ending QSO. If you are through with the other station, tell him so and don't drag it out. Say thanks and send one, and only one, 73 (not 73s). Send the prosign SK, then formal identification, then shut up. Avoid the Novice "shave-and-a-haircut" parting. It marks you as a juvenile, is often annoying at the other end and is of questionable legality.

5) C.w. first: Strive for perfect character formation and spacing. If the guy on the other end cannot read your sending you are just occupying valuable band space for no good purpose. Slow but perfect, code will convey intelligence faster than a sloppy 35 words per minute off an uneducated bug. Do not send any faster than you expect to receive, even when calling CQ, unless the other fellow asks you to QRQ. Don't be bashful about sending QRS, if necessary.

NOTHING MORE IRRITATING THAN A GUY SENDING A STRING OF R'S....

6) BK, good and bad: Regulations permit exchanges of transmissions without identification under certain conditions. The formal identification routine is time-consuming and the BK can be used to speed communications a great deal. Reread the regulations and use the BK, but don't forget the identification rules. Don't try to use BK unless you know that the other fellow knows what you are doing; otherwise, you will wind up with that frustrated feeling. Normal procedure is for one station to end transmissions with BK. The other station prefixes with BK and goes right into his transmission. Never use the trademark "so bk to u." If the other fellow knows and uses the BK procedure, he will pick up when you send "so bk . . ." and you will miss half of what he has to say while you are completing the formalities. If you *must* use this trite Novice accent, for Pete's sake spell out the word BACK.

7) Q signals: Learn the international signals and use them. You can convey a whole sentence — full of intelligence — with one three-character Q signal.

8) QRM. Before transmitting, *listen* on your frequency. If there is a QSO in progress do not transmit — wait or QSY. This is not only good operating procedure but it is also the civilized, gentlemanly thing to do. If you are not sure the frequency is clear, listen some more.

9) Tuning: Before tuning up your rig, follow the QRM rule carefully — a signal from a tune-up procedure is just as much QRM as any other signal.

10) Key clicks. Get a filter *before* you get your first complaint.

11) Abbreviations. There are standard abbreviations which everyone uses and understands. Learn and use them and do not try to remake procedure by dreaming up your own. Consult the list of miscellaneous abbreviations and Q code in *Operating an Amateur Radio Station* (ARRL booklet) as you operate.

(*Continued on page 162*)

• *Two-Meter DX Via Satellite Translator.*

Communicating Through Oscar III

BY ROBERT TELLEFSEN,* W7SMC/6 AND HARLEY GABRIELSON,** W6HEK

AMATEUR SPACE COMMUNICATIONS are due to begin this year, using the internationally allocated amateur space communications frequency assignment in the two-meter band. A new Oscar satellite, third in the series, is being readied for orbiting this fall. It will enable amateurs to establish two way contacts over distances of up to 2000 miles.

Oscar III

Oscar III is to be a radio-frequency translator. It will accept any number of input signals of any mode in a 50-kc.-wide channel (144.075 to 144.125 Mc.), and will retransmit these signals higher in the same band (145.925 to 145.875 Mc.). A signal entering the translator will be converted to a lower frequency (30 Mc.), amplified, passed through a 50-kc.-bandwidth filter, converted up to a frequency within the transmitting channel, amplified, and radiated from a dipole antenna. In this process, a signal entering the high-frequency end of the input channel will be reradiated at the low-frequency end of the output channel.

In addition to the translator, the Oscar III satellite package will contain two beacon transmitters. The first beacon (145.850 Mc.) will transmit the "HI" identifier. Three channels of telemetry will be transmitted, using the HI rate, as in Oscars I and II, plus two groups of variable-width pulses interspersed between the HIS. The second beacon (145.950 Mc.) will transmit a continuous carrier for special tracking purposes, such as for stations with phase-lock receivers For a more complete discussion of the Oscar III package, see the article by Art Walters, W6DKH, in an early issue of *QST*.

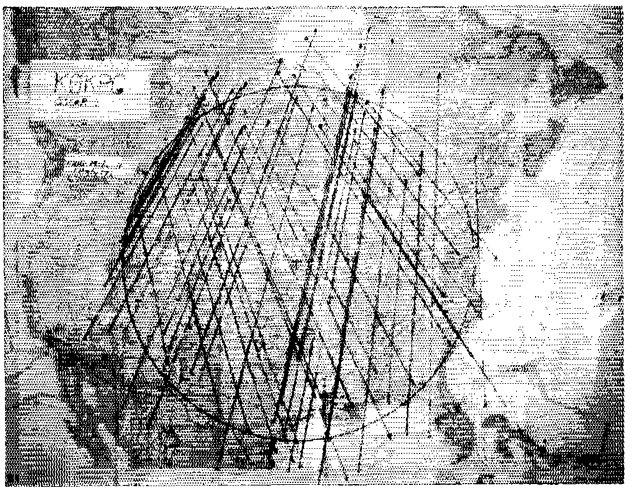
Doppler and Oscar III

The frequency inversion mentioned above is designed to reduce the total frequency shift observed by the receiving operator. A signal traveling from the ground to the satellite may shift as much as 8 kc. lower during a pass. If the inversion were not incorporated, the relayed signals would be shifted downward an additional amount between the satellite and the receiving station. The total Doppler shift could then be as much as 16 kc., but the inversion limits the shift to a maximum of 8 kc. The net frequency shift observed at the receiving station will be the satellite-to-receiver shift minus the transmitter-to-satellite shift. It will be possible to observe a net upward frequency shift for cases where the subsatellite track approaches closer to the transmitting than to the receiving station.

After they have been shifted by the Doppler effect, signals transmitted to the satellite must fall within the translator input channel frequency limits. There will be times when signals transmitted as much as 4 kc. outside the channel limits will be relayed through the satellite. At other times, signals transmitted as much as 4 kc. within the input channel limits will fall at the edge of or outside these limits. In the same fashion, signals relayed through the translator will be received at the ground at frequencies as much as 4 kc. above or below the frequency limits of the output channel.

Transmitting stations must transmit within the frequency range of 144.079 to 144.121 Mc. to be certain of entering the input channel of the translator for all relative positions of satellite and transmitter site. This is 8 kc. less than the width of the translator input channel. However, all or part of the frequencies from 144.071 to 144.079 Mc. may be used when the satellite is approaching the transmitting sta-

* 277B Tyrella Ave., Mountain View, California.
** 1150 Polk Ave., Sunnyvale, California.



Oscar II data provides a means of observing the geographic coverage by a tracking station. This information forms the basis for evaluating possible operating range when the satellite carries an active communications repeater unit. (Courtesy KØKPG)

tion. All or part of the frequencies from 144.121 to 144.129 Mc. may be used after the satellite has *passed the p.c.a.*,[1] *and is going away from* the transmitting station. At any instant, the usable channel width at a given ground location will be 50 kc. But, from all ground locations within range of the satellite, there may be stations transmitting over a 58-kc. range (144.071 to 144.129 Mc.).

The same considerations will apply to the translator output channel. Signals may be received from the satellite over the frequency range from 145.871 to 145.929 Mc. over a period of time, although, at any instant, the received band will be 50 kc. wide.

Ground Stations

The design of the Oscar III package involved a tradeoff between operating life, range of communication, and package weight. These factors established one watt as the average power output. The link calculations from the ground to the satellite were based upon 1 kw. e.r.p. (effective radiated power). One hundred watts into an antenna with 10 db. forward gain should do the job. It has been possible to obtain a transfer gain of 110 db. through the translator, which will make it possible for 1 kw. e.r.p. to drive the translator to one full watt of output at a range of 1000 miles. If one signal, or a combination of signals, exceeds 10^{-11} watts (110 db. below 1 watt), the a.l.c. system will limit the output to one watt by reducing the over-all gain of the translator.

When the translator is operating at maximum gain, the ground station transmitting power can be far less than one kw. e.r.p. At 1000 miles, 10 watts into a 10-db.-gain antenna would appear at the translator output at a power level equal to that of the Oscar II beacon transmitter. The same translator output can be obtained at the p.c.a. of an overhead pass with one watt into a horizontal dipole antenna.

Satellite Tracking

Here is where the tracking experience gained from Oscars I and II will pay off. Before an operator can communicate via any satellite, he must be able to acquire and track it. The most efficient use of Oscar II will be made by those operators who have the best prediction and tracking techniques, and who are, at all times during a pass, able to visualize the relative positions of the satellite and the station they are contacting.

Some idea of the possible area of coverage may be obtained by mapping observations from the earlier satellites, as was done for the Oscar II reports submitted by KØKPG (see map, left). His operating range to the subsatellite track is about 1200 miles in nearly all directions, although there seems to be a zone between 270 and 315 degrees where it is limited to about 1000 miles. This is still very good performance, considering that the median range limit for all reporting stations was 1000 miles. For those stations that submitted Oscar II reports (including latitude and longitude), the Project Oscar Association can, on request, provide the information needed to map their observations.

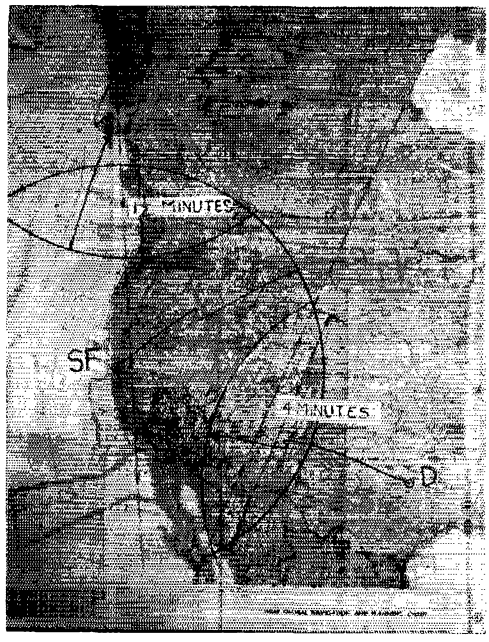


Fig. 1—The overlapping areas of 1000-mile range arcs around San Francisco (SF), Juneau (J), and Dallas (D) shows the zones where inter-city contacts are possible by way of a repeater satellite.

Once the Oscar II reports have been mapped, the pattern can be extended radially about 1000 miles to show the normal coverage which may be expected for Oscar III. Lacking this, a circle of 2000 miles' radius should cover the normal communication range. A 1000-mile-radius circle will define the area over which the satellite must pass before any communication would be possible. The nearer the target is to the 2000-mile circle, the fewer contact opportunities will occur, and the shorter will be their durations. The great circle direction between the stations will also

(Continued on page 166)

GLOSSARY OF TERMS

Subsatellite Point: The point where a line joining a satellite with the center of the earth would intercept the surface of the earth.

Subsatellite Track: An imaginary line described on the surface of the earth by the motion of the subsatellite point.

PCA: The Point of Closest Approach is the location along an orbit where a satellite is at its nearest to an observing station.

TCA: The Time of Closest Approach is the time during a pass when the satellite is at its p.c.a. Also the time when Doppler shift of signals between satellite and observer is zero.

Acquire: The initial reception of signals from a satellite on a given pass.

[1] Point of Closest Approach. A glossary of terms used in this article appears on this page.

Armed Forces Day

★★★★★★★★★★★★★★★★★★★

POWER FOR PEACE

THE three MARS Branches, Army, Navy and Air Force, in recognition of the unique communications potential of the amateur radio fraternity, will again join efforts to present the Armed Forces Day Communications Tests May 16–17.

The tests are open to amateurs everywhere. This yearly event is the only instance when amateurs may legally work crossband with the military stations taking part. Operating the military stations, as usual, will be guest operators in addition to the regular personnel. "An outstanding number of contacts," says the official announcement, "will demonstrate that there is indeed Power for Peace in the communication freedom enjoyed by the U. S. amateur, and that the close partnership with the military can be a healthy and mutually beneficial relationship in our free society."

Certificate and QSL Awards

Every amateur who works designated military stations will be eligible for a QSL. In addition, solid copy of the c.w. or RTTY message from the Secretary of Defense will earn a certificate.

Schedule and Procedures

Each transmission for the receiving contests will commence with a ten-minute call to permit listeners to select their station and frequency and adjust their equipment.

The ten-minute call will be followed by competition instructions and the Armed Forces Day message. The message will be sent one time only, simultaneously, by all stations. Copy should be submitted "as received" with no attempt made to correct possible transmission errors.

Time, frequency and call of the station copied, as well as the name, call (if any) and address of the entrant should be indicated *on the page containing the text.* Every year there are a large number of perfect copies that do not result in certificates because this information is not submitted or is detached.

Competition entries should be submitted to the Armed Forces Day Contest, Room 5B960, the Pentagon, Washington, D.C., and postmarked not later than May 31, 1964.

C.W. Receiving Contest

*Time**	*Transmitting Station*	*Frequencies (kilocycles)*
170300 GMT	WAR, NSS, AIR (Army, Navy and Air Force radio Wash., D. C.)	3347, 3385, 4015 5200, 6970, 6992.5 7301, 7680, 13,995 14,405
170300 GMT	A6USA (Army radio San Francisco)	6997.5
	NPG (Navy radio San Francisco)	4005, 7301.5, 13,920
	AG6AA (Hamilton AFB, Calif.)	7832.5

*Six-digit times include date (16 or 17) and four-digit time (170300 is 0300 on the 17th.)

RTTY Receiving Contest

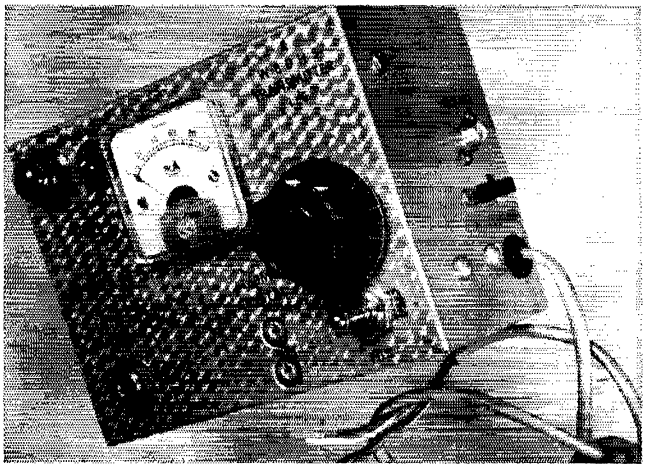
Time	*Transmitting Station*	*Frequencies (kilocycles)*
170335 GMT	WAR, NSS, AIR (Washington, D. C.)	3347, 4012.5, 6992.5, 7305, 7380, 14,405, 14,480
170335 GMT	AG4AA (Randolph AFB, Texas)	4455
	A5USA (Ft. Sam Houston, Texas)	4025
170335 GMT	A6USA	6997.5
	NPG	4001.5, 7455, 13,895
	AG6AA	7832.5

Military-to-Amateur Contacts

Military stations WAR, NSS and AIR will be on the air from 1400 May 16 to 0245 May 17 (GMT). NPG will operate from 1800 GMT May 16 to 0800 GMT May 17, discontinuing amateur contacts from 0245 to 0400 GMT to allow for broadcast of the c.w. and RTTY Armed Forces Day messages (schedule above).

Station	*Military Frequencies*	*Appropriate Amateur Bands (Mc.)*
WAR (Army radio, Wash., D.C.)	4001.5 (c.w.)	3.5 to 3.8
	4020 (a.m.)**	3.8 to 4.0
	6992.5 (c.w.)	7.0 to 7.2
	7325 (c.w.)**	7.2 to 7.3
	14,405 (u.s.b.)**	14.2 to 14.35
NSS (Navy radio, Wash., D.C.)	3365 (c.w.)	3.5 to 3.65
	4015 (c.w.)	3.65 to 3.8
	6970 (c.w.)	7.0 to 7.1
	7301 (c.w.)	7.1 to 7.2
	14,480 (c.w.)	14.0 to 14.2
	4040 (a.m.)**	3.8 to 4.0 and 7.2 to 7.3
	14,385 (s.s.b.)	14.2 to 14.35
	4012.5 (RTTY)	3.5 to 3.8
	7380 (RTTY)	7.0 to 7.2
	14480 (RTTY)	14.0 to 14.2
NPG (Navy radio, San Francisco)	3357 (c.w.)	3.5 to 3.65
	4005 (c.w.)	3.65 to 3.8
	6835 (c.w.)	7.0 to 7.1
	7301.5 (c.w.)	7.1 to 7.2
	13,920 (c.w.)	14.0 to 14.2
	4045 (a.m.)**	3.8 to 4.0
	13,975.5 (s.s.b.)	14.2 to 14.35
	4001.5 (RTTY)	3.5 to 3.8
	7375 (RTTY)	7.0 to 7.2
	13,547 (RTTY)	14.0 to 14.2
AIR (Air Force radio, Wash., D.C.)	3397.5 (c.w.)	3.5 to 3.8
	6997.5 (c.w.)	7.0 to 7.2
	13,995 (c.w.)	14.0 to 14.2
	20,994 (c.w.)	21.0 to 21.25
	7305 (l.s.b.)	7.2 to 7.3
	14,397 (u.s.b.)	14.2 to 14.35
	7332 (RTTY)	7.0 to 7.2

** Operators transmitting on these frequencies will listen for a.m. and s.s.b. signals within the appropriate bands.



To the upper left of the meter are the panel lamp (I_2) and the indicator lamp (I_1). Below are the microphone jack, crystal socket and filament switch. The small dial controls the amplifier tuning capacitor. On the side of the box are the phono-jack antenna connector, slide switch S_1 and a grommetted hole for the power cable.

The OHS 160-Meter Transmitter

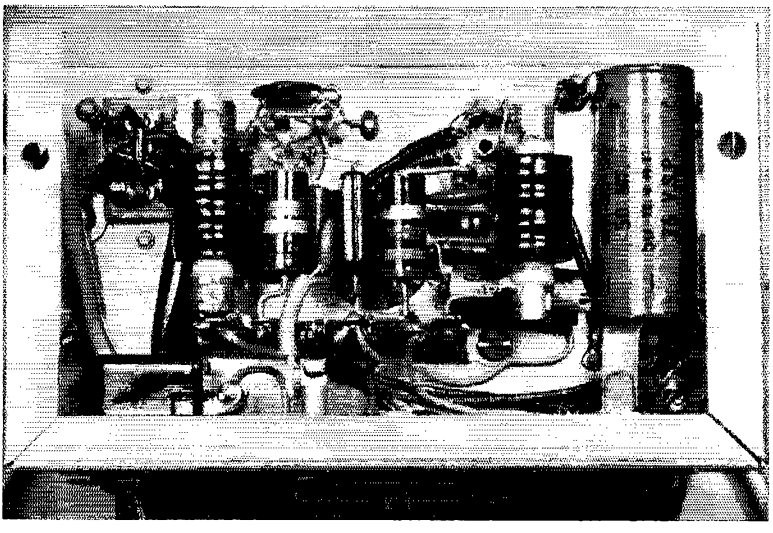
BY MORRIE WRIGHT,* W8OHS

MANY hams who like to work low power have found the 160-meter band a good place to operate. Both in daylight and during the evening hours, this band is likely to be less crowded than higher-frequency bands and is less subject to their vagaries for nighttime operation. The little 3-tube rig shown in the photographs, running at an input of 8 to 10 watts, provides complete coverage of Detroit, and distances out to 40 miles in daylight or 100 miles at night in fixed-station operation. It is also readily adaptable to mobile operation. Its dimensions are small enough to fit into the glove compartment of most cars, thus overcoming the objections that some XYLs have to a mobile installation.

* 19723 Waltham, Detroit 5, Michigan.

Circuit

The circuit is shown in Fig. 1. The triode section of a 6AN8A is used in a crystal oscillator



Most of the small components under the chassis are mounted by soldering them between a tie-point strip and the tube-socket terminals to which they connect.

which drives a 12AQ5 final amplifier having a pi-network output circuit. I_1 is an auxiliary resonance indicator; it may also serve as an overmodulation indicator. It is a handy thing to have for mobile operation when it is too dark to read the meter. Just tune for minimum brilliance.

The pentode section of the 6AN8A is used in the speech amplifier which drives the plate-screen modulator — another 12AQ5. By using a grounded-grid speech-amplifier circuit, the need for a transformer for the carbon microphone is eliminated. I found that an F-1 carbon-button microphone worked the best of those I tried. The center-tapped primary of a speaker output transformer is used as a 1-to-1 modulation transformer.

Fig. 1 also shows the heater connections for 12-volt operation. For 6-volt operation, 6AQ5s could be substituted for the 12AQ5s, the 30-ohm resistor would be eliminated, and the panel lamp connected in parallel with the heaters.

Construction

The photographs cover the essential points of construction pretty well. The container is a two-piece aluminum box measuring 3 by 4 by 5 inches (Bud CU-2105-A Minibox). The chassis is a sheet of copper-coated phenolic, approximately 3 by 5 inches, held about 1 inch from the bottom of the box by short lengths of aluminum angle fastened to the sides of the box. An aluminum plate would be equally satisfactory. The copper coating is a convenience, since ground connections can be made by soldering directly to the copper. With an aluminum chassis, these connections have to be made to a lug under a mounting screw which may not always be accessible, or at a suitable point on the chassis, in compact construction.

In mounting the coil, a strip of ¼-inch lucite or polystyrene about 1 inch longer than the coil is trimmed to fit snugly inside the coil between two opposite coil-supporting strips. A hole is drilled in the one inch of strip that protrudes beyond the coil at the panel end. A 1¼-inch machine screw and a one-inch tubular spacer are used in fastening the coil assembly to the side of the box.

To provide ventilation, half-inch holes were drilled over the top and back areas of the box cover. Along the 5-inch axis of the top surface there are three parallel rows of five holes each, on centers spaced ⅛ inch; the rows are spaced ¾ inch apart. There are four similar rows across the back surface.

Operation

The unit requires a power supply delivering 250 to 325 volts at not less than 100 ma. Fully loaded, the final draws 25 to 30 ma.

The rig should work well into almost any type of current-fed antenna system. For mobile work,

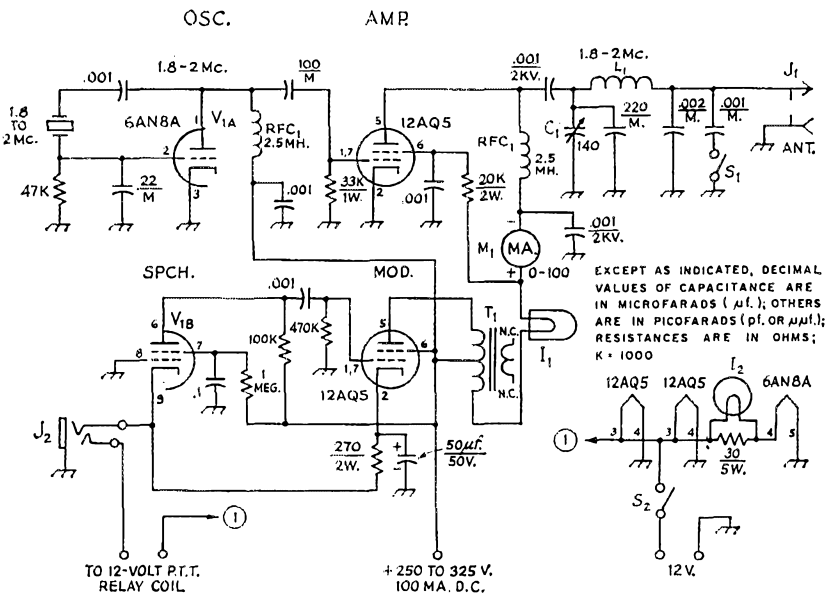
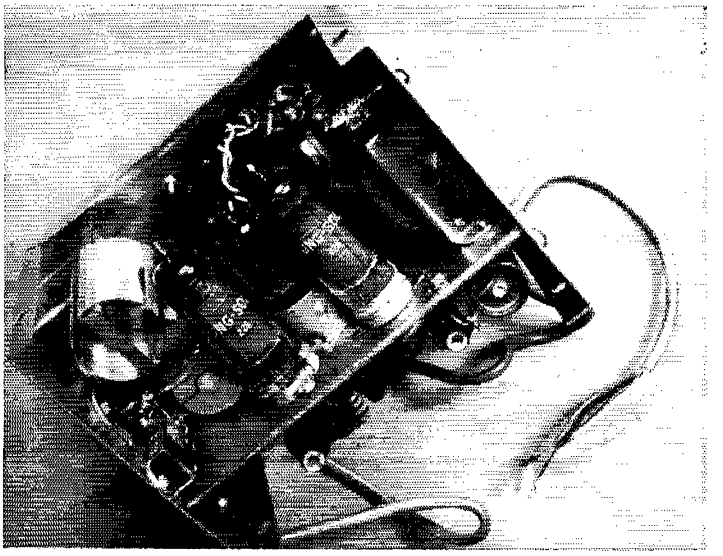


Fig 1—Circuit of the OHS 160-meter transmitter. Fixed capacitors: polarity marking indicates electrolytic, M indicates mica; others are disk ceramic or paper. Resistors: ½-watt composition unless otherwise indicated.

C_1—Midget 140-pf. air variable (Hammarlund HF-140 or similar).
I_1—2-volt 60-ma. dial lamp (No. 49).
I_2—6-volt 250-ma. dial lamp (No. 44).
J_1—Phono jack.
J_2—Three-circuit jack.
L_1—56 turns No. 24, 1-inch diam., 1¾ inches long (B & W 3016 or Air Dux 832T).
M_1—0-100-ma. d.c. meter (1½ inches).
S_1—S.p.s.t. slide switch.
S_2—S.p.s.t. toggle switch.
T_1—Any speaker output transformer with 10,000-ohm, center-tapped 40-ma. or more primary. Secondary not used.



The three tubes are grouped at the center, r.f. amplifier to the left, oscillator/speech amplifier center, and modulator to the right, next to the modulation transformer. The pi-network components and coax output connector (a phono jack) are to the left. The large resistor over the modulation transformer is the series resistor for the 6AN8 heater.

I use a center-loaded whip with which I have no trouble in working stations within a 35-mile radius. For fixed-station operation, I use a base-loaded 45-foot vertical, and have worked stations in New York, Pennsylvania, Ohio, Indiana and Illinois with quite nice reports. Several of these units are being used in the Detroit area and elsewhere with equivalent results. QST

25 Years Ago this month

May 1939

It was ARRL's twenty-fifth birthday. The May 1939 editorial briefly chronicled the first quarter-century and thanked members for their support.

. . . The biggest DX Contest of them all was going into the books. Huge scores were rolling into ARRL Contest Central, and one of the staffers took enough time out to report that two Norfolk, Va., hams, W3EMM and W3CHE, had the high U.S. scores on phone and c.w. respectively.

. . . W6GPY and W6ZA went "Exploring Below One Meter" with a 325-Mc. station; an article called "Long-Distance Set that Really Tunes" by Beckley, 3JS, written for the first *QST* (December 1915), finally made it into print after 25 years in the files; W7GBY told how to build a 3-el 20-meter beam for $16.61; and CM2AD wrote up a "Rig for the Lean Purse." Other technical articles were by W2AOE ("Preselection Pointers"), W8QAN ("Building Reliability into the Portable Rig"), W6GNR (an all-band half-kilowatt) and W9DUD (a 5-, 10- and 20-meter converter for home or mobile use). ARRL staffers W1DF and W1TS wrote technical pieces, and DeSoto had a progress report on the League's worldwide Safety Campaign.

. . . Results of the 1938 Copying Bee were in, and winners with 100% copy were CM2OP, W2ECL, W2ICX, W3EEN, W8APQ and W8BCV.

. . . Times Have Changed Department: G6WY headed the DXCC standings with 144, only eight amateurs were listed as Silent Keys, 30 clubs sported 100% ARRL membership, and only five hamfests were reported in the May 1939 Hamfest Calendar.

COMING A.R.R.L. CONVENTIONS

May 9–10 — New England Division, Swampscott, Massachusetts
May 23–24 — Oregon State, Klamath Falls, Oregon
June 12–14 — West Gulf Division, Brownwood, Texas
July 4–5 — West Virginia State, Jackson's Mill, W. Va.
July 11–12 — Rocky Mountain Division, Estes Park, Colo.
August 21–23 — ARRL National, New York City
Sept. 5–6 — Maritime Province, Charlottetown, P. E. I.
September 11–13 — Southwestern Division, Palm Springs, California
September 25–27 — Pacific Division, Sacramento, California
Oct. 16–17 — Ontario Province, London, Ont.
Oct. 17 — Michigan State, Grand Rapids, Mich.

OUR COVER

The theme of our cover this month hardly needs any further explanation. We did want, however, to be sure that you caught the name of the artist — Harry R. Hick. Harry is a long-time friend of *QST*'s, as he has been doing covers and schematics ever since April, 1916, and has the distinction of having contributed something to *every* issue since then!

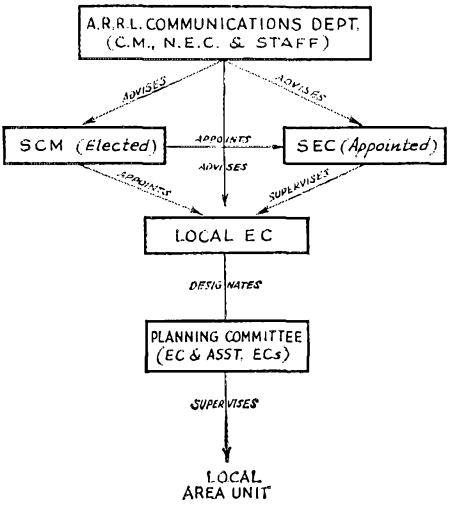


Fig. 1—The AREC superstructure, showing type of jurisdiction exercised by various officials.

The Amateur Radio Emergency Corps

How the Emergency Division of ARPSC Is Organized and What It Does

BY GEORGE HART,* WINJM

IT WAS as far back as 1935 that what we now know as the Amateur Radio Emergency Corps, emergency division of the Amateur Radio Public Service Corps, was started. A note in September *QST* for that year asked amateurs interested in signing up for emergency communication to write in to headquarters. In the November issue the first list of members appeared and initial instructions suggested that all members contact civic officials to offer their services, the goal being to have at least one AEC (ARRL Emergency Corps) member in every community.

From this meager beginning, the AEC soon blossomed into a corps of dedicated amateurs too large to be handled direct from the headquarters. Local emergency coordinators were appointed in 1937. After the war, as the need for more decentralization became apparent, Section Emergency Coordinators were established as an SCM appointment.

In 1947 the League's Board of Directors decided a headquarters staff member was needed to take organizational leadership details off the shoulders of the Communications Manager, and a National Emergency Coordinator was hired.

* National Emergency Coordinator, ARRL.

In 1951 the AEC became the AREC, and just last year the AREC became the Emergency Division of ARPSC.

This is but a thumbnail chronology that does not begin to describe the organizational evolution of your amateur emergency communications facility — nor is it our intention here to do so. We insert it merely to show that the AREC is no johnny-come-lately facility and its plan of operation is not something thought up and untried. The AREC has been "through the mill" of experience, its organization and methods of operation have stood the test of time. Today it little resembles the handful of volunteers who got it started 29 years ago because, like all living things, it adapts itself to present conditions. We could go on for pages on the changes that have occurred and what occasioned them, but let's not. Let's talk about the AREC as it is today.

Organization

There are three levels of AREC organization — national, section and local. But it is at the local level where most of the emergency organizing gets accomplished, because that's the level at which most emergencies occur, at which AREC officialdom makes direct contact with the AREC member volunteers and with officials of the to-be-served agencies. Of course official contacts take place at national and section level also, so let's dispose of these levels first so we can get down to business.

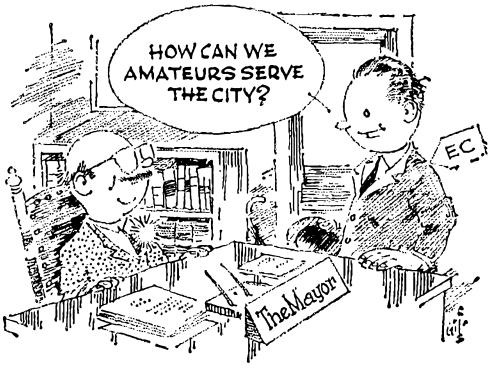
The National Emergency Coordinator at ARRL headquarters works under the direct supervision of the ARRL Communications Manager, and is responsible mainly for advising all AREC officials regarding their problems, maintaining contact with federal government and other national officials concerned with amateur emergency communications potential, and in general with carrying out the League's policies regarding public service communications. At section level, the Section Emergency Coordinator is appointed by the Section Communications

Manager (who is elected by section ARRL members) and works under his supervision. In most sections, the SCM and SEC work together in setting up a section emergency communications plan, and in appointing local ECs to implement it; in some, the SCM leaves it entirely to the SEC, who nevertheless must have the SCM's approval of everything he does. Some of our sections with capable SECs are organized to the hilt. A few have scarcely any organization at all. It depends almost entirely on whom the section members have put into office as SCM and whom he has appointed as SEC.

The local Emergency Coordinator is the key man in AREC. Depending on how the SCM-SEC team has set up the section for administrative purposes, he may have jurisdiction over a small community or a large city, an entire county or even a group of counties. Whatever jurisdiction is assigned, the EC is in charge of *all* AREC activities in his area, not just one interest group, one agency, one club or one band. The specialists are headed up by "assistant emergency coordinators." These are not SCM appointees, but designatees of the ECs. Usually, they are designated to supervise activities of groups operating in certain bands, especially v.h.f., which play an important role at the local level; but they may be designated in any manner the EC deems appropriate — for example, an s.s.b. group, a Red Cross group, a mobile group, a club group or the area on the other side of town. If the ECs are the captains or lieutenants of the AREC, the assistant ECs are the sergeants. The EC and his assistants constitute the local AREC Planning Committee and meet together from time to time to discuss problems and plan projects to keep the AREC group active and in a high state of training.

There are any number of different situations and circumstances that might confront an EC. His job is not likely to be monotonous or humdrum. An EC for a small town may find that the licensed amateur group is so small that appointing assistants is unnecessary or undesirable. On the other hand, an EC for a large city may find that his AREC group is so large that even his assistants need assistants and sometimes it is necessary to set up a special organization to handle it.

One of the important functions of your local EC is to make official contacts. He might call on Hizzoner the Mayor, just to identify himself and



set the wheels in motion, then make himself known to police and fire chiefs, the Red Cross chapter chairman, the c.d. director, officials or representatives of utility companies, newspapers, radio and TV stations. *Or*, if his organization is large enough to make the necessary personnel available, he can designate other AREC members to take care of some of these public relations and diplomatic functions. After all, the EC is only one person, and where there are too many things for one person to do, some of it has to be delegated. The ability to delegate functions is one of the attributes of successful leadership.

As an average Joe interested only incidentally in taking part in AREC, you may think that the EC's functions and troubles are not your concern. If so, you are dead wrong, brother; because the EC cannot function at *all* without the understanding, sympathy and help of the AREC membership. A good leader, no matter how astute, cannot function unless he has someone

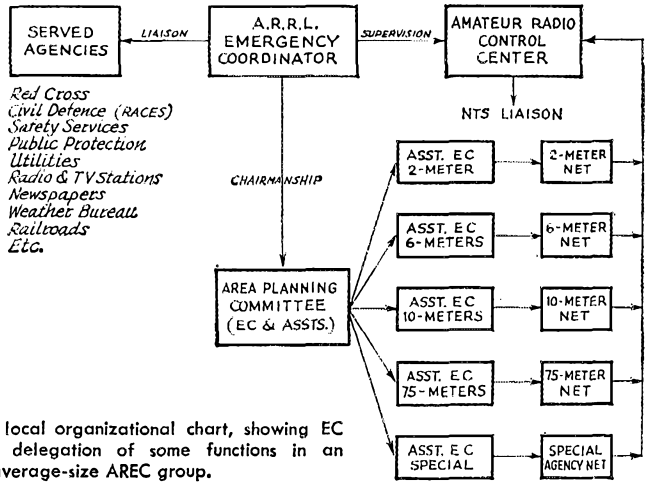


Fig. 2—Sample local organizational chart, showing EC supervision and delegation of some functions in an average-size AREC group.

to lead. If his people refuse to be led, he, to use a vernacular expression, has had it.

Operation

It is the intention that the AREC will operate mainly during emergencies, handling mainly local communications but in accordance with standard ARRL message-handling and operating practices, which are discussed in detail in the booklet *Operating an Amateur Radio Station.* The keynote of AREC operation is *flexibility.* We usually don't know just what kind of an emergency situation we may have to deal with, and so we have to be ready for almost anything. This is one of the biggest reasons we give, in *QST*'s ARPSC column, some details on tests, drills and actual emergency operations of AREC and other amateur groups throughout the country. Did you think it was just publicity? Oh no, this is only part of it. Every amateur reading about such activities elsewhere is supposed to apply them to his own situation, to ask: "Could this happen here? If it did, could we handle it? Would this be a good test for us to conduct?"

Usually local AREC operation will take the form of nets. In the average active group there will probably be a couple of v.h.f. nets, maybe a low-frequency phone net. It is usually not possible to have everyone operating in a single net because there are too many different interests involved in the average group of amateurs, each group equipped for its own specialty. Usually, however, there are at least one or two amateurs whose interest is varied enough to make them valuable as liaison operators between the nets — for local AREC nets must have liaison to be effective. Another way to accomplish liaison is to operate an amateur control center, where internet traffic can be centralized and distributed, and where traffic destined to and coming from outside points can be handled.

This brings up the important matter of outside contact. No AREC group is a complete operating entity unless it has regular and reliable radio contact with the "outside." Our national AREC plan envisages that this shall be accomplished via the National Traffic System. The amateur control center (or whatever name you want to give it) must be part of each local net and at the same time report into the section NTS net, or one of them if there are more than one, or into *some* NTS net if there is none in the section. If there is no AREC control center as such, then stations designated by the EC serve as liaison to NTS nets. *Whatever circuit is used, it can be made reliable only by frequent use in normal times.* AREC nets, to be effective in emergencies, should conduct sessions at least once per week, make the required NTS connection and serve as "local" NTS nets for such an operation. Such use of AREC nets in normal times combined with special operation of NTS in emergency times is what binds AREC and NTS together to form ARPSC. We'll talk about normal operation of NTS in another article. For the present, suffice it to say that in an emergency the NTS nets required to be in operation *will* be in operation to serve as carriers of medium and long haul traffic. That's their job. The job of the AREC nets is to handle local communications and maintain liaison with NTS nets.

In addition to maintaining local liaison among nets within an AREC area of jurisdiction and with an NTS net, it is always helpful to maintain connection with adjoining AREC groups. Very frequently such groups have to work together.

> Emergencies have a habit of not observing arbitrary jurisdictional or political areas. Therefore, ECs of adjoining communities, counties or whatever areas are used should know each other and be familiar with operating patterns, and in preparation for emergency operation have a means for working together, even though they may be in different ARRL sections, states, divisions, call areas, or even countries. In organizational competition, you may exult that your group is superior to an adjoining one; but in emergency operation, the better all AREC groups are organized the more effective is the service rendered.

In sections having large populations it is usually advisable to maintain regular connect-

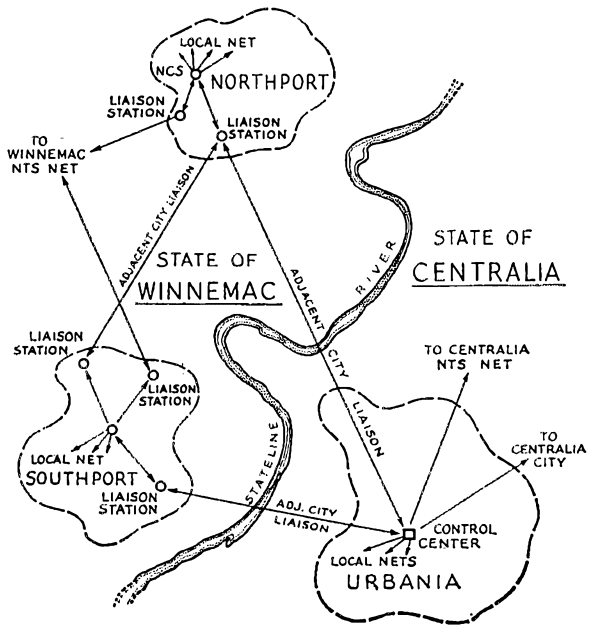


Fig. 3—Although Urbania is in a different state from Northport and Southport, adjacent-city liaison is maintained with both. Note different organizational set-up, with larger Urbania maintaining a control center. Each city maintains liaison with its NTS section net. Local nets and adjacent-city liaison will usually be v.h.f., NTS liaison usually h.f.

ing links between large cities, because traffic is almost certain to be heavy between and among them in an emergency. Some sections and states are even organized on this basis, with a section net interconnecting all such "key" cities on a 24-hour emergency basis, and intra-city "intercom" nets on v.h.f. Where population is more or less concentrated in several urban areas rather than scattered throughout rural areas, this can be an effective basis for your section operating plan.

It can be seen from the foregoing that whatever plan of operation is used, the principal and essential element is that we all work together, regardless of our personal operating preferences, to accomplish our ultimate public service objective. This means phone men and c.w. men, v.h.f. men and h.f. men, RTTY addicts and s.s.b. enthusiasts, mobileers and armchair operators, techs and generals, novices and old timers, high school students and graduate engineers. *There is a place in the AREC for any amateur who wants to take part.*

How Do I Get In?

The practical application of the last sentence in the preceding paragraph isn't always easy. Nearly every day the fact that it is sometimes difficult for an interested amateur to join the AREC is brought to our attention. It's easy enough to say, "See your EC," and leave the poor guy dangling, but this doesn't always do the trick. Who *is* the EC, and suppose there is none, *then* what? Or suppose there is an EC but he won't pay any attention to your requests for information?

The old saw that "circumstances alter cases" was never truer than in AREC organization. We can't cover all possibilities in one example, but let's assume that you are a young amateur full of enthusiasm and vigor who has spent his first couple of years on the air rag chewing and working DX and general fiddling around to no really good purpose, and who's tired of it. You remember that when you joined the League (You didn't? Tch, tch! But you are *still* eligible for AREC) there were some AREC forms enclosed, along with a letter from Johnny Huntoon telling you about this and all the other advantages of being a ham and joining ARRL. You dig them out of the bottom of your drawer and browse through them, and you're impressed. You decide by golly you'll do it, you'll get out there and do your part and stop letting "George" do it. So you fill out the AREC registration in full detail.

Then what? It says forward to your EC, SEC or SCM. You not only don't know who they are, you don't even know what the initials stand for. So you look on page 6 of *QST*, like it says, and sure enough, there are all the SCM's addresses, which you never noticed before. So you mail your SCM the registration form, then sit back and wait for things to happen.

Up to this point, your experience is fairly typical, but from here on in, the variables are tremendous. Of course, knowing your EC in the first place is a big advantage, because you can put the bee on him directly; we'll be glad to tell you the name and address of your EC if you have one. Otherwise, your SCM will forward your registration to your SEC who will see that it reaches the EC covering your area, who will issue your AREC membership card and advise complete details of the local set up, possibly assigning you a spot in a net and requesting your attendance at the next get-together.

"LET THE AREC PUT YOU IN THE DRIVER'S SEAT"

Sometimes there is no EC. In this case, the SEC will issue your AREC membership card and hold your registration until an EC is appointed. If you are eligible, he might ask if you would be interested in the appointment.

Sometimes you will send in the form (Form 7, we call it) and just *nothing* happens. If you're persistent (and we hope you will be!), you'll probably write to headquarters about it, and we'll tell you to try again, this time giving you the address of your EC (if any) and your SEC and sending a copy of our reply to both, plus a copy to the SCM. This should bring results. If it doesn't (alas, it sometimes doesn't!), you probably need some new AREC officials, and *maybe* a new SCM. The AREC is sponsored by the League, and ARRL members elect the SCM. You don't have to be a League member to belong to and participate in AREC (we want *all* amateurs to do this), but you must belong to ARRL to be an SCM-appointed official (EC or SEC).

Once in a while you run into a case where you cannot get action from your EC, SEC, SCM or *anyone*. We don't blame you for being irked, after all the propaganda urging you to join the AREC. The natural thing to do is throw up your hands in disgust and go back to ragchewing. But if you do this, and all other amateurs locally do this, and everybody does it everywhere, we'll never get anywhere; because, after all, AREC organization is basically a local function. *Someone* has to take the lead. If that someone cannot be you, this may be understandable, but it does not alter the desirability nor the necessity for having an active AREC group everywhere that amateurs exist. When disaster strikes and there are no amateurs prepared to do the job which is our inheritance and our mandate, no one is going to excuse us because we were too busy with personal affairs to bother about it. Someone has to do the job.

Why not *you?* QST

Goldwater Bill Gets House Hearing
House Hears Fee Opposition Bill
Seaman TVI Case Prehearing Conference
Technical Change in Renewal Rules

GOLDWATER BILL GETS HOUSE HEARING

On February 20 the House Committee on Interstate and Foreign Commerce, with Chairman Oren Harris presiding, held a hearing on H.R. 9035. The text is identical to that of the Goldwater bill S. 920, already approved by the Senate. It would permit the U.S. to enter into agreements with other countries whereby each would allow amateurs of the other country to operate while visiting, on terms similar to those in effect between the U.S. and Canada. ARRL President Hoover presented League testimony supporting the bill, and Commissioner Rosel Hyde appeared to record with the Committee that FCC had no problems with the proposal. Written statements of Senator Goldwater and others in favor were added to the record. No opposition was expressed and the few questions by the Committee indicated a favorable disposition toward the bill. Late news of progress on reciprocal operating will be transmitted from W1AW and official bulletin stations, and will appear in this department of the earliest available issue of *QST*.

The text of W6ZH's remarks at the hearing will appear in this department next month.

HOUSE BILL ON LICENSE FEES

A hearing was held by the Communications and Power Subcommittee of the House Committee on Interstate and Foreign Commerce on March 4-6 to consider H.R. 6697, a bill to prohibit FCC from charging fees without the specific authorization of the Congress. Representative Walter Rogers of Texas, who introduced the bill, presided at the hearing as chairman of the subcommittee. Among those speaking in favor of the bill (and thus opposed to license fees) was ARRL General Manager Huntoon. No one spoke against the bill except the Federal Communications Commission. Congressional feeling is not necessarily against fees as such; there are those who feel that correlated fees should be adopted by Congress to be charged by all government agencies for the services rendered to private interests. Indeed, another bill, H.R. 836, would authorize each agency to adopt fees. Some Congressmen think that the Commission went further in this matter than Congress intended them to do when it passed the 1952 appropriation bill, on a rider of which the FCC fee action is based.

Meanwhile, the Federal Court of Appeals in Chicago is reviewing the FCC fee action on petition by ARINC and other aviation interests, joined as intervenors by the League and other parties. The Court is to determine whether FCC had sufficient Congressional authority, and if so, to see whether FCC carried out its instructions from Congress. The ARRL brief, filed in March, alleges that the fees are improper as applied to the amateur service, inasmuch as the amateur service is "engaged in the transaction of official business of the Government," in handling emergency communications, in TVI Committees, in OO work and as volunteer examiners. The Court is expected to hold oral argument in May, and the League plans to participate.

Meanwhile, FCC is collecting fees for license applications, depositing the fees in a special Treasury account so that they can be returned to payers if Congress or the court overturns the Commission's fee system.

SEAMAN CASE

In February *QST* we reported briefly on the case of Charles A. Seaman, K3IOP, who, while operating on six meters as a Technician, and in spite of the fact that FCC field personnel found his equipment to be okay and demonstrated the effectiveness of high-pass filters, ran into continuing neighborhood TVI problems which developed into a full-scale political hassle. K3IOP passed the General Class exam last August. In October a General Class license was issued to Butch with the condition that he not operate on six meters; this procedure is rare, but is provided for in FCC rules. Two of the six commissioners present dissented to the imposition of the condition quoting Commissioner Bartley. ". . . Since, based on all the evidence at hand, the licensee is operating in accordance with the rules."

Seaman requested a hearing, as provided by Commission rules in such cases, and a hearing was ordered on three issues: (1) To determine the nature and extent of interference to television reception in Elizabeth, Pennsylvania and nearby surrounding area, created or likely to be created, by applicant's operation of his amateur radio station in the 50-54 Mc. band. (2) To determine, if interference is caused by the applicant's operations, what measures, if any, can be taken by either the applicant or the persons receiving such interference to eliminate or reduce such interference. (3) To determine, in the light of the evidence adduced under the foregoing issues, whether the public interest, convenience and necessity would be served by the applicant's operation in the 50-54-Mc. band and what, if

any, conditions should be attached to his operation in that band.

The League and the Borough of Elizabeth were permitted to intervene as "parties respondent." At a prehearing conference held on February 26, 1964, counsel for Seaman (Irwin I. Tryon, W3WFR, John H. Elder, W3RSB, and Quayle B. Smith, W3KDR, all serving voluntarily without pay) and for the League (General Counsel Booth, W3PS) argued that only technical issues specified in the hearing order could be taken up. Counsel for the Borough and for the Safety and Special Radio Services Bureau of FCC argued that Seaman's intentions, conduct, and qualifications to hold a license at all were at stake. The hearing examiner ruled in favor of K3IOP on this point. The Borough and the Bureau appealed the Hearing Examiner's ruling, and written briefs were filed by all parties.

As this copy is written in late March, no date for a further pre-hearing conference nor for the hearing itself had been set.

The documents filed so far are quite extensive and would take up several *QST* pages. The League's opposition to any enlargement of the issues is summed up in this extract.

The League respectfully submits that the Hearing Examiner's ruling limiting the scope of the issues to technical matters was correct and should be affirmed, and that the issues should not be enlarged.

The League has been greatly disturbed by this case from its very outset. Efficient utilization of the entire radio spectrum can be achieved only by proper allocation of frequencies and by proper design, installation, maintenance and operation of equipment. Each service must learn to live with its neighbor in the spectrum. Unless both cooperate as good neighbors and utilize up-to-date equipment and techniques, one service will suffer objectionable interference from the other. Understanding and cooperation is essential to interference-free operation.

The facts available at this time indicate a breakdown in understanding and cooperation. Seaman, who was 15 years of age when he first received his Technician Class license, apparently has been unsuccessful in his efforts to explain to his neighbors why cooperation is a prerequisite to interference elimination. Some complainants apparently have failed to recognize that use of properly designed, installed, maintained and operated television receivers is essential unless licensees of other services are to be unduly penalized, and have been unwilling to even install simple high pass interference elimination filters at the antenna input terminals of their receivers. Seaman apparently has been blamed for all interference, whether from his station or from other sources.

The League has serious doubts concerning the legality of the present hearing and so indicated at the prehearing conference. If the issues are interpreted or enlarged as requested by the Bureau, the hearing will become one to punish Seaman for past operations and not one to determine if operation in the 50–54 Mc/s band may be conducted in the future without causing objectionable interference to properly designed, installed, maintained and operated television broadcast receivers in Seaman's neighborhood. If Seaman has violated any rules of the Commission, a forfeiture may be imposed under Section 510(a) of the Communications Act of 1934, as amended, a cease and desist proceeding may be instituted under Section 312(b) of the Act, or a revocation of license proceeding may be instituted under Section 312(a) of the Act. However, a hearing on an application for license cannot be used as the vehicle for imposition of punishment or other sanction unless the basic qualifications of the applicant are at issue. In granting Seaman's General Class license, even with the condition attached prohibiting operation in the 50–54 Mc/s amateur band, the Commission found that he has the basic qualifications to be a licensee. Thus, the evidence which the Borough of Elizabeth and the Bureau desire to present may only be presented in a hearing on a cease and desist or a revocation order. It is respectfully submitted that it is impossible to lawfully interpret or enlarge the issues as requested by the Bureau.

In the Opposition filed by K3IOP's attorneys is this paragraph.

6. This is a case which cannot be properly tried by an endless parading of witnesses who would testify along the lines that "once upon a time I heard Seaman on my television set" or "Seaman deliberately ruined my picture one night when I was trying to watch Gunsmoke," or "Seaman made a nasty remark about my 1954 Crosley TV." In this scientific age, technology, not questionable memories or personal animosity, must determine (1) whether there is in fact interference and (2) are there technical means available to avoid the interference. The Commission's Field Engineering Division has conducted extensive tests in Elizabeth both on Seaman's transmitter and in the homes of complainants. The kind of data derived from these tests are the only probative data upon which the Commission can ultimately deliberate. A thousand pages of testimony of a complainant would not be as probative as one page from a Commission engineer's notebook showing the results of scientific tests conducted in the complainant's home.

SUPPORT OF RTTY PROPOSAL

In January FCC issued a Notice of Proposed Rulemaking, Docket 15,267 (*QST* for March 1964, page 62) which looked toward a change in the dual identification requirement so that only the call of the transmitting station would have to be sent by A1 or A3 when other forms of emission are in use. The proposal originated with an ARRL Board of Directors request.

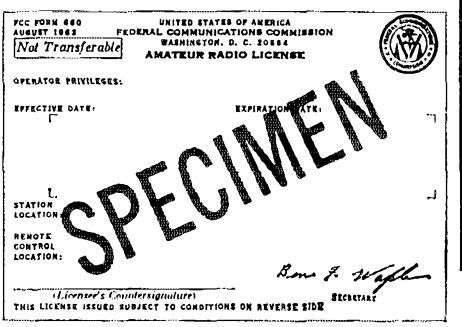
The League filed in support, shortly before the deadline for such comments on March 16, repeating arguments made in the original request for rulemaking.

TECHNICAL CHANGE OF RENEWAL RULES

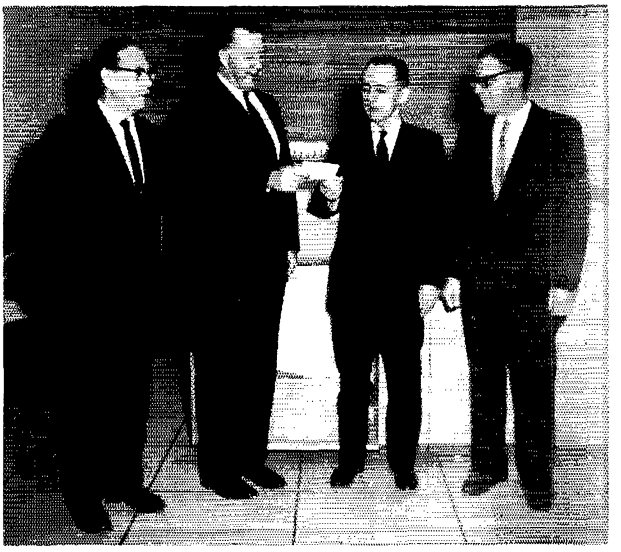
Two years ago Congress modified the Communications Act of 1934 as amended, making it possible for FCC to renew nonbroadcast licenses in advance of 60 days before expiration. As a practical matter, the Commission has since then been renewing any license which has come before it for modification, where the applicant has indicated completion of the renewal requirements (code ability at the speed appropriate to the class of license and either two hours of operation in the

(*Continued on page 174*)

W1LVQ and W3GD hold two reels of tape, on which are complete master records on all of the 250,000-plus amateur licensees! How's that for saving space?



What it's all about. New EDP equipment turns out licenses which look like this.



Automation at the FCC

FCC and ARRL staff officials inspect the first amateur license to be produced by the new electronic data-processing equipment now in use by the Commission at Washington, D.C. Left to right are Ivan H. Loucks, W3GD, Chief of the FCC's Amateur and Citizens Division; Robert M. Booth, Jr., W3PS, ARRL General Counsel; Curtis E. Plummer, FCC Executive Director; John Huntoon, W1LVQ, ARRL General Manager.

A view of the FCC office at Gettysburg, Pennsylvania, where amateur applications are processed and punched cards prepared. Cards are sent to Washington to feed the computer.

R.F. Amplifiers for 420 and 1215 Mc. with Planar Ceramic Triodes

Using Lumped-Constant Circuits for Low-Noise U.H.F. Amplification

BY J. W. RUSH,* W4EWL

It is the fashion these days to employ parametric amplifiers when the ultimate in low-noise reception in the u.h.f. range is desired. The value of these devices is not disputed, but the possibilities of simpler vacuum-tube amplifiers should not be overlooked. These amplifiers using planar-ceramic tubes should be of interest to the u.h.f. worker who wants the best possible performance from vacuum-tube amplifiers at 420 or 1215 Mc. They will come close to solid-state performance figures, with less critical construction and adjustment requirements.

Most equipment for 1215 and even 420 Mc. formerly employed cavities or coaxial circuits, but new lumped-constant and stripline techniques have raised the upper useful limit of more-or-less conventional circuitry. This progress can also be attributed in part to the low inductance, low capacitance, low transit time and high transconductance now obtainable in the planar-ceramic tube. Though there are tubes of this type that can be used for transmitting applications, we are concerned here with high-gain low-noise r.f. amplifiers for receiving. The amplifiers described could be used as remote boosters in any 50-ohm line, or as the first stages of a converter for these bands. They can be adjusted to cover the entire amateur band in question, and still give sufficient gain to minimize the noise problem in most existing equipment.

The available gains of three low-noise r.f. amplifier tubes of planar-ceramic design are shown in Fig. 1. The available noise figures for the same frequency range for the 7768 triode[1] are shown in Fig. 2. The three tubes of Fig. 1 provide about the same noise figure, but their optimum source impedances are quite different. The optimum source impedance is the impedance the tube wants to see looking back toward the antenna, for lowest noise figure. The 7768 has the highest transconductance (about 50,000 micromhos) at about 25 ma. plate current. Its high transconductance and low optimum source impedance make this tube the best choice for low-noise high-gain broad-band service in the u.h.f. range. The other types also work quite well in narrow-band service (less than 30 Mc. at 420 Mc., or 85 Mc. at 1215 Mc.).

The 7768 can be adapted readily to "home-brew" circuitry. No socket of the usual type is

* Receiving Tube Dept., General Electric Company, Owensboro, Kentucky.

[1] New Apparatus, "New High-Transconductance U.H.F. Amplifier Tube," July, 1963, *QST*, p. 74.

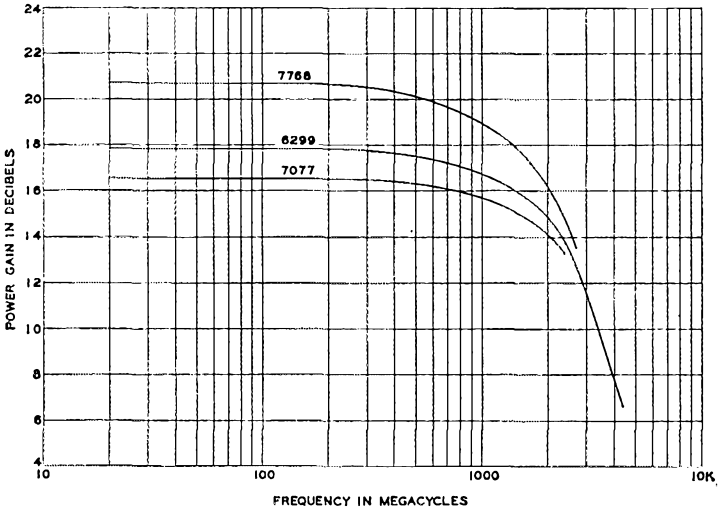


Fig. 1—Small-signal gain of three planar-ceramic triodes used in grounded-grid amplifiers.

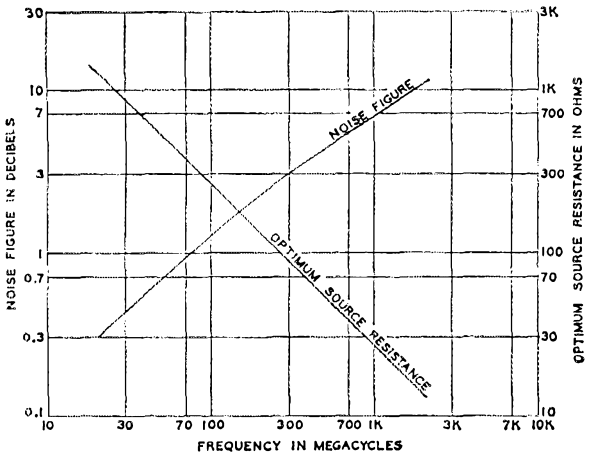


Fig. 2—Noise performance of the 7768 triode.

needed and it is recommended that none be used, as lead inductance, stray capacitance and circuit losses must be kept to a minimum. Some suggested methods of connecting to the 7768 are shown in Fig. 3. These are only suggestions, and there are other practical methods.

Although even this tube may not have the glamour of the solid-state approach to r.f. amplification, the performance of these preamps justifies the interest of those of us who want something that really works and is not temperamental. The amplifiers and tubes are not electrically or mechanically fragile. They can accept large amounts of power without burnout, and they have a dynamic range of about 100 db. without serious distortion.

The Amplifier Circuits

It will be seen from Fig. 4 that two grounded-grid stages and double-tuned circuits are used. At these frequencies components are not always what they seem to be, and the builder must assess all lead lengths and choose his components carefully. The amplifiers were not designed "by the book," and the author readily admits that trial-and-error methods prevailed. For this reason, liberal interpretation of the construction techniques may be disastrous, particularly in the 1215-Mc. amplifier.

The input circuit used provides the required "transfer function" to assure that all tubes can be tuned for match or minimum noise figure, and no attempt is made to define its equivalent circuit. The interstage and output double-tuned circuits use what might be called half-wave resonators. The inductances (coils in the 420-Mc. model and rectangular stock in the 1215-Mc. one) are tuned at one end by the tube capacitance, and at the other by variable capacitors. Somewhere along the inductors a high-current low-impedance point exists, which provides an efficient place to apply the necessary d.c. with minimum r.f. effects. This type of resonator provides relatively large coils at high frequencies, and increases the upper frequency limit for most tubes. It also provides a maximum L/C ratio, necessary for efficient broad-band circuits.

Construction of the 420-Mc. Amplifier

It is suggested that the chassis be cut and drilled as in Fig. 6A. Its edges are bent down and the corners bent up to form a channel for sections B and C. Fold lines on the drawings coincide with dimensions taken from the chassis layout, and allowances must be made for folding so that the end pieces, 6B, and partitions, 6C, will fit inside the chassis. A bottom cover may be made to fit after completion of the chassis and partitions.

The tubes are mounted mechanically by clamping their grid rings in place with four short 4–40 screws each. Fasten the tubes in place before assembling the sections. Note that the folded-over edges of the partitions face each other. Connections to the tube heaters are made with contacts removed from a 7- or 9-pin tube socket. Heater leads may also be

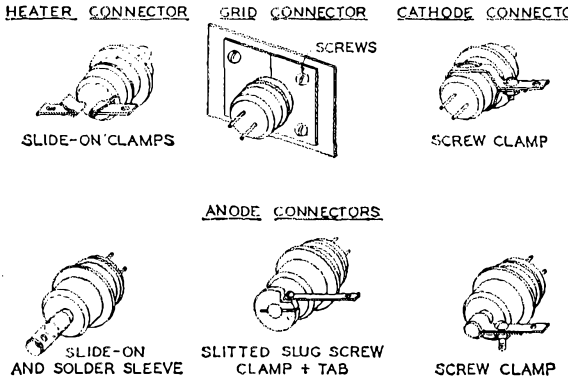


Fig. 3—Suggested methods of connecting to the elements of the 7768 triode in u.h.f. circuits. Heater connections may also be made with contacts removed from a conventional tube socket, or by soldering directly to the tube pins.

soldered directly to the tube pins. The anode connector is the round slitted one shown at the lower center of Fig. 3. The cathode connector is shown in the upper right portion of the same drawing. These socketless techniques provide minimum loss and circuit capacitance.

Coils can be wound of bare, tinned, enameled or silver-plated wire. Turns are spaced about the diameter of the wire. The Johanson capacitors are strongly recommended because of their high performance in u.h.f. circuits. They are so designed that the glass is used for mechanical support only, and the active capacitor surfaces are indexing air-dilectric coaxial cylinders. These capacitors are not listed in catalogs of most amateur radio parts distributors. Those used here were purchased directly from Johanson Mfg. Co., Boonton, New Jersey. Other glass piston-type trimmers may be tried, but the best available units should be used. Minimum lead inductance

All of the remaining assembly is straightforward except for the input capacitor, C_1. This is a homemade unit of necessity, as it is difficult to find a variable capacitor of suitably low inductance and mounting capacitance. Details are given in Fig. 7. At the left is seen the poly block and adjusting screw. The former is made of ½-inch poly rod, with a shoulder turned down and threaded to fit any suitable mounting nut. The one used was similar to the ⅜-inch nut supplied with many radio parts. A $\frac{3}{16} \times \frac{5}{16}$-inch hole is cut at the opposite end of the outer piece, which is then drilled down its center and tapped with ¼-20 thread. The adjusting screw is also made from poly rod, turned and threaded for the job. The two phosphor-bronze tabs, right in Fig. 7, are connected to input connector, J_1, and the tap point on L_1. They should be positioned so that they spring apart when the screw is in its upper position. A thin sheet of mica or Teflon may be

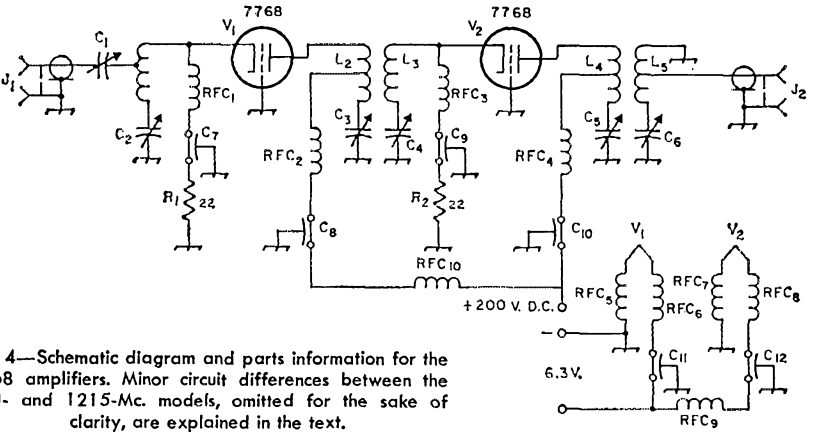


Fig. 4—Schematic diagram and parts information for the 7768 amplifiers. Minor circuit differences between the 420- and 1215-Mc. models, omitted for the sake of clarity, are explained in the text.

C_1—420 Mc.: handmade; see Fig. 7 and text.
—1215 Mc.: 0.5 to 5 pf. ceramic trimmer (Johanson 2950).
C_2–C_6, incl.—420 Mc.: 0.6 to 5 pf. glass trimmer (Johanson 1875).
—1215 Mc.: Like C_1.
C_7–C_{12}, incl.—420 Mc.: 1000-pf. button feedthrough, thread mounted on ear-soldered type (Erie 654-017-102K).
—1215 Mc.: 1000-pf. feedthrough, solder-in type (Centralab MFT-1000).
J_1, J_2—420 Mc.: BNC receptacle.
—1215 Mc.: Type N receptacle.

L_1—2 turns No. 14, 7/16-inch diam., tap ½ turn from cathode end.
L_2, L_4—2½ turns No. 14, 7/16-inch diam.
L_3—2 turns like L_2. Space all turns 1 wire diam.
L_5—1½ turns No. 14, ¼-inch diam. See text. Values above are for 420-Mc. model. Details of inductances in 1215-Mc. model are in Fig. 9.
R_1, R_2—22-ohm, ½-watt composition.
RFC_1–RFC_9, incl.—420 Mc.: 10 turns No. 24 enam., ⅛-inch diam., or Ohmite Z-460.
—1215 Mc.: 6 turns No. 24 enam., ⅛-inch diam.; stretch to ¼-inch long.

is of paramount importance at 420 Mc. and higher.

The coil L_5 is described as having 1½ turns. This is the coil that is soldered between C_6 and the BNC output connector. A small loop is then soldered to the connector and to a solder lug under one of the connector mounting screws to provide a tap point near the ground end of L_5. This is a very low-inductance loop with important effect on proper alignment of the converter. It is approximately ¼ turn of No. 14, ¼ inch in diameter. The choke tap points on L_2 and L_4 are relatively uncritical. The chokes may be connected to the tube ends of the coils without serious effect on performance.

used for insulation. When the tabs are fully compressed by the poly screw, the capacitance should be at least 35 pf.

Alignment Procedure

Without a sweep generator it will be difficult to align the two-stage amplifier to operate over all the 420-Mc. band with good gain and the flatness desired. If a laboratory sweep generator is not available some u.h.f. TV sweep generators may sweep this low in frequency. Another suggestion could be the use of the second or third harmonic of a v.h.f. TV sweep generator. This will require a high-gain scope, and a serious mismatch will exist at the generator terminals. With-

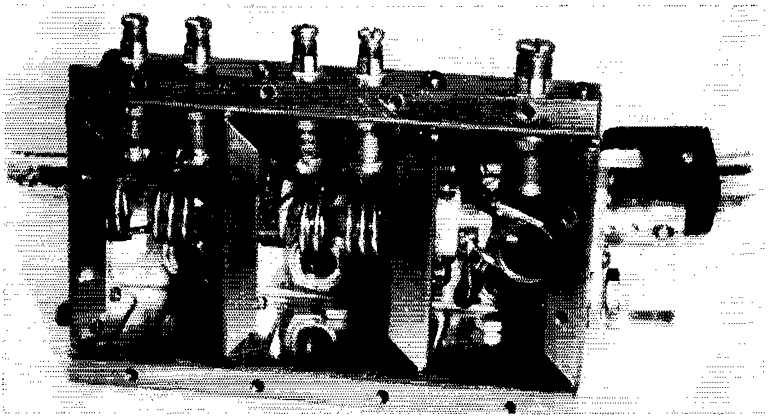


Fig. 5—Bottom view of the 420-Mc. amplifier. The input end is at the right.

out a sweep source the amplifier can be tuned up in the usual fashion for one desired frequency, i.e. 432 Mc., by tuning each capacitor for maximum output. If this is done, additional gain can be obtained by reducing the coupling between L_2 and L_3 and between L_4 and L_5 and moving the tap on L_5 closer to the ground. (Less L in the low inductance loop described earlier.) The positions shown in Fig. 5 are for broad-banded alignment.

If the builder intends to use the amplifiers only over a narrow band (432 to 432.2 is common), he should definitely reduce the bandwidth as suggested above. Decoupling L_2L_3 and L_4L_5 is particularly important, as overcoupled circuits tend to indicate a false selectivity when aligned without a sweep generator. In any case, the coupling should be adjusted for maximum desired-frequency gain. Low gain and narrow bandwidth usually indicate undercoupling. The tap on L_5 should also be adjusted for maximum gain. No change in input circuitry is needed for narrow-banding, this circuit being inherently broad as a result of the low input impedance of the grounded-grid stage. C_1 and C_2 should be adjusted for best signal-to-noise ratio or minimum s.w.r., whichever is more desirable.

Assuming the builder has a sweep generator and a 50-ohm detector for a load, the following alignment procedure is recommended. Connect the sweep to the normal input connector and the detector load to the output connector. Make sure the detector is flat over the band by first connecting the detector load directly to the sweep source. Tune C_1 and C_2 for maximum sweep output and detune C_3 and C_4 as much as possible without losing all of the indicated sweep output on the scope. Adjust C_3 and C_4 so that they do not appear to produce narrow-band responses since the object at this point is to adjust C_5 and C_6, the tap on L_5, and the coupling between L_4 and L_5. Carefully adjust these variables for a slightly saddled response with the 3-db. points wider apart than the band edges. Typical functions of the individual elements are:

C_5 — Desired response and frequency with a rocking effect.

C_6 — Desired response and frequency with a rocking effect.

Tap on L_5 — More inductance in the small loop reduces the saddle.

Mutual coupling — Closer coupling increases the saddle and increases bandwidth.

Mutual coupling is varied by physically moving the self-supported coils. Tune and adjust for maximum gain with acceptable saddle and

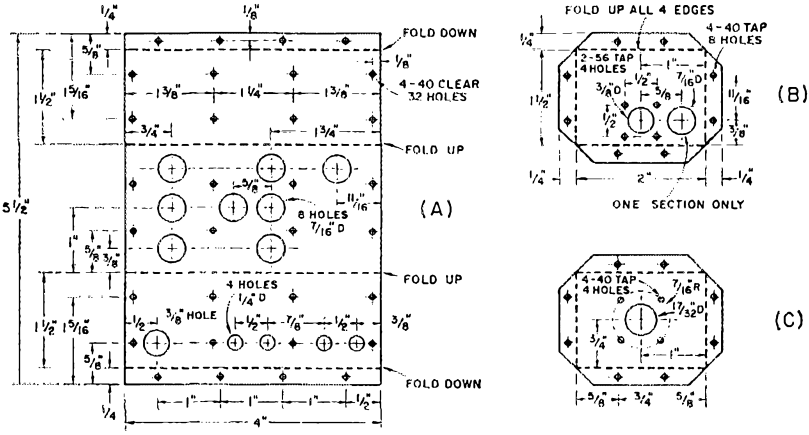


Fig. 6—Details of the chassis and partitions for the 420-Mc. amplifier. Two of each type are needed. End sections, B, and partitions, C, of which two each are needed, should be bent to fit inside the main chassis, A, after the latter is folded. Material is 1/32-inch brass.

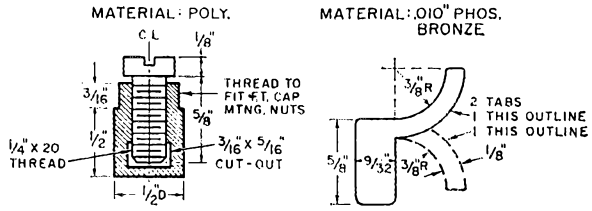


Fig. 7—Details of the handmade input capacitor, C_1, used in the 420-Mc. amplifier.

proper center frequency and band edges. This should complete the adjustment of the output circuitry except for a slight touch-up mentioned later.

To adjust the interstage circuitry, disconnect the lead from the r.f. detector to the scope and attach the scope lead directly to the high side of the cathode resistor of V_2. This connection should be made on the outside of the chassis since the object here is to read the rectified sweep signal as detected by the second tube.

Adjust C_3 and C_4 and the coupling between the coils in a manner similar to the output circuit adjustments, using the same response criteria. The output circuitry will sometimes produce narrow-band "suck-outs" in the interstage response. If this is serious, detune C_5 and/or C_6 a recorded number of turns to permit resetting after completion of interstage alignment. Remove the scope lead from the cathode resistor of V_2. Reconnect the scope to the detector load and make minor adjustments on both circuits to produce desired over-all response.

The best procedure for adjusting the input circuitry, C_1 and C_2, is to use an automatic noise figure setup and adjust these controls for minimum noise figure. If this is not available, the usual substitutes apply, such as listening for best signal to noise, or using some sort of noise source such as a noise diode or forward-biased crystal diode, properly terminated for 50 ohms. Peak gain, minimum v.s.w.r., and minimum noise figure are not coincident. Final adjustments should be made with the bottom cover attached. After tuning the input for lowest noise figure, the over-all response should be rechecked.

Measured Performance

Once the amplifier has been adjusted it is important that the unit see, as nearly as possible, 50 ohms looking toward the antenna and toward its load. In broad-band circuits the response is very dependent upon the load impedance, and serious changes in response will be noted for load impedances other than 50 ohms. With the band edges approximately at the 1-db. points (about 10 per cent down) and a similar saddle depth, amplifier gains of about 25 db. were obtained. Noise-matched noise figures of 4 to 4.5 db. were measured. Power matching for minimum v.s.w.r. usuly costs about 1 db. of noise performance.

Construction Details for the 1215-Mc. Amplifier

The reader will note the same circuit diagram, Fig. 4, is shown for both amplifiers. As best as can be determined, this is the case, but the resonant elements take on much different configurations. Similar construction procedures are recommended for the 1214-Mc. unit, Fig. 8. The second amplifier uses the same planar triode and in this case provisions are made for easier tube changing. One should not assume this to be necessary, any more than at 420 Mc. In most cases no tube change will ever be necessary, as the 7768 has been shown to last many thousands of hours. Fig. 9 shows mechanical details.

Connections are made to the cathode and heater as described for the 420-Mc. amplifier. The grids are secured to the interstage partitions with U-shaped mounting clips. Once the tube is inserted, the four 2-56 screws should be tightened to assure good r.f. ground. The anodes are clamped directly to the two plate lines as detailed in Fig. 9. Fillister-head screws should be used, or regular round-head screws can be filed down, to permit close contact of the plate line to the ceramic face of the tube.

The biggest difference between the two amplifiers is the use of strip-line (or slab-line) resonators in the 1215-Mc. model. These cannot be adjusted easily for variation of mutual coupling,

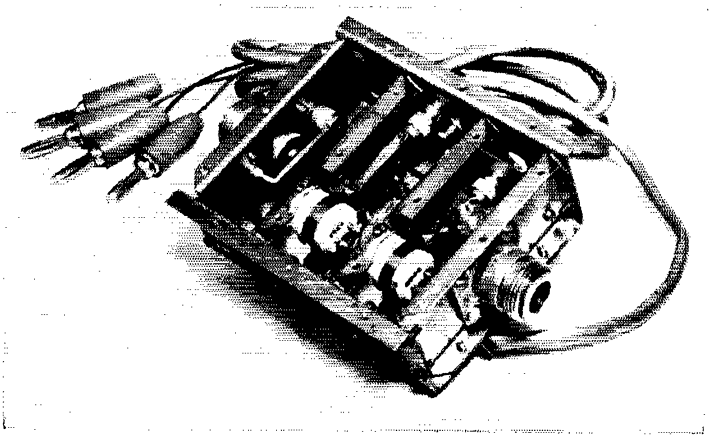


Fig. 8—Bottom view of the 1215-Mc. amplifier.

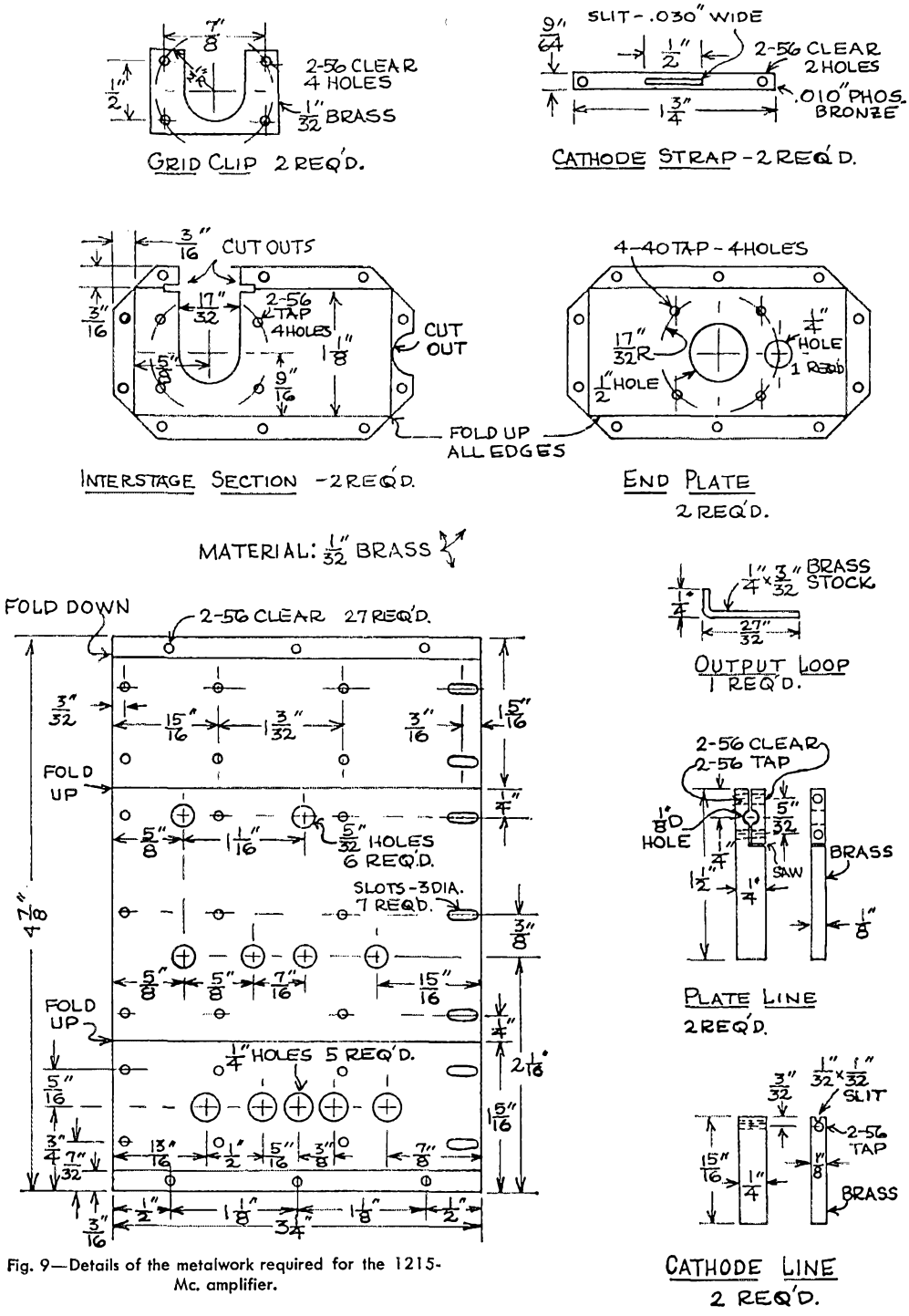


Fig. 9—Details of the metalwork required for the 1215-Mc. amplifier.

so interstage and output coupling had to be adjusted by different methods. It may not show in the reproduction of the photograph, Fig. 8, but there is a rotatable interstage coupling loop between L_2 and L_3. This is omitted from the diagram, because of the difficulty of proper schematic presentation. Though this has the appearance of an inductive loop, being made of thin flat stock formed into about a 5/16-inch square, it actually provides variable capacitive coupling

between L_2 and L_3. It is made rotatable by removing the ceramic from one of the tuning capacitors and soldering the loop to the round threaded stud that remains. Externally the adjustment looks like another capacitor.

Mutual coupling adjustments between L_4 and L_5 are made by moving the end wall back and forth in the elongated chassis holes. The adjustment of the tap on L_5 is also more difficult than before. Approximate location of this tap is obtained as follows: solder the output loop to the output end wall so that the loop contacts the top rim of C_6 and is parallel to the wall. A thin piece of flat contact material, bent in the shape of the letter "J," is then soldered to a shortened UG-58 center conductor and adjusted to press against the inside of the loop, L_5, when the panel jack is installed. The point of contact to L_5 should be about 5/16 inch from the bend. The loop should be carefully soldered to C_6, and to assure a good connection between the output connector and the inside of the output loop, the contact to the loop should be firm. The tab used was made of 0.010-inch phosphor bronze, about 1/8-inch wide, and about 5/16-inch long, and the short leg of the "J" was soldered to the coax connector. Small adjustments in the tap position can then be made by rotating the center conductor of the type N coax connector, if the spring tab is properly constructed and adjusted.

C_1 is installed by soldering the tab end of the capacitor to an unaltered UG-58/U connector. A solder lug, attached to the threaded end of C_1 by the capacitor nut, is then soldered to the top face of L_1 near the 2-56 cathode-strap mounting screw. The unbypassed heater chokes are soldered to the side of the chassis. The cathode and plate chokes are soldered at one end to their respective feedthroughs and on the other end to the bottom side of the cathode and anode strip-lines. To reduce the effect of d.c. choking on r.f. performance, the chokes were soldered to a low-impedance point previously described on the half-wave resonators used. These points are about 1/2 inch from the center of the tube anode on the anode lines, and approximately at the 2-56 screw points of the cathode lines. For the cathode choke, a small solder lug can be installed under the bottom 2-56 screw used to attach the cathode strap.

Alignment and Use

Almost identical alignment procedure can be used on the 1215-Mc. amplifier as described previously for the 420-Mc. unit. The procedures for adjusting mutual inductance have been described. For single-frequency usage, i.e., at 1296 Mc., more gain and a narrower bandwidth can be obtained by reducing the mutual coupling and tapping the output connector closer to the shorted end of the output loop. Complete removal of the interstage loop in this case cuts the interstage bandwidth to about half. To obtain further reduction in bandwidth a shield may be added between L_2 and L_3 and between L_4 and L_5. Adjustment of coupling is then accomplished by the size of a hole in the shield.

Almost flat bandwidth over the complete 1215-Mc. band was easily obtained. A power gain of about 22 db. was measured. The half-power single-stage bandwidths were about 150 Mc. At 1215 Mc., minimum noise figures and v.s.w.r. are usually obtained at the same time, and little improvement in noise was noted by detuning the input from a maximum gain condition. Noise figures of 8 to 8.5 db. are typical for the amplifier adjusted to cover the complete band.

In both broad-banded and narrow-banded amplifiers the first-stage noise figure should be the same if the tube sees its optimum low noise source impedance. However, narrow bandwidths provide more first-stage gain and the over-all noise figure will be lower. In no case should lower noise figures than given in Fig. 2 be expected. These are first-stage noise figures only, and assume no second-stage noise contribution and lossless input circuitry. Since the 1215-Mc. amplifier has less stage gain, more improvement in over-all noise figure will result from narrow-banding than with the 420-Mc. model.

The author will be glad to try to answer any questions or to provide additional details on either or both of the described amplifiers. QST

A 400-Cycle Supply for Selsyn Indicators

BY LOREN G. WINDOM,* W8GZ

Most amateurs are aware of the fact that the aircraft-type radio compass (Selsyn) indicators available on the surplus market, and widely used as rotary-beam direction indicators, are designed for 400-cycle operation. We also know from experience that these 400-cycle Selsyns will operate on 60-cycle current. However, the use of 60 cycles has several undesirable features such as loss of accuracy, sluggish or jerky operation, and considerable hum or chatter in the indicator Selsyn.

Feeding the Selsyns

When a 60-cycle test is made on the work bench, with short leads between the driver Selsyn and the indicator Selsyn, good accuracy is obtained and with only a slight tendency toward sluggish operation. If, however, we use a long cable between the driver and the indicator, such as is usual in amateur antenna installations, we find that the use of a 60-cycle supply introduces directional errors and also accentuates the sluggish or jerky operation of the indicator. The directional error varies principally with the length of the control cable, and the point at which the 60-cycle supply is connected to the Selsyn circuit.

A test setup, using a good linear audio oscillator to supply the drive voltage to the Selsyns on the two rotary beams at W8GZ, disclosed that, when the Selsyns were operated at 60 cycles with

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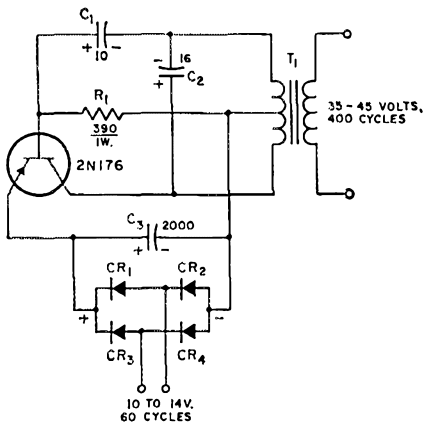

Fig. 1—Circuit of the 400-cycle supply. Capacitance is in microfarads, resistance in ohms. Capacitors are electrolytic.

C_1, C_2—50 to 150 w.v.d.c.

C_3—2000 μf. or more, 25 w.v.d.c. or more (Mallory CG452U50D1 or equivalent).

CR_1–CR_4 incl.—Bridge rectifier, 50 p.i.v., 35 volts r.m.s. 1.5 amps. (Mallory FW-50 bridge rectifier unit, or four silicon diodes).

R_1—See text.

T_1—Filament transformer: 26.5 volts, c.t., 0.6 amp.; 60 cycles, secondary used as primary (Thordarson 21F27).

the a.c. voltage applied to the terminals of the indicator Selsyn, the indicated antenna direction was in error by as much as 20 degrees. The largest errors were in the direction range of 45 to 135 and 225 to 315 degrees. In the test case, the Selsyn controls were approximately 100 and 200 feet in length. When the 60-cycle a.c. voltage was applied to the terminals of the driver Selsyn, this error was reduced to approximately 10 degrees.

As the frequency of the supply voltage was increased, the indicator error decreased until at about 300 cycles the indicators reached substantial accuracy. Operation at frequencies above 500 cycles was accurate, but sluggish and jerky, irrespective of the applied voltage. The 400-cycle voltage may be applied to the terminals of either the driver Selsyn or the indicator Selsyn. In either case, the 400-cycle power supply need not be close to the Selsyn. The supply can be located wherever convenient and its output run by cable to the Selsyn terminals. The tests led to the conclusion that a voltage of 35 to 45 at a frequency of 350 to 400 cycles results in the best possible operation and accuracy. The voltage should be held to the minimum which gives satisfactory operation to reduce the audible hum from the indicator.

One 400-Cycle Source

The next problem was to develop an inexpensive but reliable source of 400-cycle voltage. After considerable experimentation with circuits, and much cut-and-try with components, the circuit of Fig. 1 was found to be stable and completely reliable over an extended period of operation. The cost of constructing the 400-cycle power supply with all new components is about $11; however, the usual junk box will supply most of the parts from surplus already on hand.

The 2N176 transistor was chosen because of its voltage ratings and low cost. Any similar transistor should prove satisfactory. The value of the resistor R_1 is not critical. A value of 390 ohms is suggested as giving the highest output voltage. The critical frequency-determining components are the output transformer T_1, and the capacitors C_1 and C_2. If a transformer other than that suggested is used, the capacitors must be adjusted to compensate for any change in transformer impedance. Best results were obtained by fixing C_1 at about 10 μf., and then varying the value of C_2 until an output frequency of 400 cycles was obtained. Reducing the value of C_2 increases the output frequency, while an increase in the value of C_2 lowers the output frequency. Tests with several different output transformers resulted in using values of C_2 ranging from 4 to 20 μf., depending upon the particular transformer.

While voltages across C_1 and C_2 are quite low, it was found that capacitors of very small physical size tend to heat, resulting in frequency instability and eventual breakdown. Capacitors in the range of 50 to 150 w.v.d.c. have proven satisfactory.

Frequency Adjustment

Checking the output frequency of the unit can be accomplished by either of two methods. First, and most desirable, is by the use of an oscilloscope and a calibrated audio oscillator. In this method of adjustment, the output of the power supply is fed to either the vertical or the horizontal plates, while the output of the audio oscillator at 400 cycles is fed into the other scope plates. When the value of C_2 is correct, the usual circular pattern will appear on the scope. The figure will probably be a flat-sided circle more nearly resembling the letter D than the letter O.

The second method is by the use of a speaker or headphones across the output of the supply (be sure and connect a capacitor of about 0.2 μf. in series with the speaker-transformer primary or phones) and comparing the output frequency by ear with that from a tuning harp or fork or, even better, by beating against the 440-cycle transmission from WWV.

In the final adjustment of the value of C_2, it is desirable that the 400-cycle power supply be connected either to the Selsyns it is intended to operate, or to a similar pair.

The stability of two of these power supplies, which have been in use for a considerable period, is better than plus or minus 10 cycles at 400 cycles. They are housed in metal boxes, along with other control equipment, at the base of my antenna towers. Any large degree of frequency instability indicates a defective or leaky capacitor at C_1 or C_2.

The 10 to 14 volts at 60 cycles required to operate the power supply can be obtained from a tap or winding on the transformer operating the antenna rotator, or from a small low-current transformer such as a bell-ringing transformer. In my own case, this voltage is supplied by a tap on the transformer operating the prop-pitch motors used to rotate the antennas. QST

Product Detectors for the HRO

BY W. M. ROWE, JR.,* W4JDR

AND LOREN G. WINDOM,** W8GZ

Judging from the response to W2DUD's article in the October (1963) issue, there are still many of the older models of the HRO receiver in use. The two items presented here describe different methods of applying the product detector for improved performance.

I HAVE just completed modification of an HRO-50, using the product detector adapter described in October 1963 *QST*.[1] In the expectation that the details of this modification would be of interest to *QST* readers, the following is submitted.

Two modifications were made to the sideband adapter to improve the versatility of this unit when used with the HRO. The objective in this was to permit the adapter to be used for copying c.w. signals as well as sideband signals.

The adapter unit was constructed on a 4 × 4 × 2-inch aluminum box, and was equipped with an octal plug permitting it to be plugged directly into the narrow-band-f.m. adapter socket of the HRO-50. A circuit diagram of the modified sideband adapter showing the octal plug is shown in Fig. 1. You will note that provision has been made for removing the crystal-oscillator plate voltage when the mode switch is in the c.w. position. You will also note that I have included an audio filter in the output circuit of the sideband adapter. This filter was calculated to have an upper cutoff frequency of 2500 cycles. The reason for including the filter was that the HRO audio system has good high-frequency response which is undesirable for communication; however, some persons who might want to perform this modification would still prefer to retain the wide-band audio feature if they use their HROs as broadcast receivers (heaven forbid!).

The modifications to the receiver are as follows.

Remove the lead presently connected to Pin 3 of the n.b.f.m. adapter socket. Tape this lead up as it will not be used.

Remove the ground from Pin 6 of the n.f.m. adapter socket.

Remove the coaxial cable running from Pin 3 of the c.w. oscillator (or b.f.o.) V_9 to Pin 5 of the diode detector V_7, and connect this lead to Pin 6 of the n.b.f.m. adapter socket.

Replace C_{50} with a 50-pf. silver-mica capacitor.

Remove C_{62} and rewire the audio switching section of the control switch as shown in Fig. 2.

Remove R_{22} and R_{23}, and rewire the a.g.c. circuit as shown in Fig. 3.

These modifications permit the use of the HRO as a sideband receiver, as an a.m. receiver, and as a c.w. receiver with product detector. The modification to the a.g.c. circuit, while not con-

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** 1755 South Lancaster Ave., Reynoldsburg, Ohio.

[1] Chapin, "There Is Still Life in That Old Receiver." *QST*, Oct., 1963.

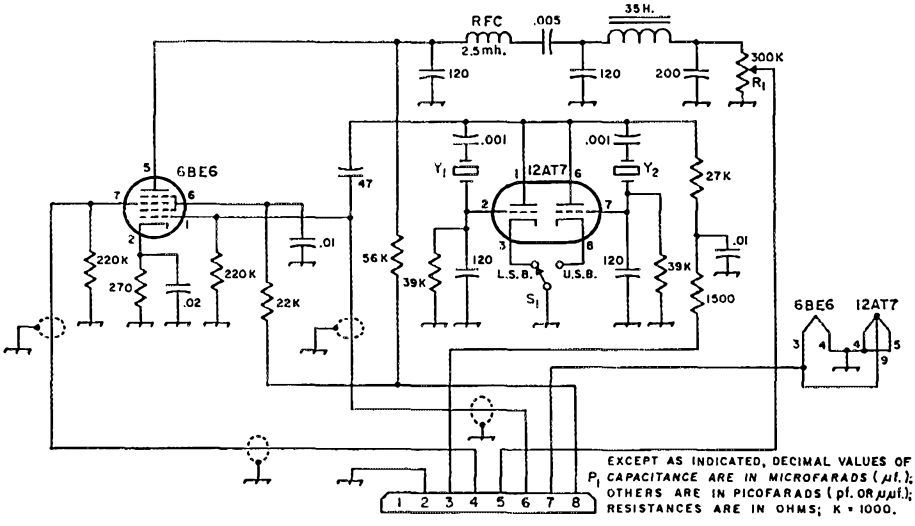


Fig. 1 — W4JDR's revision of W2DUD's HRO product-detector adapter. Capacitors of decimal value are disk ceramic; others are mica or NPO ceramic. Resistors are ½-watt composition. P_1 is an octal plug, and S_1 is a s.p.d.t. toggle or slide switch. R_1 should be adjusted for equal volume for all positions of the mode switch. See text regarding selection of Y_1 and Y_2.

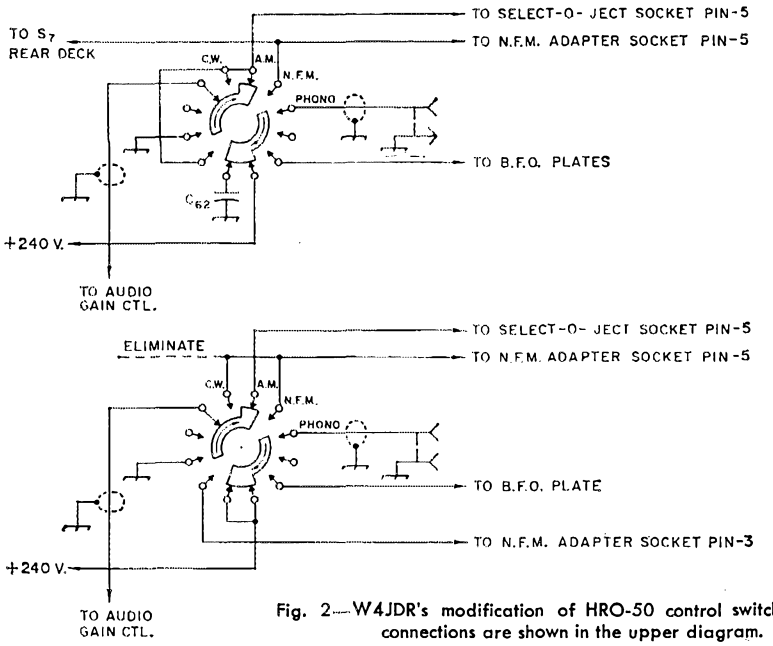


Fig. 2—W4JDR's modification of HRO-50 control switch. Original connections are shown in the upper diagram.

sidered optimum, is adequate and will provide for a.g.c. action in any mode of receiver operation.

As implied by W2DUD in his article, the frequencies of the surplus crystals he used are not the best. The crystals he used are quite well suited for sideband reception when the receiver is operating in its broadest selectivity position; however, if the selectivity switch is placed in position 2 or 3, the signal being received is not centered within the passband of the receiver.

For good sideband reception, it is suggested

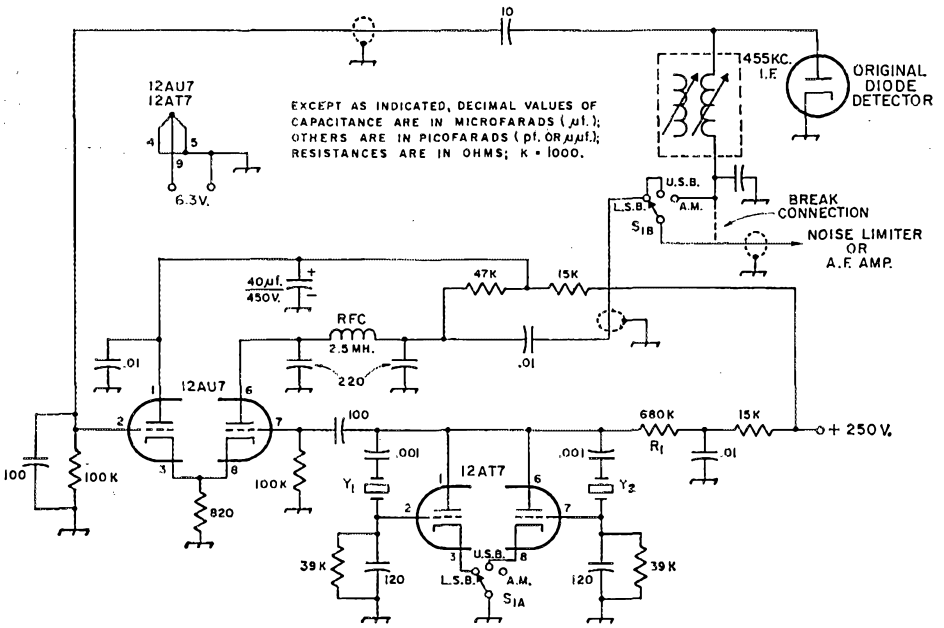


Fig. 4 — Circuit of product detector used in W8GZ's HRO-50-1. Unless specified, capacitors of decimal value are disk ceramic; others are mica or NPO ceramic except that polarity indicates electrolytic. Resistors are ½-watt composition.

R_1—Adjust value for 12AT7 plate current of approximately 0.35 ma.

S_1—Ceramic rotary switch: single section, 2 poles, 3 positions (Centralab 2002, 3 positions not used).

Y_1—l.f. plus 1.5 to 2 kc.

Y_2—l.f. minus 1.5 to 2 kc.

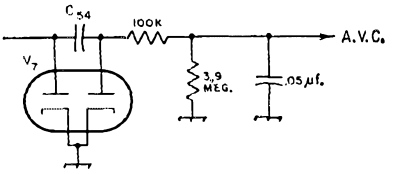


Fig. 3—HRO-50 a.g.c. circuit as modified by W4JDR.

that the receiver bandwidth should be restricted to approximately 2 kc. total. When using a narrow bandwidth, the crystals should be chosen such that their frequencies are approximately 1.5 kc. either side of the i.f. so as to center the intelligence-bearing portion of the sideband within the passband of the receiver.

Some persons may not care to copy signals with a restricted passband and, for this reason, it is felt that each person should carefully consider his particular situation before procuring crystals.

— *W. M. Rowe, Jr., W4JDR*

—•••—

Having tried the product detector described by W2DUD on my HRO I found two rather serious defects: (1) the 10-pf. grid-coupling capacitor from the 6BE6 to the original diode detector was much too large. A value of one pf. (or just a short length of twisted wire) was much better; and (2) the circuit tended to overload on strong signals, even with the smaller capacitor.

Fig. 4 shows a circuit diagram of an improved product detector/b.f.o. circuit which I think will be found much superior. You will note that I have used the standard product detector, as per the *Handbook*, to which I have added W2DUD's b.f.o. circuit and constants *except that the plate voltage on the 12AT7 must be reduced.* I found that the injection voltage was fairly critical and that

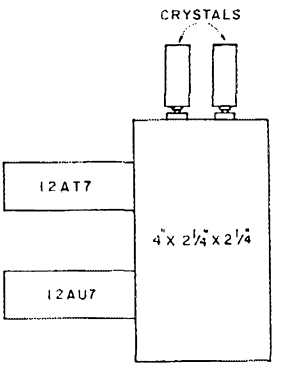


Fig. 5—Sketch of b.f.o. replacement unit described by W8GZ. The box is Bud CU-2103-A.

a plate voltage which gave 0.3- to 0.4-ma. plate current on the 12AT7 gave the best results.

As to b.f.o. crystals, I prefer plus and minus 1500 cycles because of my fairly sharp i.f. amplifier (HRO-50-1).

Of course, the noise limiter is inoperative for s.s.b. c.w. reception.

Constructionwise I removed the HRO b.f.o. coil can and replaced it with a 4 × 2¼ × 2¼-inch Minibox which houses all of the components except the 10-pf. coupling capacitor to the original diode detector (see Fig. 5). This capacitor is soldered directly to the diode socket with a shielded lead to the 12AU7 product detector to reduce stray coupling. The HRO b.f.o. variable capacitor is removed and S_1 installed in the panel hole left by such removal. This lash-up gives minimum length leads.

— *Loren G. Windom, W8GZ*

GOLDEN ANNIVERSARY ESSAY CONTEST—

What ARRL Means To Me

As part of the commemorative program of the League's 50th anniversary year, each ARRL member is invited to submit an entry in a Golden Anniversary Essay Contest on the subject, "What ARRL Means To Me."

Through the years, the League has meant many things to many people. Perhaps to you the most impressive function of your association is its public service field organization of traffic nets and emergency preparation; perhaps it is W1AW code practice, representation of the amateur service in domestic and international regulatory affairs, training aids for clubs, division conventions, Field Day; perhaps it mostly means receiving *QST* each month. You pick the subject, but make the theme, "What ARRL Means To Me."

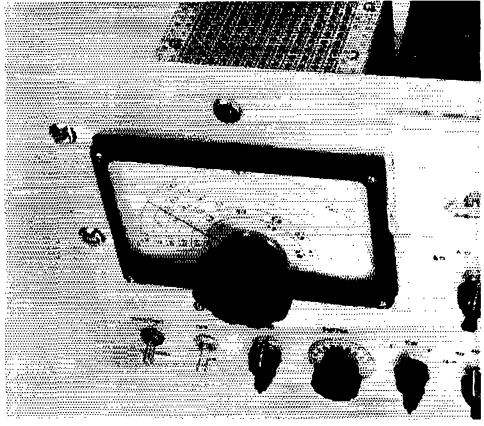
From those submitted the judges will select two which in their opinion are outstanding; the winners will receive handsome trophies and cash awards of $100 and $50, and of course the essays will be published in *QST*.

Any ARRL member, full or associate, is eligible. All entries should be typed (double space) or neatly handwritten in English on one side of unruled paper and sent to the ARRL Essay Contest Committee, 225 Main Street, Newington, Connecticut 06111, and **received by May 15, 1964** (note new date). The decisions of the judges will be final; all entries become the property of ARRL. Suggested length of entries is between 1000 and 2000 words.

Dust off your mill, or ball pen, and tell us what the League means to you! QST

V.F.O. and Phone for the "Gallon" Mark II

BY LEWIS G. McCOY,* W1ICP



This shows the panel arrangement after addition of the v.f.o. dial to the "Novice Gallon—Mark II." Immediately below the v.f.o. dial knob is the v.f.o. band switch. To the right is the knob for C_{26}. The dial lamp has been moved to above the v.f.o. dial and the spot switch to just below the dial assembly.

THE "Novice Gallon" Mark II, described in the April issue of *QST*, was designed for crystal-controlled use only. When a Novice gets his General Class ticket, one of the first things he wants to add to his station is a v.f.o. This article describes the addition of a v.f.o., plus a screen modulator for those hams interested in working a.m. phone.

Fig. 2 is the circuit diagram of the v.f.o., cathode follower, amplifier stage, and the modified crystal-oscillator stage. The numbering of the components in Fig. 2 is a continuation of numbering from Fig. 1 of the Mark II article. V_{10A}, one triode section of a 12AU7A, is used as the v.f.o., the other half of the tube being a cathode follower. S_{9A} is used to switch the grid and cathode leads of the oscillator tube either to a

* Technical Assistant, *QST*.

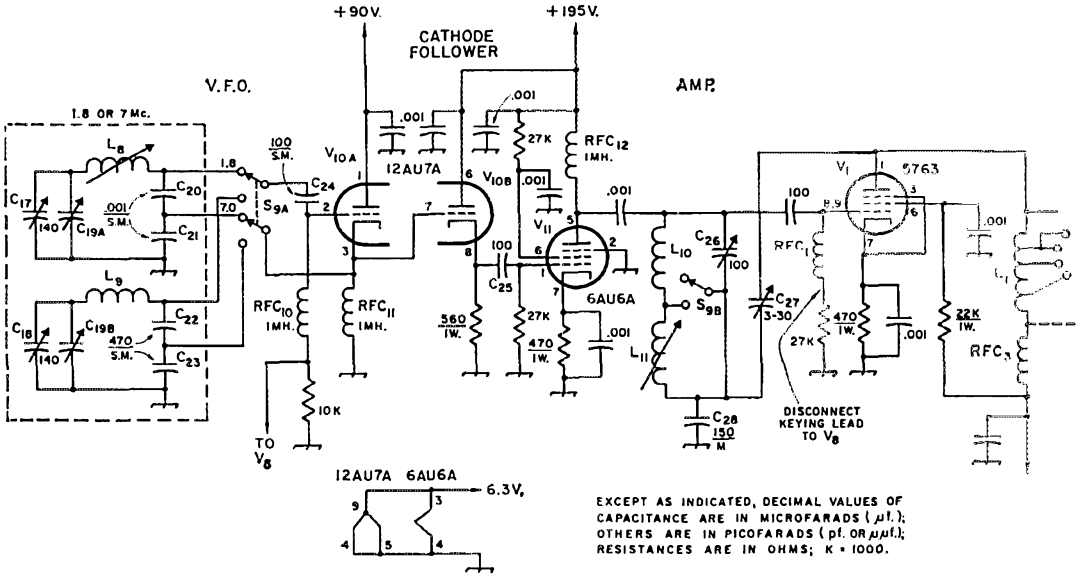


Fig. 2—Circuit diagram of v.f.o. Fixed resistors are ½ watt unless indicated.

C_{17}, C_{18}—140-pf. variable (Hammarlund APC-140).
C_{19}—6.5-51-pf. dual-section variable (E. F. Johnson 50LD15); see text.
C_{20}, C_{21}—1000-pf. silver mica.
C_{22}, C_{23}—470-pf. silver mica.
C_{24}—100-pf. silver mica.
C_{25}—100-pf. mica.
C_{26}—100-pf. variable (Hammarlund HF-100).
C_{27}—3-30-pf. trimmer.
C_{28}—150-pf. mica.
L_8—68-130 μh., slug-tuned (Miller type 4409).
L_9—15 turns No. 24 enameled, close-spaced, wound on one-inch diam. form (Millen type 45000).
L_{10}—30 turns No. 24, 32 turns per inch, ⅝-inch diam. (B&W Miniductor 3008).
L_{11}—126-250 μh., slug-tuned (Miller 4410).
RFC_{10}, RFC_{11}, RFC_{12}—1-mh. r.f. choke (Millen 34300-1000, National R50).
S_9—3-pole, 2-section ceramic rotary, One section (S_{9-}) has two poles, the other section (S_9) a single pole. (Centralab sections type XD, RRD and index assembly type P-270).

160-meter circuit or a 40-meter one. For 160-, 80-, or 40-meter transmitter output the 1.8-Mc. circuit is used. When operating on 20, 15 or 10 meters, the 7-Mc. circuit should be used. Output from the cathode follower is fed to a 6AU6A amplifier, V_{11}, the plate circuit of which can be switched via S_{9B} to either a 160- or 40-meter tuned circuit.

Plate voltage for the oscillator is 90 volts, regulated, obtained from the junction of V_6 and V_7. The Mark II circuit in April *QST* called for a 0C3/VR105 for V_7, but this has since been changed to a 90-volt regulator because of screen modulator requirements, as explained later. Plate voltage on the cathode follower and 6AU6A amplifier is 195 volts, regulated, obtained from the top of the V_6V_7 string.

The original crystal oscillator, V_1, has been converted to a cathode-biased, neutralized amplifier stage. Neutralization is required to keep the stage from self-oscillating, because in some cases the grid and plate circuits are both tuned to the same frequency. Because the stage is neutralized, the loading resistors R_1 and R_2 can be removed from the plate circuit of V_1. There are no changes in V_2 or the 6146B circuits.

Screen Modulator

The modulator circuit, Fig. 4, has a 12AX7 for the speech amplifier and a 6AQ5 for the screen modulator. Either crystal, dynamic or ceramic microphones can be used. The 6AQ5 is operated Class A, with its output transformer coupled to the screens of the 6146Bs. S_8, a 4-position switch, had only three positions in use in the Mark II originally; the fourth position now is used to feed the modulator output to the screens for phone operation.

With screen modulation the transmitter is run at approximately 100 watts input and the carrier output with 100 per cent modulation is approximately 30 watts. A negative feedback loop ($C_{29}R_9$) from the modulator output to the cathode of V_{12B}, is built into the modulator to reduce distortion caused by the nonuniform screen voltage to 90 volts, for 100 per cent modulation, from the 105 volts we started with. The difference in transmitter operation at 90 volts, as compared with 105 (or 195 instead of 210) was insignificant, so V_7 was changed to a VR90.

V.F.O. Construction and Adjustment

As you recall, space was provided on the chassis and panel of the Mark II for the addition of a v.f.o. The photographs show how the added components are arranged. The v.f.o. tuned-circuit components shown in the shielded section of Fig. 2 are mounted above the chassis. To stiffen the chassis top, all these parts are mounted on a 4¾ × 5½-inch piece of 1/16-inch aluminum.

The dial is an Eddystone type 598. A problem the home constructor frequently encounters is finding a variable capacitor that is easy to turn, or at least one that has adjustable bearings to permit a smoother drive. The E. F. Johnson type 50LD15 is such a type, and is used as the tuning capacitor, C_{19}. The dial drives the variable without any slippage.

To get the best coverage for the 40-meter range, C_{19B} must be modified by removing rotor plates. Four plates should be removed from the rotor shaft. Use long-nose pliers to grip the end rotor plate of one of the sections while working the plate gently back and forth. The solder seal that holds the plate to the shaft will break loose and you can remove the plate.

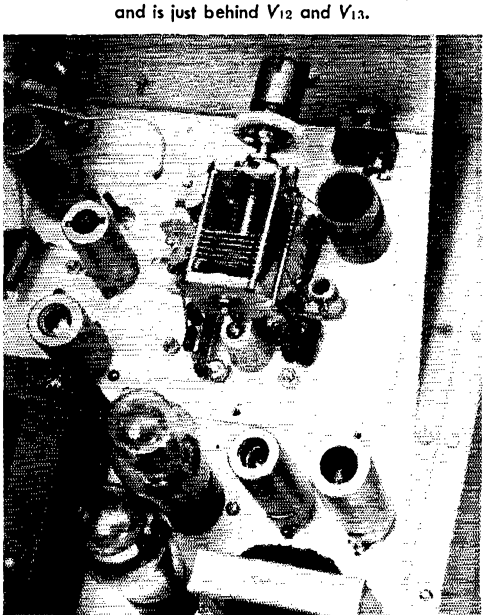
The v.f.o (and 6AU6A) band switch, S_9, is mounted below chassis, the dial light, I_2, being removed to make room for the switch. The spot switch, S_1, is also removed to make room for C_{26}. Both the spot switch and I_2 are reinstalled, the switch below and the indicator above the dial assembly.

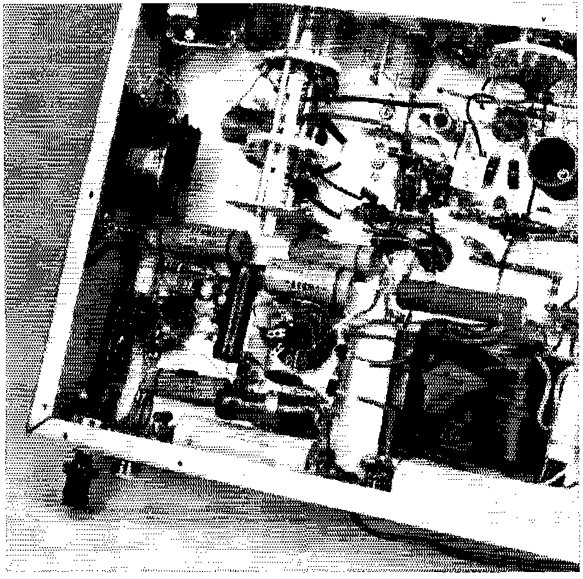
Fig. 2 shows the changes need for converting V_1 into a buffer-multiplier stage. When mounting C_{26} on the panel, use insulating washers — the same as was done when C_4 was installed. C_{26} must be insulated from the panel in order to neutralize V_1. The keying lead that comes from V_8 is disconnected from the V_1 grid circuit and reconnected to the junction of RFC_{10} and the 10K resistor in the grid circuit of V_{10A}.

A shielded enclosure is installed to completely shield the v.f.o. tuned circuits above chassis. The exact size of your shield will depend on your layout, but the sides should be made from solid aluminum as shown in the photograph. We found that without the shielding there was some hum present in the signal due to the field from the power transformer.

When the v.f.o. and other modifications are completed you are ready to test the rig. Use a dummy load as described in the Mark II article. Set S_9 and the other band switches in the rig to the 160-meter position. Put S_8 in the tune position and let the tubes warm up. Tune your receiver to 1750 kc., b.f.o. on, and with the re-

The v.f.o. components shown in the shielded area in Fig. 2 are mounted above the chassis. L_9 is the coil in the upper right corner. On the panel, in front of L_9, is the spot switch. To the rear of the v.f.o. components are V_{12} and V_{13}. L_7 was moved from below the chassis to above, and is just behind V_{12} and V_{13}.





Here is a below-deck view of the modulator and v.f.o. additions. The microphone jack, J_4, and gain control, R_8, are mounted on the rear of the chassis. T_2 is mounted on the side of the chassis and all remaining modulator components are mounted in the area to the rear of T_2. Just to the left of the v.f.o. band switch is the 40-meter coil, L_{10}. This mounted as far as possible from the plate circuit of V_1 to reduce undesired coupling between stages. V_{10} and V_{11} sockets are mounted to the right of the v.f.o. switch bracket. Neutralizing capacitor C_{27} is visible just to the right of the V_{11} socket.

ceiver gain reduced so you won't be overloading the receiver. Turn on the transmit switch and close the key, or turn on the spot switch. Set C_{19} so that the plates are fully meshed and then adjust C_{17} to the point where you hear the v.f.o. signal in the receiver. Once you get the v.f.o. signal set at 1750 kc., tune C_{19} toward 2000 kc., following the signal in the receiver as you go. With the plates of C_{19} open, the v.f.o. signal may be either lower or higher than 2000 kc. If the frequency is lower, decrease the inductance of L_8 by moving the slug, so that the signal moves toward 2000 kc. Once you get the signal at 2000 kc. with C_{19} fully open, turn the v.f.o. knob back so that the plates are fully meshed again. You will probably find that the signal is not exactly at 1750 kc., so you'll have to adjust C_{17} again. Work back and forth so that 180-degree rotation of C_{19} will make the tuning range 1750 to 2000 kc. Once you have that range, the 160-meter v.f.o. circuit is satisfactorily adjusted.

Switch the v.f.o. to the 40-meter circuit and the rest of the band switches accordingly. Set the receiver for 7000 kc., and with C_{19} fully meshed, adjust C_{18} so that the v.f.o. signal is on 7000 kc. With the specifications given in Fig. 2 for L_9, 180-degree rotation of C_{19} should cover from about 7000 to slightly more than 7425 kc. (7245 kc. is required in order to hit the high end of the 10-meter band with the fourth harmonic of the oscillator frequency.) However, with a different layout you may not have *exactly* the same number of coil turns. You may have to add or remove a turn or half turn in order to get the exact frequency range.

After the v.f.o. was completed we ran into a problem that had not existed with crystal control — a VR-tube oscillation that put a lot of "crud" on the signal. This was cleaned up by connecting a 0.01-μf. disk ceramic across the 7500-ohm 20-watt dropping resistor and a 4-μf. 450-volt electrolytic from V_6 to ground, as shown in Fig. 3.

To neutralize V_1, remove the plate and screen voltage from the tube by actually unsoldering the leads. Couple an absorption wavemeter to L_1 and set the v.f.o., C_{26}, and C_3 for 160-meter output as indicated on the wavemeter. Adjust C_{27}, the 3-30-pf. trimmer, so that the least amount of indication is shown by the wavemeter. Retune C_{26} and C_3 as you make the adjustments, since the object is to set C_{27} so that the least amount of r.f. appears at L_1 with all circuits peaked. After you get this setting reconnect the plate and screen leads (turn off the power before doing so!) and the rig is ready for use.

The v.f.o. dial can be calibrated by checking the settings against your receiver. In calibrating, don't forget that the v.f.o. is on 160 meters for 160-, 80- and 40-meter operation, and on 40 meters for 20, 15, and 10. L_{11} should be peaked for maximum grid current in V_2 with the rig tuned to 160.

Because V_1 is neutralized the loading resistors R_1 and R_2 can be removed, giving a little more drive to the final amplifier on 15 and 10 meters. The original Mark II had enough, and the resistors could have been left in, but in some cases, because of layout and differences in voltages, more drive on those bands may be usable.

One word of caution: when using the v.f.o. for what you hope is 80-meter output make sure you don't tune to the *third* harmonic of the v.f.o. For example, if you intend to operate on 3600 kc. it is possible to tune up the rig on three times the v.f.o. frequency, or 5400 kc. Check the circuits with a wavemeter, or set your receiver to 3600 kc., reduce the gain, and then tune the circuits in each of the stages to the point where they "peak". Make a note of the dial settings and you won't run into problems later on.

Adding The Screen Modulator

The circuit for the modulator is shown in Fig. 4. We thought we would have plenty of room, but as it turned out L_7, the low voltage power-supply choke, had to be moved to the top of the chassis (see photographs). Also, to make room for the microphone jack and gain control the key jack was moved over near the

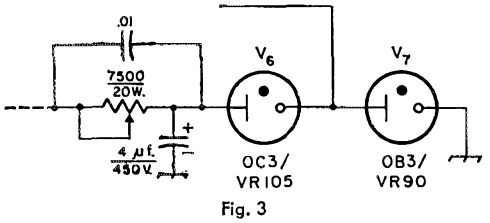


Fig. 3

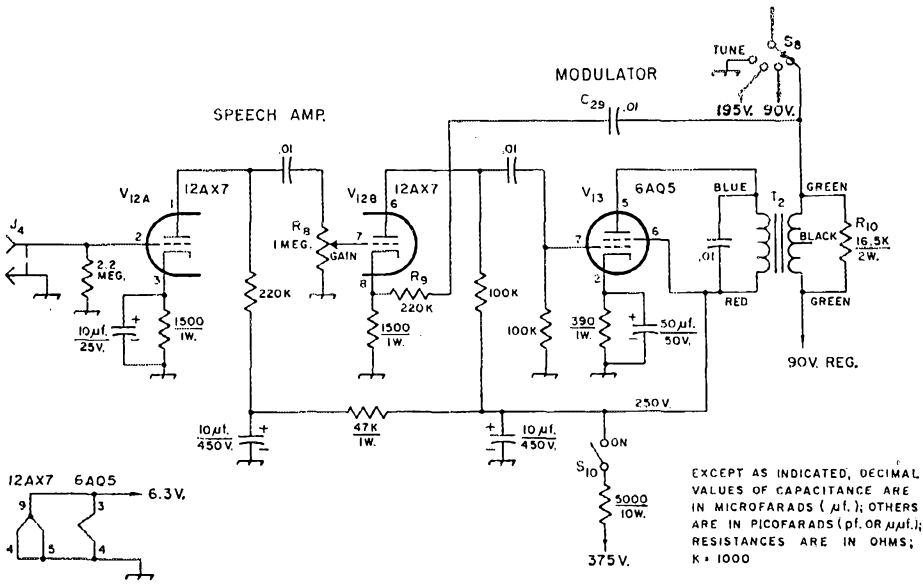


Fig. 4—Circuit diagram of the screen modulator. The 0.01-μf. capacitors are disk ceramic; all others are electrolytic.

C_{29}—0.01-μf. disk ceramic.
J_4—Microphone connector.
R_8—One-megohm volume control, audio taper, with s.p.s.t. switch (S_{10}).
R_9—0.22 megohm, ½ watt.
R_{10}—16,500 ohms, 2 watts (two 33,000-ohm, one-watt resistors in parallel).
S_{10}—S.p.s.t., (part of R_8).
T_2—Driver transformer, primary 7000 ohms, 40 ma., secondary 15,800 ohms (Triad A-83 X).

two coax fittings. This provided sufficient room for the modulator. If we were going to do the job again (how many times have you heard that statement?) we would have used a chassis another inch or two deeper.

The two tubes in the modulator circuit are mounted just behind the v.f.o. shield box. The modulation transformer is on the side of the chassis. The only critical thing about wiring the modulator is that shielded wire must be used from the microphone jack, J_4, to the grid of the 12AX7. Also, the leads from the arm and top of R_8 should be shielded.

Tune-Up On Phone

In screen modulation the power input to the final amplifier, without modulation, should not exceed 1½ times the plate dissipation ratings of the amplifier tubes. The ratings on the two 6146Bs total 70 watts, so the maximum d.c. input that can be run on phone is about 100 watts. It is a good idea to make all preliminary tests with a dummy load on the rig so you can become familiar with the tune-up procedure. If you have an oscilloscope it should be used; methods of checking modulation with a scope are described in the *Radio Amateur's Handbook*.

It is possible to adjust the modulation without a scope, but you must have at least an output indicator. A Monimatch or a dial-lamp output indicator would be suitable. Details for building either unit are given in *Understanding Amateur Radio*.[1] The tune-up procedure consists of setting S_8 in the c.w. position and adjusting the grid-drive, plate-tuning and loading controls for the setting that will give you the maximum output for 200 watts input. If you are using a Monimatch set the instrument to read forward power, reduce the Monimatch meter reading to about half scale, and then adjust the transmitter controls for *maximum* r.f. output with no more than 200 watts input. With the dial lamp indicator you keep adjusting for maximum brilliance with 200 watts input. When the tuning is properly done, the output should *decrease* if you increase the loading (higher plate current) without touching the drive control. If the output increases with more loading, try another combination of loading and drive until you find one that gives you the most output you can get at 200 watts input, but which will result in *less* output if you load the transmitter more heavily without changing the grid drive.

When you have obtained this condition, switch S_8 to the phone position and the amplifier plate current should drop to no more than half its former value. In our setup, when switched to the phone position, the plate voltage on the 6146Bs was 750, the screen voltage was 90, the plate current was 130 ma., and grid drive was 2 ma. At this stage, turn up the gain control gradually while talking into the microphone. When you reach the gain setting that causes the current to just barely "kick" on voice peaks you should have the correct setting for 100 per cent modulation.

You can check the modulation by listening to the signal in your receiver, using headphones. Reduce receiver gain to the point where there is no danger that overload will cause a false indication.[2] If you get a squeal in the modulator

(Continued on page 174)

[1] *Understanding Amateur Radio*, Monimatch, pages 14, 209, 210; dial lamp indicator, page 267.

[2] *Understanding Amateur Radio*, page 251.

• Recent Equipment —

Squires-Sanders SS-1R Receiver

MANY of the specifications and features of the SS-1R receiver will already be familiar to the reader, because the receiver has been widely advertised and sections of it have been the basis for technical articles.[1,2] However, in the interests of completeness, we will have to act as though the receiver were a complete surprise and this was the first description.

Although the SS-1R is essentially an amateur-bands-only receiver, it can be made to receive most of the 3.5- to 30-Mc. spectrum, with only a few exceptions. As an amateur receiver, it covers the amateur bands within this range in 500-kc. segments, and WWV can be received at 5, 10 and 15 Mc. Optional 500-kc. segments between 7.5 and 11.0 Mc., and 16.5 and 20.5 Mc., are available for use with a v.h.f. converter.

A general idea of the frequency sequence through the receiver can be obtained from Fig. 1. The first mixer is a 7360 beam-deflection tube, with the local oscillator signal applied to the deflection plates and the incoming signal to the No. 1 grid. The output plates are connected push-pull. Used in this application, the tube has a low noise figure and the ability to handle strong signals without cross-modulation.[1] The output coupling of the first mixer is a band-pass filter, 5.0 to 5.5 Mc. In the 6BH6 oscillator stage, the 9-Mc. crystal is used for 80 or 20, the second harmonic of the 8-Mc. crystal is used for 15 meters, and the second harmonics of 11.5 Mc. or higher are used for 10 meters. When harmonics are used, they are selected by tuned circuits. On 40 meters, the first mixer is bypassed and the antenna circuits feed the No. 1 grid of the second mixer.

The second mixer is also a 7360 balanced mixer, with the tunable (6.0 to 6.5 Mc.) oscillator signal fed to the deflection plates. The tunable oscillator uses a triode section of a 6BK7B in a Hartley circuit, and the other triode section serves as a cathode follower. The oscillator cannot be lightly dismissed, and we will spend a paragraph or two on it later on.

Three degrees of selectivity are available in the 1-Mc. i.f. amplifier. A 5-kc. (at −6 db.) channel is obtained from the transformers alone. With a −60 db. bandwidth of 25 kc., it is used for a.m. reception. A 2.5-kc. bandwidth crystal-lattice filter (5 kc. at −60 db.) is used for sideband and c.w., and a sharp two-crystal filter (0.35 and 2.0 kc. at −6 and −60 db.) is there when the going gets rough on c.w.

Following the selectivity in the i.f. amplifier there are two gain-controlled 6BA6 stages, a fixed-gain 6AX8 pentode stage, and a 6AL5 automatic noise limiter.[3] The limiter level is adjustable by a panel control; the limiter is used primarily on c.w., where it does a nice job of protecting one's eardrums.

The a.g.c. rectifier at the end of the i.f. amplifier has a threshold level set by the manual gain control, so that as the gain is reduced manually the a.g.c. can take over on a loud signal. Slow and fast time constants, as well as an "AGC OFF" condition can be selected with a panel switch. In addition, extremely strong signals will apply a.g.c. voltage to the signal grids of the 7360 mixers.

For a.m. reception a germanium diode serves as the detector. For sideband and c.w. reception, a 6BE6 product detector is used. The 6AU6

[1] Squires, "New Approach to Receiver Front-End Design," *QST*, Sept., 1963.
[2] Squires, "A Pre-I.F. Noise Silencer," *QST*, Oct., 1963.
[3] "Bishop's Noise Limiter," *Electronics*, June, 1953. Also see Stiles, *QST*, page 16, June, 1960.

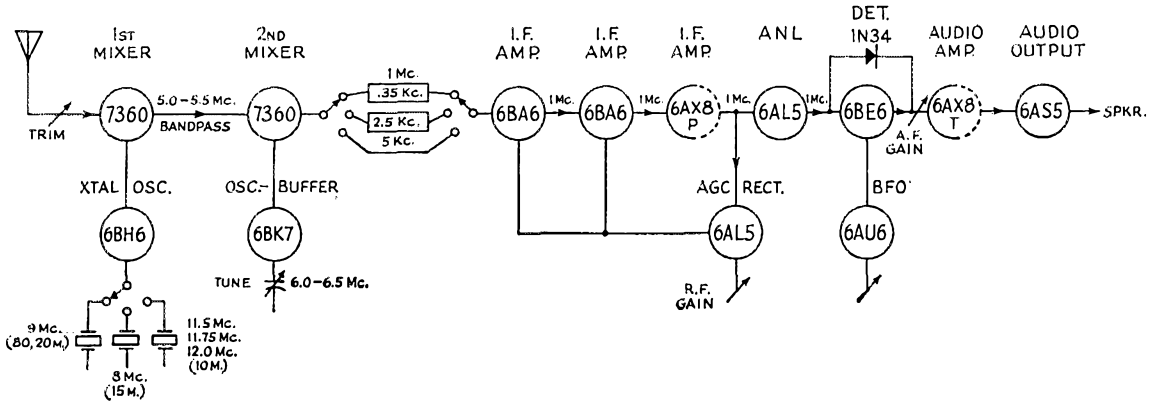


Fig. 1—Simplified block diagram of the SS-1R receiver.

b.f.o. is preset for sideband reception, but on switching to c.w. the b.f.o. panel control becomes operative. Not suggested in Fig. 1 is the circuitry that switches capacitors in and out of the preset b.f.o. so that a panel switch marked "USB" and "LSB" does indeed give upper and lower sideband reception, regardless of the band. Also not shown is similar circuitry across the 6BK7 oscillator circuit that shifts the oscillator just enough to make the tuning dial always read the frequency of the (suppressed) carrier. It is a highly refined extension of the principle first described by Bob Ehrlich.[4].

The audio section of the receiver utilizes the triode portion of the 6AX8 and a 6AS5 pentode to deliver a maximum of two watts of audio.

The Oscillator

We promised a paragraph on the oscillator, and here it is. It is tuned by a variable capacitor (see photograph) at a tuning rate of 10 kc. per knob revolution. That of course is great for sideband or high-selectivity c.w., but it is a lot of knob twisting if you are at 3.5 Mc. and want to check 4.0 Mc. So don't twist the knob — push a button! Immediately a small motor picks up the chore and whizzes you to the other end of the band, at a speed of 62½ kc. per second. Although this doesn't approach escape velocity, it sure beats turning a knob 50 times. Actually the motor tuning also provides a convenient check on a "dead" band. One sets the selectivity at 2.5 or 5 kc., with the b.f.o. on, and the "dead" band can be checked in a few seconds by pushing the proper button, since there is no electrical noise from the motor.

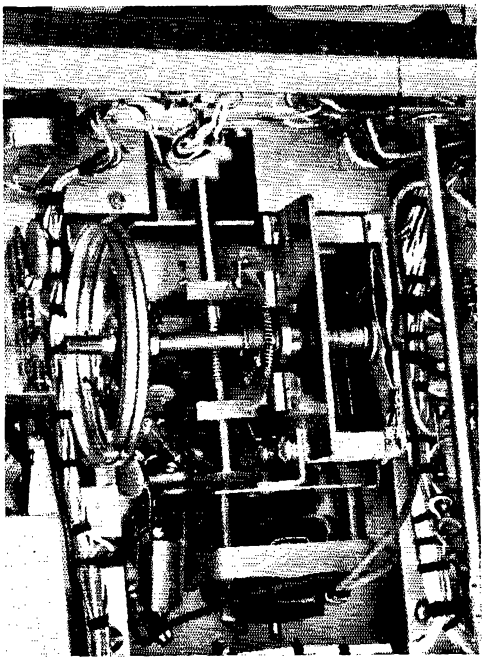
The slide-rule dial of the receiver marks 100-kc. intervals. The receiver frequency is read to the nearest kilocycle through a small window. This is not the usual scale-and-pointer device; it is a counter that displays the numbers 0 through 99, one at a time. A glance at the slide rule tells what 100 kc. section you're in, and the digital indicator does the rest. On 80 meters the slide-rule scale reverses (high frequency at left-hand end), but the usual window closes and a new window opens, disclosing another counter that reads correctly and saves the day. Anyone even remotely connected with the construction of radio receivers will appreciate that it takes quite a capacitor to be used with a digital readout like this.

Sharp observers may have noted the lack of voltage regulation in the block diagram. There is none. The line voltage can be varied over 15 volts or so, and all you can notice is a change in *gain!* We have been told that the oscillator was designed to compensate for voltage changes; there is nothing magical apparent in the schematic, so it must be a trade secret or something. In any event, it is quite impressive.

The Noise Silencer

A companion unit to the SS-1R is the SS-1S Noise Silencer. It is housed in the speaker cabinet

[4] Ehrlich, "Notes on a Specialized Phone Receiver," *QST*, April, 1953.

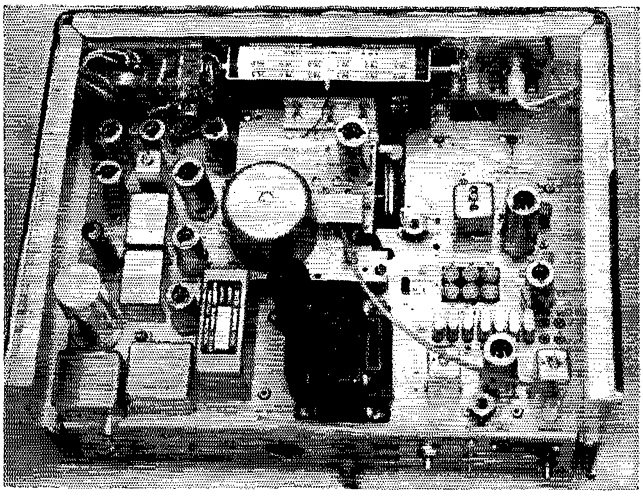


The tuning capacitor for the oscillator is a rugged unit manually operated from the panel through the panel shaft, a worm and spring-loaded gears. The small nylon gears near the panel (top of photograph) drive the digital frequency indicators (counters) and the drum drives the pointer on the slide-rule segment indicator. The small motor is normally disconnected from the panel shaft but engages on demand to drive the tuning capacitor. Small coil to left of motor is part of a low-pass filter in the oscillator output; the special inductor for the oscillator is housed in a shield dome visible in the other photograph.

and is an accessory (doesn't come with the receiver). Its basic principles were described earlier.[2] The output of the 5-Mc. band-pass first i.f. of the receiver is sampled by the noise silencer, and a noise-blanking pulse is developed. This keys a gate in the silencer. The 1-Mc. output of the second mixer is fed through the gate and back to the selective circuits in the receiver. Switches and threshold controls for the silencer are provided on the panel of the receiver. Having heard most of the noise silencers since Jim Lamb's original, this reviewer is willing to state that this seems to be the most effective of them all. It is not affected by adjacent-channel signals, as were some of the old versions. But before anyone gets the wrong idea, it will not remove all types of noise. It is at its best with high-amplitude pulses of short duration, such as automobile ignition. In common with all such systems, the larger the duty cycle of the noise, the less effective the silencer because it has less time to let the non-interfered-with signal through. The big feature of this silencer is that it accomplishes the silencing without introducing a little noise itself.

The Right Antenna

Unless the amateur radio world is changed overnight, someone is going to connect an SS-1R



Top view of the SS-1R receiver. The front panel and sides are formed from a single piece of extruded aluminum, bent to the proper shape. The chassis slides in or out of grooves formed during the extrusion process. Platform at top center supports the oscillator section.

to an antenna without reading the instruction book. If the antenna is a random wire, the new receiver owner may be sadly disappointed. He may even think his receiver isn't very good. But if, instead of calling the dealer or the manufacturer, he reads the instruction book, he will find the statement that the receiver is tailored for 50-ohm transmission-line installations. In other words, if your antenna is a dipole or beam fed with and properly matched to 50-ohm line, the input circuits of the receiver will work as they were intended to. If you use an antenna coupler, so much the better, because now you can present 50 ohms to the receiver with any antenna system.

All this is not conjecture on our part. After a large dose of stupid pills we first connected the SS-1R to a long wire. The antenna trimmer didn't peak correctly, and we found a few nonamateur signals. Shifting over to a properly matched beam at W1AW, the receiver became a different box. It was a hard lesson to take, but after preaching the use of receiver antenna couplers for years we should have known better. In a receiver with an r.f. stage, the input circuit can be effective or not, depending upon its design and the antenna in use. But the tuned circuit between r.f. stage and mixer is *always* effective, because it is isolated from the antenna by the r.f. stage. In the SS-1R there is no protection like this, so the antenna *must* look like the 50 ohms the receiver was designed around. Acknowledging this requirement, one then has himself a receiver in the SS-1R.

General

Some day a manufacturer may take the giant step and try to sell a receiver without the "traditional" S meter. (The "traditional" S meter is calibrated in "db. above an extremely strong signal," a very exact measure indeed.) The SS-1R almost made it, but the manufacturer chickened out. The SS-1R S meter has two scales. The top one is the familiar marking, partially in S units and then in db. "over S9." (S9 is obtained with 50 μv. input at the calibration frequency of 21 Mc.) A lower scale is calibrated in db. above 1 μv. and runs to 100. It shouldn't take long for shrewd observers to note that S9 on the upper scale coincides with 33 db. on the lower scale. Since "33 db." sounds like a lot more than "S9", it would be no surprise to see the lower scale become very popular, especially on the weaker signals and rarer countries.

The workmanship and quality of the SS-1R is in every way what one has a right to expect from a receiver carrying the price tag it does. The instruction book, packed with the receiver, is well organized and complete, except for page 6. (Here the unpacking instructions for the receiver are given, and we must confess that the SS-1R had been unpacked and enjoyed for several hours before we learned the factory method for removing it from its shipping carton.) — *B. G.*

Squires-Sanders SS-1R Receiver

Height: 7¾ inches.
Width: 16¼ inches.
Depth: 13 inches.
Weight: 25 pounds.
Power Requirements: 105–125 v.a.c., 60 cycles: 55 watts.
Price Class: Under $900 (silencer extra).
Manufacturer: Squires-Sanders, Inc. 475 Watchung Avenue, Watchung, New Jersey

Strays

W6IAB has a wallfull of BPL cards, but still needs some QSLs for WAS. Do *you* owe him a card?

— • • • —

S.s.b. 100 years old? Lord Tennyson began one of his poems "Break, break, break." — *WØRA*

— • • • —

The Student's Traffic Net meets daily at 1600 CST on 3868 kc. You don't need to be a student.

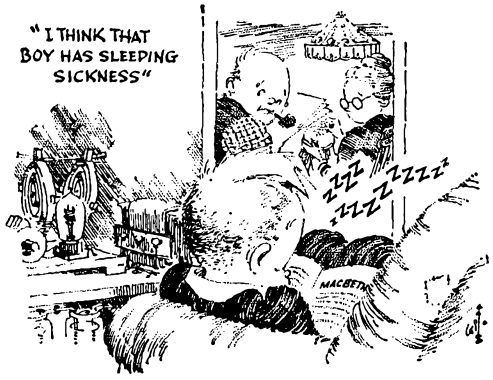
Houston ARC Old Timers' Night Address

ARRL First Vice-President Wayland M. "Soupy" Groves, W5NW, spoke at a recent Old Timers' Night of the Houston, Texas, Amateur Radio Club. His words well describe the joys — and difficulties — of hamming in the early days. Here is the way he recalled them.

MY FIRST CONTACT WITH RADIO was a crystal broadcast receiver, quickly graduating to a one-tube $5.00 UV-200. I bought that UV-200 long before I was able to get the rest of the parts. The next thing I bought was a Burgess 22½-volt "B" battery. Knowing nothing about radio, I just had to find out if the filament was good so I thought I could quickly put the "B" battery to it (after all, it wasn't nearly as large as the six-volt car battery). Well, the tube was good, but not for long. It wasn't a sad ending though, because I sent it back to Sears Roebuck — they knew as little as I did and sent me a new tube.

"Edgar Fain, later to become 5NY, told me about amateur radio one day, and I knew from that very day that it was for me. We quickly got busy with a doorbell buzzer and learned the code, getting an old Navy operator to certify as to our code proficiency. Then we took turns calling stations and CQing with the ¼-kilowatt Sears Roebuck rotary spark. I was the lucky one, raising 5AHT in Fort Worth (40 miles south of Denton) and from that very moment I knew a new world had opened up to me.

"Almost immediately I turned to c.w., once again showing the quality of genius [I] referred to earlier by buying what I considered the most important part of the new rig — a 0-to-5 Jewell thermocouple ammeter costing $12.00. Remember how most of us judged the performance of our stations by how high we could push the ole antenna ammeter, regardless of how it was done? The other parts for the c.w. rig came as finances permitted and I was able to build them. I soon got a filament voltmeter, but it was a long, long time before I got the all-important plate milliammeter. (However tuning by listening to the hum in those old homemade plate transformers with loose laminations was a good substitute.)



"Let me tell you about the first filament transformer that I wound. It was way short on core or turns (probably both); it heated so badly and smelled so awful I couldn't leave it in the bedroom. I put it in a bucket of crankcase drainings and put it on the ground outside the window.

"In the first few months I joined that select group that had worked all districts, Canada and Mexico. My mother got so worried about the sleep I was losing that I really had to rely on the old ingenuity again, or else the 2 A.M. skeds would have to stop. (My room was next to the OM's and no ham ever had parents who slept so lightly: I couldn't turn on a light switch or operate a key with normal spacing. I solved this problem by turning on the wall switch before going to bed and just screwed the light bulb in and out. I don't believe anyone ever operated with such close spacing on a key. I had to set the alarm for 2 A.M. or I wouldn't wake up. I solved this by putting the clock inside one pillow and putting another on top of it. Sleeping on that worked real good. 5BX in Dallas solved this problem by going to bed with only one blanket — by two o'clock he was so cold he *had* to get up. I really think I put one over on my parents, but I slept so much in the daytime that I overheard Dad tell Mother 'I think that boy has sleeping sickness.')

"About this time the big rush was on to get on 80 meters. I remember a lot of the fellows had trouble getting up there (or *down* there as we called it then). I didn't

(*Continued on page 178*)

These twenty men have enjoyed a total of 868 years as amateurs! They are among the OTs feted by the Houston, Texas, ARC in February. From left to right they are (first row) W5NN, first licensed in 1917; W5DB, 1920; author Groves, W5NW, 1923; W5AMK, 1923; K5JLQ, 1921; (second row) W5AE, 1919; W5TG, 1922; W5EC, 1919; W5HZ, 1920; W5AEQ, 1924; W5RIH, 1911; (third row) W5OP, 1919; W5WR, 1923; W5OX, 1923; W5FE, 1923; W5VA 1919; (fourth row) W5AIR, 1922; W5FJ, 1922; W5FSC, 1922; and W5AF, 1920. (Photo by W5SWU)

Hints and Kinks For the Experimenter

BENDING COPPER TUBING

IT'S an old trick but worth repeating: when winding large coils with copper tubing, put ordinary beach sand inside the copper tubing and it will prevent the tubing from "kinking" or flattening during the winding process.

— *Jim Carlson, WB6EED*

NOVEL BIAS SUPPLY

A TRANSFORMERLESS bias supply suitable for use with almost any amplifier that doesn't draw grid current is shown in Fig. 1. The value of C_1 and R_2 are selected to result in a d.c. output voltage across R_1, that is slightly higher than the bias required. This system has a definite advantage over any equivalent resistive divider, since

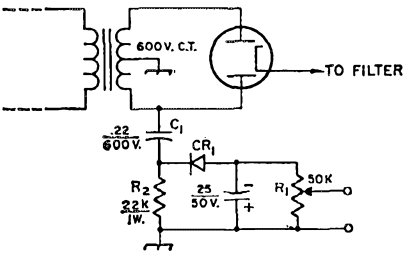


Fig. 1—K9YQD's bias supply.

the capacitor dissipates practically no power and also isolates the bias supply for d.c. as well. The values given in Fig. 1 are the ones I use to supply bias for my 50-watt 2-meter transmitter. The diode, CR_1, can be any general-purpose silicon type of sufficient rating. — *Robert Mudra, K9YQD*

MORE ON HEAT-RADIATING TUBE SHIELDS

HAVING read WA2KWM's Hint & Kink in February *QST*, I have decided to clarify the process for treating the HX-30 tube shields.

The correct procedure is to heat the shields in a gas flame until they are red hot, and then quench them in a salt-water solution. It may be necessary to repeat this procedure two or three times until the shields turn a dull, dark gray. Care should be taken to make sure the shields make a good ground contact with the socket fingers, when reinserted.

Care should also be exercised in substituting other tube shields for the ones supplied for the tubes that drive the 6360 final amplifier. This is particularly true for the 6AK6. If the internal dimensions of the shield are different than the original ones, the different shield-to-plate capacitance will necessitate retuning these stages.

Of course, it is worth noting that "shiny" tube shields always run hotter than do dark ones and thus reduce tube life. This Hink & Kink can be applied to shields on most any equipment.

— *Sheldon L. Epstein, K9APE/2*

TRANSFORMER WINDING NOTES

THOSE amateurs who don't have a TV transformer to guide them in winding a power transformer [1] may use the following tips for designing their own transformers.

There should be six turns of wire per volt r.m.s. per square inch of core. In other words, for every volt across a winding, divide by the number of square inches of cross section of transformer and multiply by 6 to determine the number of turns. Allow one third of the "window" area for primary wire, one third for secondary wire, and the rest for insulation and packing. Determine primary-wire size from the wire tables by dividing allowed primary area by the number of turns. Calculate length of primary wire by multiplying the number of turns by the average length per turn. The same is done for the secondary wire length. The average length will be longer, of course, since the secondary is the outside winding.

The power the transformer can dissipate in heat is ¼ watt per square inch of outside surface area. The area is found by direct measurement or by the formula $2.5L^2 + 3.6LH$, where L is the length of the laminations and H is the height of the stack. — *Frederick Cunningham, K1AJZ*

[1] McCoy, "Tailor-Made Volts," *QST*, Feb. 1964.

WORKSHOP IDEAS

A NEW 67-page booklet from NASA, called *Reliable Electrical Connections*, contains a lot of Hint & Kink material on handling of wires, components, soldering, shielding, lacing, printed-circuit boards, etc. Helpful information on how to make a good solder joint, the proper way to strip a wire, the correct method of tinning wire, and many other workshop practices are contained in the manual.

The book, which is part of a series to provide technical information, is available from the Office of Technical Services, Department of Commerce, Washington, D.C., 20230, for 70 cents. — *E. L. C.*

BETTER DIAL ILLUMINATION FOR THE SUPER-12

Those who use the Gonset Super-12 mobile converter know that the dial illumination is marginal. A substantial increase in illumination of the dial can be obtained by gluing a small piece of white card behind the lamp to act as a reflector. Also, attach white cards on the inside of the cabinet, both on the top and front surfaces above the glass dial window.

— *Richard Shongut, W2QFR*

DX QSL TIP

Instead of enclosing a self-addressed envelope when QSL-ing a DX station, send along a self-addressed gummed label. It will cost you less for postage and will be less expensive for the DX station, since he can now send you the card instead of a card in an envelope. It probably would be a good idea to place the gummed label between sheets of waxed paper, especially when the DX station is in the tropics!

— *Irv Oppenheim, WA2WIJ*

10 MC. WWV WITH THE COLLINS RECEIVER

Collins 75S-1 and 75S-3 owners have had fun permuting the high-frequency crystals to see what additional band coverage can be obtained. There is one particular variation that is quite useful these days at locations where WWV on 15 Mc. fades out early in the evening.

Take the 6.555-Mc. crystal and plug it into one of the 14-Mc. positions — in other words, in place of either the 8577.5-, the 8677.5-, or 8977.5-kc. crystal. Next, tune the preselector to about 6 Mc. on the dial. WWV at 10 Mc. will come banging in loud and clear at "45" on the main tuning dial.

If you are interested in the frequency combinations that give the above results, here is the rundown. The second harmonic of 6555 kc. is 13,110 kc. Subtracting 10 Mc. (WWV) from this gives 3110 kc. Subtract the i.f., 455 kc., giving 2655 kc. as the p.t.o. frequency. The dial reading is 2700 minus 2655, or 45 as indicated on the dial.

When the band-selector switch is at one of the 14-Mc. positions, and the preselector is set to read about 6 Mc., the tuned circuits will tune to the proper frequencies.

— *D. W. R. McKinley, VE3AU*

PLASTIC BAGS FOR THE WORKSHOP

The problem of how to organize various varieties of parts is not unusual in the workshop. My solution is to package small parts in moisture-proof plastic bags. For small parts, two pieces of plastic are cut to the desired size, held with long-nose pliers near the edges, and held near the flame of a match or candle. Be careful not to ignite the plastic.

When packaging large parts, it usually isn't necessary to make your own bags; simply use sandwich bags available at grocery stores. The fourth side of the package can be sealed with an identifying label and hung on a rack such as shown in Fig. 2. — *Craig E. Kershow, KN3ZEE*

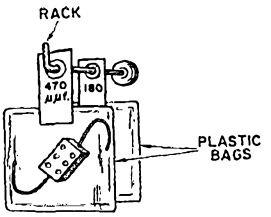


Fig. 2—KN3ZEE'S plastic bag parts holder.

RACK PANEL SPEAKER ENCLOSURE

Installing a speaker in a cabinet panel or rack can sometimes be a problem. An easy solution is to drill several ¾-inch holes in a circular pattern for the sound waves to come through. After removing the burrs, cement a plastic picture frame to the panel. Instead of a picture, insert a piece of speaker grill cloth to cover the holes. The frames are available at most five-and-dime stores for only a few cents. — *Chuck Utz, K1QNF*

AUTO RADIOS FOR 160 METERS

Many amateurs who wish to revamp a car radio for 160-meter mobile work are under the impression that an extensive modification is in order. Actually, the task is not nearly so difficult as would be expected.

After the radio has been removed from the car, it should be opened and inspected. If the front end employs variable-inductance tuning, proceed as follows. First, locate the oscillator trimmer. This capacitor is usually mounted close to a converter tube and is connected in parallel with a padder capacitance of approximately 300 pf. Remove the padder and replace it with one having a capacitance of approximately 250 pf.

Next, feed the output of a modulated signal generator to the antenna jack of the receiver and adjust the r.f. amplifier and the converter circuits for maximum response at 1900 kc. The set may now be reinstalled in the car and connected to the antenna. The antenna trimmer should now be peaked while listening to a weak signal located somewhere around 1800 kc.

Receivers employing variable-inductance tuning that we have converted have ended up with a frequency range of 600 to 1925 kc. Of course, the original calibration is off after the change.

If the auto radio uses variable capacitors for tuning purposes it is possible to modify the tuning range merely by inserting a capacitance of approximately 100 pf. in series with the leads to the variables. This system does not permit complete coverage of the b.c. band and the sets we have worked with tuned 1100 to 2000 kc. after the revamping and the alignment had been done.

— *Fred Nazar, W8RNA*

Some Anniversary Greetings

From the HONORABLE HERBERT HOOVER, former President of the United States:

It is indeed a pleasure to congratulate the League on its fiftieth birthday.

Mr. Maxim, your first president, used to call on me frequently while I was Secretary of Commerce in the early 1920s, and I learned much from him about the aspirations and the accomplishments of radio amateurs in those early days.

In 1927, at the close of the International Radio Conference in Washington, I concluded my remarks to the assembled delegations in this vein:

"At this point I should mention that this conference for the first time has recognized the amateur as an important element in radio communication, and has conferred upon him by international treaty certain definite wave lengths. The effects of these arrangements for the amateurs have been agreed by their representatives as increasing and assuring their opportunities to make contact with their companions overseas. To have given the boys of the world a status in international life by treaty is a fine recognition not only of the rights of all boys but a tribute to their service in developing the art."

Today, almost forty years later, these particular boys have pretty well grown up. But many of them are still active in amateur radio, and they have since been joined by hundreds of thousands of others from all over the globe.

Our faith in them was fully justified in those early and eventful times, and I hope that with their unique abilities and enthusiasm they will be able to carry on their fine traditions of public service for many more years to come.

From the HONORABLE DWIGHT D. EISENHOWER, former President of the United States.

I am delighted to learn that The American Radio Relay League is celebrating its Golden Anniversary, and I hasten to send my congratulations to the 100,000 members in its ranks.

I understand there are more than a third of a million amateur radio operators in the world today, and that they are licensed by their governments in almost every country. The fact that in the last 50 years they have achieved such wide recognition is a great tribute to their competence, skill and enthusiasm.

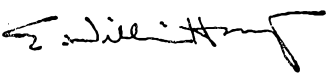
Amateur radio is a fine example of an effective people-to-people program for better international understanding. The friendly and non-controversial conversations that are constantly taking place are unaffected by the usual barriers of oceans, mountains and deserts; nor are they limited by international boundaries. Radio amateurs can be a truly constructive force for peace and goodwill in this troubled world.

Your members have much to be proud of on this 50th Anniversary — as well as a great challenge in the years that lie ahead.

From the HONORABLE E. WILLIAM HENRY, Chairman, Federal Communications Commission:

Please convey my congratulations to the membership of the American Radio Relay League on having reached its fiftieth anniversary.

I note that the League was born only two years after the first amateur station licenses were issued by the Federal Government. I recognize that the survival and growth of the Amateur Radio Service has been in great part due to the League's strong and vigorous representation of the radio amateur before national and international regulatory bodies. In view of its past history, I am confident that the League will, in living up to its "of, by and for the amateur" motto, continue to grow and progress in the years to come.



From the HONORABLE F. G. NIXON, Director, Telecommunications and Electronics Branch, Department of Transport:

It gives me great pleasure to offer to you and to your associates of the American Radio Relay League our heartiest congratulations on the occasion of the 50th Anniversary of the League.

Amateurs have pursued their hobby in Canada since before the First World War, and have worked harmoniously with the Agencies of Government concerned in the management of the radio spectrum.

The Canadian division of the ARRL has done an able job of representing its membership and is assuming responsibility of bringing the points of view of those concerned to the attention of the administration. The fact that Canadian Amateurs have assumed a major burden of regulating their own activities and policing their operations has made it unnecessary for us to maintain large staff for this purpose. The Canadian radio regulations reflect directly the recommendations of the amateurs themselves, and this, we believe, has been instrumental in the fine showing our amateurs have made over the years.

F. G. Nixon

From MAJOR GENERAL DAVID P. GIBBS, Chief of Communications-Electronics, U.S. Army:

On behalf of the Department of the Army and all Army communicators, it is a sincere pleasure for me to extend congratulations to you on the occasion of the 50th Anniversary of the founding of the American Radio Relay League.

The Army, through its radio communications activities, has enjoyed a close, harmonious and beneficial relationship with the League for almost as many years as the League has been in existence. The League gave assistance to the Army in the formative days of both the Army Amateur Radio System — AARS — in 1925 and the Military Affiliate Radio System — MARS — in 1948. These contributions are among many which are still paying dividends and for which the Army is still appreciative.

It is unnecessary for me to enumerate or elaborate on the importance of the role the League has played in National and International amateur radio affairs. The respect with which the League is held in the minds of countless numbers of radio communicators throughout the world is adequate evidence of the excellence of its endeavors and leadership.

I am sure that the guardianship of amateur radio responsibilities, which many thousands of radio amateurs have invested in the League, will be as energetically fostered and protected in the future as it has been in the past.

David P. Gibbs

From C. W. LOEBER, Chief, Telecommunications Division, Department of State:

The celebration of the 50th Anniversary of the American Radio Relay League is a fitting occasion to recall the debt that many of us in the field of telecommunications, and more especially radio communications, owe to the League.

The close of World War I in 1918 resulted in my own introduction to *QST* and the work which the League was doing to restore interest in amateur radio and to call the attention of amateurs to the tremendous advances in radiocommunication growing out of that War. As a youngster in knee pants I was an avid reader of the first post-War issues of *QST* and before long my Ford spark coil was rending the air in my neighborhood. Through *QST* and the indulgence of the older hams in my neighborhood, I was able to qualify for my second class amateur radio license and my provisional station license in November 1920. The Department of Commerce, under Mr. Herbert Hoover, its Secretary, issued me the call letters 9ATW. My half-kilowatt Thordarson transformer and my homemade rotary spark gap were the pride of my life. Thanks to this ham experience I soon qualified for my commercial operator's license and after finishing the University, embarked on my career in telecommunications.

I make these personal references only to emphasize that many of us who today play more or less important roles in national and international communications, owe our start to the efforts of the League to interest young people in radio and to guide them, through the publication of *QST*, excellent handbooks, license manuals, and the like, with sound technical information and education.

Accordingly, it is only fitting that we pause for a moment to recall the many benefits which have flowed from the unremitting efforts of the League to stimulate interest in radiocommunication. Many of us owe the League a great debt and I am sure all of us, including my colleagues in the Department of State, wish for it many more decades filled with success.

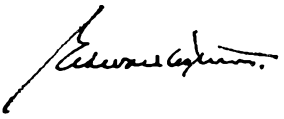
C. W. Loeber

From EDWARD A. McDERMOTT, Director, Office of Emergency Planning:

It gives me great pleasure to extend to the American Radio Relay League my congratulations on the occasion of its fiftieth anniversary.

Your organization can be justly proud of its accomplishments during the half century of its existence, beginning at a time when members of the League had to relay signals from one station to another in order to cover any appreciable distance. That situation was followed in a very few years by their dramatic demonstration of the efficacy of high frequencies to span continents and oceans, and in the more recent past by their widespread exploitation of the radio spectrum above 100 Mc/s. Not to be outdistanced by the space age, the application to amateur radio of space communication techniques by Project OSCAR has now been accomplished.

The staff of the office of Telecommunications Management joins me in extending to you our best wishes for your future success.



From GEN. ALFRED M. GRUENTHER, President, American National Red Cross:

The staff of the American National Red Cross join me in extending our very warm and hearty congratulations to all of you during 1964, the fiftieth anniversary of the American Radio Relay League.

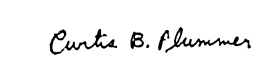
From the very beginning, members of the League have maintained the principles and high standards on which it was founded. The meaning of the word "relay" in your official title has been synonomous with emergency communications over the years in disasters and emergencies which have disrupted or overloaded normal communications channels. The contributions made by its members in advancing the technical phases of the radio art are evidenced in the wide variety of complex and sophisticated electronic devices and systems which we use for our entertainment, for our business, and for the defense of our country. In time of war they have provided a vital reservoir of trained operators, technicians and electronic experts, and served their country with distinction. And with their worldwide encompassing communications facilities, they have proven their unique ability to enhance international good will.

On behalf of the American National Red Cross, who has been a working partner with you in major disasters for more than twenty years, I, therefore, want to wish you continued success in maintaining the traditions of your League as the standard-bearer in amateur radio affairs.

From CURTIS B. PLUMMER, Executive Director, FCC:

It is with sincere personal pleasure that I take this opportunity to congratulate the League on the achievement of your "Golden" year.

Throughout the many years of my official association with the American Radio Relay League, I have time and again been afforded first-hand knowledge of its dedication to advancement of amateur radio operation in such fields as public service and technical achievement. My wish for your future success, in keeping with your illustrious and productive past, is extended to your staff and membership.



From WILLIAM H. HOWE, Chairman, Canadian Joint Telecommunications Committee:

The Communications divisions of the Canadian Military Services congratulate the American Radio Relay League on reaching its fiftieth anniversary. We are fully conscious of the great work which the league has accomplished in the past years and are sure that an even more successful half-century lies ahead. We wish you success in your many endeavours.

From WALTER H. PAGENKOPF, President, Armed Forces Communications and Electronics Association:

It gives me a profound sense of pleasure and a warm feeling of satisfaction to write and congratulate the American Radio Relay League, Inc., on its 50th anniversary on behalf of the Armed Forces Communications and Electronics Association. More precisely, I congratulate the League for two things, both, in my judgment representing extraordinary good fortune — good fortune not only for you but for the ideals as well as the success which you have accomplished. I congratulate you first on having rendered 50 years of devoted and unselfish humanitarian service to the Nation in the field of amateur radio. Secondly, I congratulate you on the fact that you have had the good wisdom to work untiredly in support of and for the development of the young and old in their desire to become radio amateur operators in support of a program which contributes to the national welfare but does not demand thanks or compensation. The League service to the Nation has been both outstanding and unequalled and its desire to provide for that important area known as communications for world-wide understanding is worthy of the highest commendation.

The members of ARRL have, indeed, established an outstanding record of public service in the amateur radio communications and experimentation field as evidenced by its venture with the OSCAR satellite. Also, its work in the field of electromagnetic compatibility and its untiring efforts in regard to legislation on reciprocal licensing are evidence of additional achievements.

The Armed Forces Communications and Electronics Association wishes you many additional years of continued success.

Walter H. Pagenkopf

From REAR ADMIRAL BERNARD F. ROEDER, Director, Naval Communications:

The many accomplishments of the American Radio Relay League during the past fifty years must be a source of pride and inspiration to you, other League officials, and members throughout our Great Nation. The League has long been recognized as an organization dedicated to the advancement of amateur radio and its leadership has been noted for channeling steadfast efforts toward this end.

Recalling the days of the spark gap and galena crystal brings nostalgic memories from a past rich in communication history. The United States Navy is proud to have shared the early history of wireless telegraphy with the American amateur and is equally proud of the excellent associations experienced with the American Radio Relay League throughout the years. An outgrowth of these fine associations has been the formation of the Department of the Navy policy to support and encourage amateur radio activities, and to carefully protect the independent status and the prerogatives of the amateur radio operator.

On behalf of the Department of the Navy, it is my pleasure to reaffirm the above policy and extend greetings to the American Radio Relay League upon this, the Fiftieth Anniversary of its founding. To all those associated with the League — congratulations and best wishes for continued success.

Bernard F. Roeder

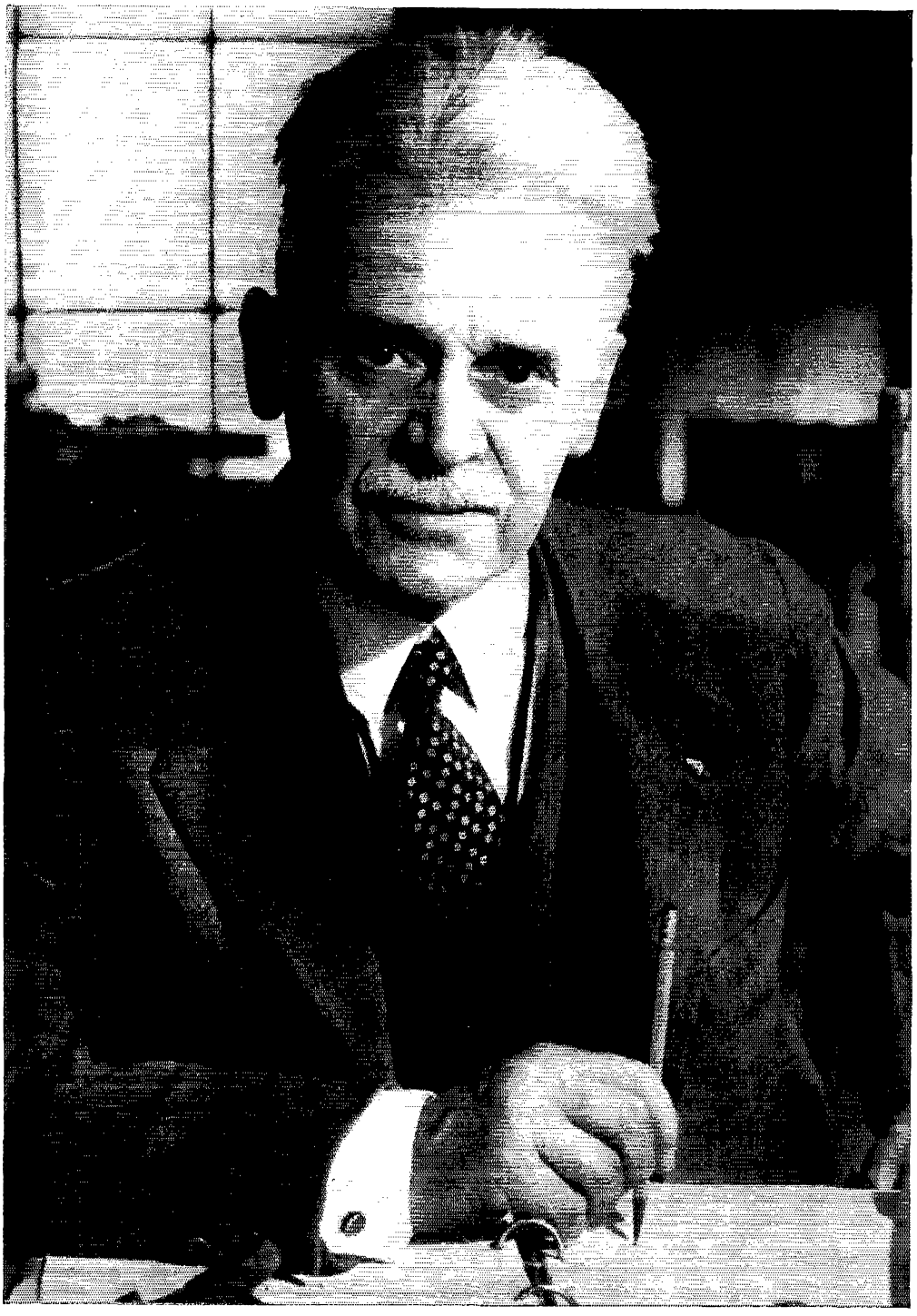
From GEORGE S. TURNER, Chief, Field Engineering Bureau, FCC:

As the Chief of the Field Engineering Bureau, parent organization of the Federal Communications Commission, it is my privilege to extend to you our congratulations in the celebration of the 50th Anniversary of The American Radio Relay League. The Field Bureau within this decade has also celebrated its 50th Anniversary and at that time was honored by recognition thereof by your League. It is, therefore, my sincere pleasure to thus return the compliment.

Also on this auspicious occasion it is my pleasure to express, in behalf of the staff of our Bureau, our sincere appreciation for the assistance and cooperation that we have received from the League and its membership through the years. Your Official Observers, TVI Committee Members, Communications Manager, Directors, General Manager, and yourself [President Hoover], are individually deserving of special recognition. Moreover, may I assure you of our strong desire that the cordial relations which have existed throughout the past half century between our two organizations shall continue to grow and prosper in the years ahead.

Geo. S. Turner

Additional Anniversary Greetings Will Appear Next Month



[*Reprinted from May, 1934, QST—ARRL's 20th Anniversary*]

73 to my fellow amateurs on A.R.R.L.'s birthday.
Hiram Percy Maxim. W1AW

ARRL and International Amateur Radio

AMATEUR radio regulation in 1925 was a singularly uncomplicated affair, with the regs occupying less than a page in *QST*. These regulations had been rewritten each year in accordance with the Hoover conferences held by the Department of Commerce, a practice which had begun in 1922 and which was to continue until 1926. "Frequencies" were almost unheard of — everyone operated on wavelengths. The amateur bands included 150 to 200 meters, 75 to 85.7, 37.5 to 42.8, 18.7 to 21.4, and 4.69 to 5.35 meters. Converted to our present-day frequencies, these were the bands of approximately 1500–2000, 3500–4000, 7000–8000, 14,000–16,000, and 56,000–64,000 kc. Quiet hours from 8:00 P.M. until 10:30 P.M. were mandatory if you operated on the 150–200 meter band or if your plate supply did *not* provide a pure continuous wave. The special sub-band of 170–180 meters was allocated to those who wished to use phone, spark, or i.c.w.

But the amateur and the broadcast listener and the Department of Commerce were having their troubles. Despite the quiet hours imposed everyone operating on the 150–200 meter band, interference to broadcast reception was rife, and amateurs were threatened with quiet hours even on the wavelengths below 85 meters. *QST* published a series of editorials on the subject, the Department of Commerce sent out warning letters, and about a hundred licenses were suspended in the spring of 1925.

One solution to the problem was for the amateur to obey the technical regulations. Inductive coupling, good power-supply filters, key-thump filters — these were required at the amateur station that was going to both obey the regs and stay out of difficulty.

Another solution was the formation of Local Vigilance Committees in every city where there was interference trouble. These committees were composed of three transmitting members of the League, a representative broadcast listener, and a member of the press. Each Committee was to announce its existence in the press, search out cases of interference, and do its utmost to solve them.

Amateurs of today are so careful of the band edges, and accurate measuring and marker equipment is so common, that it is hard to imagine the rather cavalier attitude taken toward the observance of band edges in the mid 1920s. For one thing, not many hams had frequency meters, and not everyone had an accurate wavemeter. The League appointed a number of OWLS, Official Wavelength Stations, who regularly announced their wavelength of operation so that listeners might calibrate their receivers, and standard frequency transmissions were made from the Bureau of Standards, the Massachusetts Institute of Technology, and Stanford University. The problem of off-frequency operation was complicated, too, by a factor which does not exist today. In these early days of ham radio, the U.S. assignments did not agree with foreign assignments, for there was no international radio law and no international allocations table. Thus, U.S. amateurs had a habit of sliding down to 30 meters, where some of the foreign hams were congregated.

As we have said before, all of this regulation was based on the "gentlemen's agreements" developed at the National Radio Conference called by Secretary of Commerce Hoover. But a legal decision early in 1926 said in effect that the Department of Commerce had no authority to impose on the stations operating below 200 meters any restrictions not expressly written into the radio law of 1912. This made wavelength assignments in narrow bands, quiet hours, limitations on types of equipment, all without legal standing. What resulted from this court decision was pandemonium in the broadcast field, but an adherence to the established order by amateurs. Broadcast stations came on the air by the dozen, increased their power, moved to "more choice" wavelengths — but the amateurs stood fast on their word.

Our title photo above shows delegates participating in the organization of the International Amateur Radio Union in 1926.

. . . It was freely predicted that when the conference adjourned amateurs would have 600 kilocycles at the British figures, and no more. There was good reason for this belief. . . . It represented more territory than many nations felt amateurs should have. Only a few countries of the world had any actual concept of the fact that amateurs could be anything but a liability; the rest, although they were made familiar with the American situation by formal discourse and private visit, could not stretch their credulity sufficiently to believe that the U. S. government actually granted these privileges of its own free will. They believed, instead, that American amateurs forced this recognition through political influence, and they were afraid of such a possibility in their own countries. There was no adequate way to control thousands of amateurs except, as Germany had indicated, control through technical considerations: making it so difficult to operate that amateurs could not do much harm in violation of the state's monopoly. Bands for amateurs? Well, perhaps; but small bands, narrow bands, in territory not needed for government use, and with all utilization highly restricted. There had even been talk of restricting all amateurs to 13 meters and below. Such was the attitude. And the British, despite their preconference cordiality, were among its most rigid upholders.

Days passed, in which much of the other business of the conference was settled. Eventually the actual work of constructing an allocation table was at hand. Recommendations were to be turned into regulations. Formal committee meetings resulting in no progress, informal discussions between delegates of the several leading nations were substituted, over afternoon tea-cups and evening delegation-whiskey glasses. The process was an involved and protracted one. Two delegates would get off in a corner and talk quite frankly until they discovered something they could agree upon. A third was brought into the circle, and then another, until finally general agreement on one point was reached. Then the same thing occurred in connection with other matters. Finally the stage was reached where most of these viewpoints had been reconciled among the larger and more influential nations, whereupon formal approval in committee was sought.

The amateur was well supported in this "tea-cupping," not only by his representatives but by the American delegation, from Secretary Hoover down. Major General C. McK. Saltzman, in charge of all technical matters, has always been a loyal friend of the amateur; so was Lieut. Colonel J. O. Mauborgne, U. S. A., Captain S. C. Hooper, U. S. N., and Lieut. Commander T. A. M. Craven, U. S. N. Captain Hooper presided at all informal meetings of the "tea-cuppers." Commander Craven conducted the actual negotiations during the time which Colonel Mauborgne later referred to as "those hectic days when a frequency channel was more eagerly sought than a million dollars." More than any other man, it was Craven who was responsible for the final Washington frequency regulations. He originated the "ladder" scheme of allocation for the frequencies above 1500 kilocycles; he conducted much of the informal negotiation; and, particularly, he and his associates safeguarded amateur radio.

Point by point, in seemingly endless detail, the tea-cupping went on. The upper amateur band was set at 1715–2000 kilocycles (the 1715 figure being the result of the European adherence to a wavelength scale) or 175–150 meters. After much argument, amateur bands centered at the American 80–40–20 meter figures, rather than the British suggestion, were approved. The width of these bands, however, was not so easily settled. Craven held out for wide bands; Shaughnessy [Great Britain] insisted on narrow bands, and most of the nations supported him. Australia, New Zealand and, at first, Canada occupied compromise ground. Agreement being impossible, Warner, in conference with Craven, evolved the idea of establishing N.G.P. (not open to general correspondence) bands for government stations, amateurs, etc., which each nation might sub-

From all of this was to come the Radio Act of 1927, which set the pattern for all future radio legislation in this country. The word "amateur" was used for the first time in any statute. The Act created the Federal Radio Commission and gave it powers to classify radio stations, prescribe the nature of the service to be rendered by each station, assign frequencies, prescribe technical standards, provide for the elimination of interference, and require logs.

Revised international regulation was just around the corner, it having gone fifteen years without a change. Since the London Conference of 1912 there had been a world war and a vast change in the technology of radio. When the Washington Conference was finally held in 1927, it had to provide for a whole new field — high-frequency radio — and many new services, including two which continue to be competitors for high-frequency spectrum space — amateurs and short-wave broadcasting.

Again, this conference would set the pattern which international amateur radio legislation would follow in the years to come. ARRL was by necessity the voice of amateur radio throughout the world, because in many other countries amateur radio societies were either non-existent or too new to have any influence in their govern-

allocate as she wished. This plan did not meet with general approval, but it offered opportunity for a pre-arranged compromise proposal by Captain Gino Montefinale of Italy for bands of variable width, as each administration desired, centered at the proposed figures and with certain maxima not to be exceeded. Thus Italy was added to the small group of amateur supporters. But France, England, Germany objected. The German tactics were especially violent; it was rumored that Germany had licensed a new station at 7200 kilocycles after the conference had started with no other purpose than to provide an obstacle to the amateur negotiations. Eventually a new Shaughnessy proposal—400 kilocycles at 18.75 meters, 200 kilocycles at 37.5, and 100 kilocycles at 75, a tremendous concession by the British but still unsatisfactory—was made, supported by all but France, Italy and the United States; this was referred to a still smaller group to which was assigned short-wave broadcasting matters as well.

The first action by this group was the acceptance of Commander Craven's proposal of 3500–4000 kilocycles non-exclusively, the existing American assignment. This was the first ray of light; at the very least, it assured adequate domestic territory in conjunction with the 1715-kilocycle assignment. The 20-meter band was next considered; after discussion it became apparent that 400 kilocycles was the only figure on which the group could reach agreement. It represented the maximum compromise in either direction that could be achieved by the "sub-tea-cuppers" in attendance—Colonel Mauborgne, Commander Craven, Major W. Arthur Steel of Canada (the only government representatives present), K. B. Warner, representing the amateurs, Dr. Van der Pol of the Netherlands, representing the broadcasters, Charles E. Rickard, representing the Marconi beam stations, and Captain H. Abraham of Germany, representing Telefunken.

With the 80-meter and 20-meter bands finally settled, this group tackled the 40-meter band, the most important of all. The United States demanded 7000 to 8000 kilocycles. But the most that the other delegates would consider was 200 kilocycles, for at 7200 there appeared a German station; since unanimous agreement was needed, and Captain Abraham was adamant, this proved a difficult stumbling-block. Another location was sought, but was blocked by Major Steel of Canada, who exhibited determined opposition to the amatuer cause, in complete variance with the anticipated Canadian attitude. Finally, Captain Abraham agreed to 225 kilocycles, amid general approval. Warner's objections were set aside. Additional bands at 28,000 to 30,000 kilocycles and 56,000 to 60,000 kilocycles, on a shared experimental basis, were readily fitted in, and this group reported to the larger group.

A night of debate among the amateur representatives followed. The U. S. delegation had expressed despair at securing any additional territory. The 3500–4000 kilocycle assignment was in itself remarkably magnanimous; should the international situation be accepted in order to strengthen the hold on the domestic bands? Maxim and Stewart were of the opinion that discretion was the better part of valor; Warner, however, held to the idea that the better plan was to gamble all on a last desperate attempt to salvage a usefully large international band. Eventually, it was decided to gamble comparative safety and hold out for 400 kilocycles at 40 meters.

When the subject came up the next morning, Warner, as the amateur representative, was the sole objector to the proposed table. Captain Hooper supported him; Shaughnessy opposed. Eventually after wearisome debate, Captain Abraham agreed to shift his station 75 kilocycles more, allowing 300 kilocycles; the British agreed to accept the change, and the group adopted the proposal.

From that point on those figures were not changed.

—Portions of this story in contrasting type are from *200 Meters and Down*, by Clinton B. DeSoto.

ment. Because of close contact with those who would be on the U.S. delegation, a position by the U.S. government favorable to amateur radio was assured. The League's Vice-President Stewart had appeared before the committee responsible for forming U.S. position and had stated the amateur case, many months before the actual conference. Subsequently, liaison with this committee was closely maintained. Because of this agressive policy for ARRL, Secretary Warner was able to report to the Board just prior to the Washington conference that the United States position on amateur radio was that it would attempt to secure international adoption of the privileges afforded amateurs in the United States.

This was a request which seemed nothing less than fair to U.S. amateurs, but which was to be met with great coolness on the part of other governments. The United States was one of the few countries where communications had developed on the basis of private enterprise, while in most other countries communications were a government monopoly, and the idea of numbers of private citizens being licensed to communicate freely without government control was considered dangerous. In fact, prior to the conference a number of countries announced their intentions of either eliminating amateurs entirely from the

T. A. M. Craven, who as a member of the U. S. Delegation played a key role in support of the amateur position at the 1927 conference in Washington. Mr. Craven subsequently served two terms as an FCC Commissioner.

frequencies above 1500 kc., or else limiting them to very low power and/or narrow bands of frequencies.

The League had a selling job ahead of it! Fortunately, as we have already recorded, the U.S. government had promised to support amateur radio. Now to tackle some of the other governments, with the help of such other amateur societies as existed.

The first break came when, in September, Secretary Warner and Canadian General Manager Russell were able to speak with the entire British delegation and representatives of other British Empire groups. As a result of this presentation, these British delegates agreed to give favorable consideration to U.S. proposals. But this was rather luke-warm support, and the conference got underway, 74 countries participating, with the amateur being supported warmly by the United States, half-heartedly by a few other nations, and not at all by a good many.

We need not chronicle in detail here all that went on during the weeks to come — suffice it to say that, thanks to the firm and unswerving support of the U.S. delegation, the allocations table was whacked out line by line, step by step, and amateur radio was provided for. And how was this done? We think you'll find the accompanying excerpt from *Two Hundred Meters and Down* edifying (pages 66-67).

When the Washington Conference of 1927 was over, amateur radio was for the first time provided for on an international basis. The frequency bands assigned represented for U.S. amateurs a loss of about one-third of the frequencies which had been provided for them by the "gentlemen's agreements" reached at the Hoover conferences but represented for many foreign amateurs substantial gains in privileges. Further, thanks to the firm support afforded by the U.S. government delegation, these frequency bands were far greater than if some of the other governments' proposals had been successful. For example, under the British proposals amateurs would have ended up with a total of 600 kilocycles, instead of the 7485 kilocycles that were in fact allocated to amateurs.

But what would amateurs do now that they were forced to operate in these narrower frequency bands? There were wails of anguish from some quarters that the League had sold the amateur down the river, that amateur radio was finished. But was it? Not quite. The League had embarked on a Technical Development Program, as will be related elsewhere in this series, so that clean stable transmitters and selective receivers were within the grasp of everyone. With these tools available, the nation's 16,000 amateurs found that they were not overcrowded in the bands available. And a good thing it was that the regulations had been stabilized and the techniques improved, for in the next half dozen years the amateur population mushroomed by some 300 per cent.

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Among other developments during this period, one was to prove a particularly important and effective part of amateur radio through the years: the formation of the International Amateur Radio Union, having as its purpose the coordination and fostering of international two-way amateur communication. The coming of international DX and the prospect of worldwide radio had made it patently clear that some sort of international union among radio amateurs was necessary. President Maxim of ARRL laid the groundwork during a business trip to Europe in early 1924, and on April 14, 1925, the First International Amateur Congress convened, with 250 delegates in attendance. A constitution was written and approved, and officers were elected. Hiram Percy Maxim was the first president, Kenneth B. Warner the secretary-treasurer.

Membership was to be by individuals until there were twenty-five members in a country who could band together and form a national section. By 1928 there were enough strong national societies so that the IARU could be reorganized into the federation of societies originally contemplated. There was no provision for dues or financing, and it was agreed that one national society would be chosen to act as the headquarters society to conduct the affairs of the Union, act as a medium for the carrying on of Union business, and that its officers would be the officers of the Union. ARRL was chosen as the headquarters society and has so continued to this day.

The Union itself has played an important part in the international affairs of amateur radio, and has participated actively and officially in the international telecommunications conferences which have affected amateur radio.

Sidelights

"Anything labeled 'technical' is thought to be too difficult to understand," laments *QST*'s technical editor in *January, 1925* . . . At the Dakota Division Convention in *November, 1924*, Don Wallace was toastmaster at the "Don Mix" banquet . . . Belgium's hams are now licensed, and no longer have to operate in secret. *June, 1925* . . . The Headquarters office has moved from 1045 Main Street to 1711 Park St., Hartford. *July, 1925* . . . Even in 1925 there was a plea for honest signal reports. In those days you didn't say, "You're 40 db. over, OM." You said, "You're very, very, very QSA, OM!" . . . The regs didn't require that a log be kept, but Asst. Traffic Manager Budlong had some good suggestions on why an amateur should. *November, 1925* . . . The first National Convention of Canadian Amateurs was held in Montreal in *November, 1925* . . . The regs were changed in *December, 1925*, to permit phone operation on 3500–3600 kc., in addition to the phone privileges on 170–180 meters . . . Ten Swiss amateurs had their complete stations and all correspondence and QSLs confiscated by Swiss authorities, because the amateurs concerned had been communicating with foreign hams. *March, 1926* . . . ARRL dues were increased from $2 to $2.50. *April, 1926* . . . The editor opined that DXing was becoming too much of an obsession with some hams. *May, 1926* . . . The first edition of the ARRL *Handbook* was announced. *October, 1926* . . . A George Bailey, 1KH, wrote in to say that at the ripe old age of 39 he became a ham entirely through the study of *QST* and the *Handbook*. *June, 1927* . . . It was announced that there was now a licensed ham transmitter in Japan. Three unlicensed stations had been fined. *August, 1927* . . . 1MK, the ARRL Headquarters station, was moved from 1711 Park Street out to Brainerd Field, an airport along the bank of the Connecticut River, where operating conditions were expected to be much better. *April, 1928.*

Operating Achievements

An eminent radio engineer was talking with the editor of QST prior to the 1921 transatlantics. "It can't be done," he announced dogmatically. "Why," he explained, vest-pocket slide rule in hand, "the number of amperes that with a kilowatt input can be erected at the base of a 200-meter transmitting aerial of optimum effective height simply isn't capable of inducing the minimum required microvolts-per-centimeter of receiving aerial length to produce a signal of unit audibility at anything like that distance!"

— Two Hundred Meters And Down

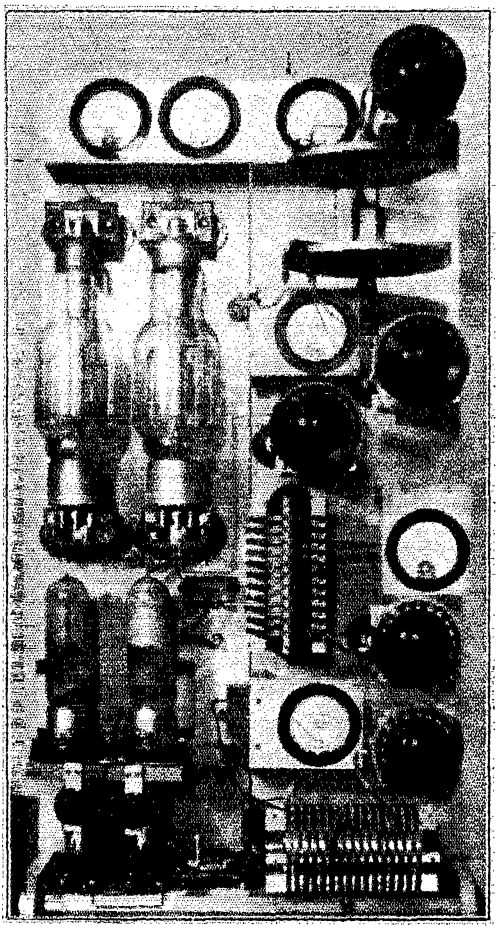
FORTUNATELY, most amateurs of the twenties were not familiar with the theoretical reasons why the shorter waves were "worthless." Their restless, inquiring minds . . . their indefatigable, pioneering spirit . . . started the trek downward in the exploration and development of unknown territory — soon to become the most valuable portion of the spectrum.

As month after month brought new successes with shorter and shorter wavelengths, every operator who could do so sought to establish two-way contacts and extend his station range. The first concentration on about 110 meters gave way to expanded activity in the new 80-meter band resulting from the Hoover radio conference. During the winter of 1924–25, hams on four continents were QSOing nightly at 80 meters. In order to encourage further exploration, ARRL offered trophies for original work on the 40-, 20- and 5-meter bands.

The League's Traffic Department kept busy with projects to improve operating and station capabilities. The eclipse of January, 1925, called for nationwide fading tests. The inauguration of President Coolidge in the spring of 1925 prompted another Governors-to-President relay. Washington's birthday was the signal for another set of Transcons. Midsummer short-wave tests for 40, 20 and 5 meters were announced, and the editor hoped that someone could break the existing DX record for 5 meters, which was the roughly 100 miles between Hartford and Boston. In May of 1925 English and Australian amateurs succeeded in having a daylight QSO on 20 meters, and at the same time there was a controversy in the pages of *QST* as to who had been the first to work across the Atlantic on 20 meters.

In the spring of 1925 ARRL granted a seven-month leave of absence to its Traffic Manager, Fred Schnell, so that he could conduct tests with the Navy on Pacific Fleet maneuvers. Using the famous call letters NRRL, his two suitcases full of ham gear kept in touch with shore far beyond range of the huge shipboard transmitters.

Recognizing the new frontiers in amateur radio, the 1926 ARRL Board renamed its Traffic Department the Communications Department. District Superintendents and City Managers were abolished; elections were announced in *QST* for the newly created post of Section Communications Manager for operating administrative purposes. Official Bulletin Stations were inaugurated, transmitting latest amateur news "each Saturday and Sunday night at 10:30 P.M." With BCI a continuing headache, the



This is the transmitter which Fred Schnell built for use on the NRRL cruise. It used a pair of 210s in parallel as a crystal oscillator, a pair of 203s in parallel as a frequency doubler, and a pair of 204As in parallel as a power amplifier.

Official Observer system was conceived as a means of amateurs helping each other keep out of trouble.

The first ARRL Headquarters station (beyond Mr. Maxim's 1AW at his home) was a 20-watt rig of four UV-202s in parallel, operated during the noon hour by some of the 18 staff members. Later, 1MK was moved to rented quarters at the Hartford airport, where two 204As and a single 861 gave a real punch to simultaneous 80–40-meter bulletin schedules.

In August, 1925, the Army announced a plan of cooperation between the Signal Corps and transmitting amateurs, approving an agreement that had been drawn up between members of the Signal Corps and the League's Board of Directors earlier in the year. Goals of this cooperative agreement were to secure additional lines of communication that could be used during a time of emergency and to build up a trained reservoir of radio operators trained in army methods of handling traffic. Hams participating in this program would be known as Army Amateur Radio Stations. The announcement in October, 1925, *QST* brought a rush of applications, and by mid-1926 AARS was operating in high gear.

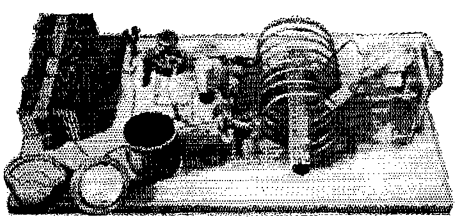
The trunk-line system of handling traffic took a back seat to a new 5-point system: each amateur was called upon to select stations to the north, east, south and west of him and keep schedules with them. From time to time these patterns were interconnected by interesting maps in *QST* so that a chain of schedules could be used for routing traffic.

It was in these earliest days of DX that the sixth district amateurs began establishing their reputation. In April, 1926, the first WAC certificates were issued, with the first two going to u6OI and u6HM.

The Jewell Electric Instrument Company sponsored a contest for low-power work, the winner to be that ham who achieved the greatest miles-per-watt. The wattage was to be the *total* input to all tubes in the transmitter, including filaments. Loren Windom, 8GZ, was the winner, and his outstanding achievement was the QSO with Australian 5BG, using an input power of .567 watts over a distance of 10,100 miles. This gave a record-breaking 17,820 miles per watt. The tube was a 199 with four volts on the filament and 70 volts on the plate.

In March of 1927 was carried the announcement of the first International Relay Party — the first DX contest. It was to run from May 9 until May 23, and rules were vastly different from present-day versions. Each U.S. amateur could send one, and only one, test message to each foreign country, but could receive as many test messages as he wanted.

A new opportunity for amateur exploration came in 1928 with the opening of the band at 10 meters. It was an unknown territory, and a few dozen amateurs tackled it in earnest, responsive to *QST* technical articles. Initial results were spotty and disappointing, particularly since many hams had hoped that it would turn out to be a "super" 20-meter band. However, some results were obtained. A schedule between W1CCZ and W6UF produced successful communication on seven consecutive days, and the entire series of QSOs was heard solidly by ZL2AC.



Loren Windom, 8GZ (who, just incidentally, happens to be one of our authors in this 1964 issue of QST), established some low-power records in 1926 using this rig. The tube is a UV-199, the plate power was 75 volts at 5 ma., the circuit was self-excited.

It was not until several years later that developing knowledge of the sunspot cycle brought a better understanding of the vagaries of the 10-meter band.

This too was a period of the earliest DXpeditions. The *Bowdoin*, the Coast Guard Ship *Arctic*, the yacht *Tahiti*, the airship *Shenandoah*, the yacht *Kaimiloa*, Schnell on the *USS Seattle*, the Savoy Geographic Expedition in Brazil and the Byrd expeditions to Arctic and Antarctic regions — these and many, many more carried amateur equipment and amateur operators and thus enabled amateurs to render communications services and establish the finest traditions.

In these few lines we have been able to tell you only briefly of the operating activities of amateurs in the middle 1920s. It was a period of exploration, of seeking out the capabilities of newly discovered bands, of seeking out the capabilities of unused bands, of contacting kindred spirits throughout the world.

And yet new techniques, new explorations were just around the corner. We will discuss another month what changes in the operating habits of amateurs came with different frequency assignments, different equipment and techniques.

Emergency Communications

DURING the 1925–29 period, amateur radio emergency communications took some rapid strides toward operational readiness. The first concrete step took place in an announcement early in 1925 to the effect that thenceforth "QRR" would be the signal indicating that there was a *railroad* emergency and all amateurs should stand by to assist in handling railroad traffic. The item in March 1924 *QST* was signed with the initials A.L.B. "Emergency traffic," it says, "will have precedence over all other forms of traffic."

The year 1925 was the one in which explorer Floyd Collins was trapped in Sand Cave, Ky. Communication was needed from the rescue site to Cave City, the nearest telegraph office, and was supplied by 9BRK, who set up a transmitter using two "5-watters" and 500 volts of dry batteries. At Cave City 9CHG did the receiving. This circuit remained in continuous operation for four days, with no sleep for the two operators; there just weren't any others available.

In the same issue of *QST* reporting the above emergency work is an item concerning a test being run by the Burgess Battery Company for providing an emergency power supply using standard "B" batteries for plate supply. The system used at 9VD consisted mainly of unplugging a pair of 50-watt tubes and plugging in a pair of 5-watters while a d.p.d.t knife switch made the change from a.c. power supply to the B batteries. Simple, but effective.

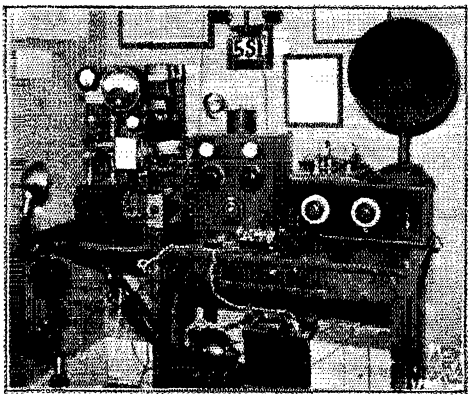
Emergency work hit the editorial pages of *QST* in January, 1926, when K. B. Warner urged all amateurs to take part in "railroad emergency" preparations. In January, the Pennsylvania Railroad requested a special amateur circuit set up to serve their system during emergencies and A. L. Budlong was put in charge. Several tests were held, and many amateurs participated. The distinctive call "PRR" was used during these tests and for years was the Pennsylvania Railroad's rallying call for amateurs serving the system.

Meanwhile, our Canadian friends were not idle. In November of '25, Canadian 4CG at Selkirk, Manitoba spent three days trying to get medical aid from Winnipeg for a critically ill woman and child, in the absence of regular communication facilities. Contact was finally made with 9EBT in Fargo, N. Dak., who wired Winnipeg and a doctor was dispatched to the isolated village of Selkirk in time to save two lives.

Even then, Florida hurricanes were "old hat" to the natives, but the use of amateur radio for emergency communication was something new and wonderful. After the particularly vicious hurricane that hit Florida in 1926, all wires and power lines were down and communications were just nonexistent. Dozens of amateurs bridged the communications gaps with their own battery-powered equipment. Amateur stations 4KJ and 4HZ received prominent mention in the writeup. Others mentioned were 4PU, 4SB, 4IZ, 4PI, 4FS, 4RM, 4HU, 4NH, 4DD, 4BN and 4VS, along with many stations out of the area who assisted in handling traffic. This hurricane's path and characteristics were used in the Florida 1961 Simulated Emergency Test described on page 20, March 1962 *QST*.

In February of 1927, San Diego, Calif., ex-

An emergency installation in 1924. This is 9BRK, who with 9CHG operated four days without sleep as rescuers attempted to reach Floyd Collins in Sand Cave, Ky.



5SI—A REAL RM LAYOUT
Note dynamotor at bottom, which furnished emergency plate supply during the Mississippi flood.

This station, 5SI, operated on emergency power during the 1927 Mississippi River flood. The dynamotor, operating from storage batteries, is under the table. Ray Arlege, 5SI, later served as ARRL Director from the Delta Division.

This picture and caption originally appeared in *QST* for August 1927.

perienced a communications emergency crisis when heavy rains washed out wire lines. Several amateurs handled all communications while repairs were being made, including 6DAU and 6FP.

Consciousness of the need for emergency power was being felt. The May 1927, issue of *QST* contains an article by 1AY describing a number of emergency power installations at various amateur stations. No mention whatever is made of gasoline-driven generators in this article. The primary source is always a battery or batteries. Some used banks of "B" batteries for plate source, with "A" or lead storage batteries for filaments. Others used battery-powered dynamotors. One unique system described is use of a spark coil to supply plate voltage for the tube, but caution is advised that this causes an "i.c.w. note," whereas only a "pure d.c." note is allowed in the lower-frequency bands.

Other instances of amateur work in emergencies during 1927 occurred in the flooded lower Mississippi River Valley; in Weeksburg, Kentucky, where a cloudburst hit; and in the New England area where a tropical storm caused considerable devastation. *QST* dispatches of this day are rather vague about the exact dates when these emergencies occurred, especially the Mississippi River flood, but we note that 5SI and 5SW were principals in this operation and received commendations from high officials. In the Kentucky emergency (June 1927) a cloudburst wiped out all contact with the outside for the mining town of Weeksburg, and 9DVT set up a schedule with 8DOI of Huntington, W. Va., for several days serving as the only means of communication. The New England storm of November, 1927, dumped so much water on the area that a large part of it was isolated by floodwaters. Thousands of messages were handled by amateurs in an operation so widespread and so prolonged as to constitute a literal mobilization of the entire emergency communications reserves of the New England states.

In early 1928 a flood followed a dam break at Santa Paula, Calif., and amateurs were instrumental in getting word to the Red Cross to send supplies and aid. Young 6BYQ was the hero who got the message through to 6ALX operating at 6AUT. Subsequently 6BYQ stayed home from school for three days to perform vital emergency radio operation in the disaster.

In late 1928 another hurricane belted the West Indies and Florida, but this time the amateurs were forewarned and experienced. NP4AAN in the Virgin Islands took over the naval radio station there and maintained contact with the Navy Department in Washington, part of the time using the Navy station's call, NBB. The storm hit Florida so hard that even the amateurs were off the air. Two amateurs in Palm Beach, 4AFC and 4AGR, set up emergency stations under the worst conditions imaginable, after one attempt that failed, and stayed on the air the entire week following, maintaining contact with the American Red Cross in Washington and other points. While they were doing this, their homes and possessions were swept away.

By this time, emergency work was becoming an important part of amateur radio, and the League was recognizing it. In the Communications Department section of *QST*, short editorial comments by staff members began to appear, and the 1928 Florida hurricane itself was the subject of an "up front" editorial. In the November issue, Louis Huber commented on "Hurricanes and Amateur Radio" and F. E. Handy on "Priority in Emergencies." In the December issue, a heading asked "Are You Ready?"

But there weren't many emergencies to speak of in 1929 — not communications emergencies, anyway. Not until December was there a report of one, this in New York State, the result of a sleet and snow storm which took down telegraph and telephone lines. The Niagara Falls Power Company asked W8OA to establish contact with Lockport and other New York cities, which he did with the aid of *W8s* ADE OE and AFM.

One thing of importance that did happen in 1929, however, was the issuance of a form by the Federal Radio Commission to be used by each applicant for an amateur license to explain why his operation would "be in the public interest, convenience or necessity." ARRL persuaded the Commission that in view of the already-established records of the amateurs in public service, the existence of the amateurs as a class should be considered in the public interest and the form was unnecessary. This was the beginning of our mandate as a public service, which blossomed fully in the thirties, as we shall see in forthcoming installments.

Technical Progress

Those of us whose memories date back to the time preceding World War I find it difficult, sometimes, to think of amateur radio as other than a "new" art; time passes so swiftly. It is hard to realize that much — perhaps most — of the technical foundation for communication in 1964 had been laid by 1924.

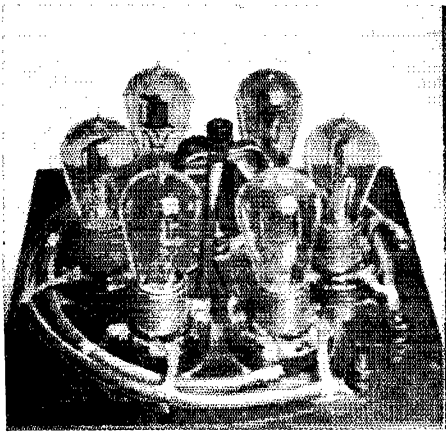
Take, for example, the problem of stable operation of vacuum tubes as amplifiers at radio frequencies. Last month, in reviewing technical developments in the early '20s, the "losser" method of stabilization was cited as the only one appearing in r.f. amplifiers for receiving; transmitting amplifiers, when such amplifiers were used at all, exhibited no means for preventing self-oscillation. The neutrodyne circuit, invented by Hazeltine and described by him in a Radio Club of America paper published in April 1923 *QST*, was the amateur's first introduction to neutralization. That there were other neutralizing circuits was not generally known because, as detailed in a paper by L. M. Hull in January 1924 *QST*, almost nothing had been published on this subject except in patents.

The Hull article described all the "anti-regenerative" circuits known at the time (and today, for that matter), covering resistance loading, reversed-feedback arrangements of several types, and bridge neutralizing circuits — including the "capacity bridge" in the same form as is used so widely nowadays in neutralizing tetrode transmitting tubes, although applied then to triodes.

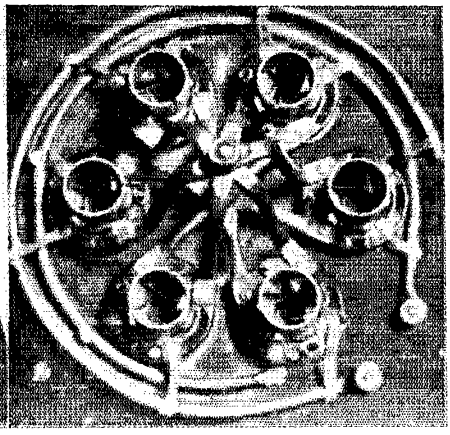
This paper did much to clear up the fog surrounding neutralization and stabilization, but nothing much happened to transmitters as a result of it, at least not immediately. Although many m.o.p.a. circuits were shown in *QST* during the following several years, the amplifier invariably was treated as though a triode would automatically amplify, and not oscillate, when its grid was connected to the tuned circuit of a master oscillator. Which may be one reason why so few m.o.p.a. transmitters were in use in amateur stations!

However, there were plenty of other things to worry about in transmitters. Getting the oscillator to stay put on one frequency was one. Getting rid of key clicks for the benefit of the b.c.l. was another. For the former, it was recognized by 1924 that an oscillator circuit using a large tuning capacity and a relatively small inductance was capable of better stability than the customarily-used combination of a large coil and small condenser — the beginnings of what we now call "high *C*" circuits. It was also recognized that an oscillator inductively coupled to the antenna was both more stable and less likely to have key clicks that got into nearby broadcast receivers. Ultimately, in early 1925, a prohibition against direct coupling to the antenna was written into the regulations; thereafter, most transmitters used the Hartley circuit with loose coupling.

Then a most significant development hit the amateur world with the publication of July 1924 *QST* — an article by H. S. Shaw on "Oscillating Crystals." But for a year or more, the amateur and crystal control were on just speaking terms, nothing more. There weren't any crystals available. Crystal control really got started with an article by J. M. Clayton in November 1925 *QST*, in which it was shown how to make your own, starting with the raw quartz. For a while, it was not at all unusual for an amateur to cut and grind crystals, but eventually manufactured ones did come along — mainly thanks to enterprising

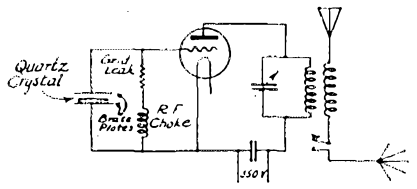


THE TUBE ARRANGEMENT



THE LAYOUT WITH TUBES REMOVED TO SHOW CONNECTIONS

Tubes in parallel were no novelty in the early 20s! This neat arrangement by 1GV had six 5-watt tubes and so officially was a "30-watt" combination (the rest of the circuit was hooked to the binding posts.) It actually ran at 800 watts input when the coal was poured on for the 1923 Transatlantics. (From February 1924 QST.)



Circuit used at 1XAU for operation with 5-watt tubes

The first amateur crystal-controlled transmitter used this circuit with two W.E. 5-watt tubes in parallel. Output was about 5 watts on 3150 kc. The triode oscillator circuit is still a standard. (From July 1924 QST)

amateurs who went into the business.

However, this is somewhat beyond the date at which we have to stop the present story. Through 1925 self-excited-oscillator transmitters were still the rule. Much practical information on improving them was coming along regularly, and the year 1925 wound up with a *QST* description by Ralph Heintz of a transmitter which had a considerable influence on later amateur sets — a tuned-plate tuned-grid circuit using copper-tubing coils that could be changed for various bands. It wasn't long before copper tubing took over for amateur transmitting inductances, and the t.p.t.g. started giving the Hartley a good run for its money.

Power Supply

By 1922 the chemical rectifier was well established, and something had been learned about how to get the best results from it. It was discovered that a single electrolytic cell could take a peak inverse voltage (the term had not yet come into existence, though) of only 50 to 100 volts, and that there was a distinct relationship between electrode area and current-carrying capacity. But the electrolytic rectifier was a messy thing at best, requiring continual attention, and so when the first gas rectifier, the Amrad S tube, was introduced in latter 1922 it was an immediate success. (Vacuum-tube rectifiers, at this time, were both expensive and short-lived.)

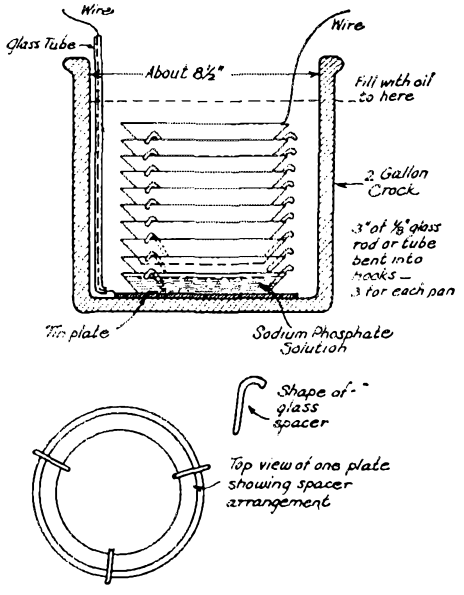
Rectified plate supplies did not give what we would today call good d.c. Confusion about filtering abounded until F. S. Dellenbaugh cleared the air, in a 1923 *QST* classic, with a thorough exposition of filter theory and practice. The article introduced the "brute-force filter," a term that became as much a part of amateur jargon as "conventional Hartley." In short order, the 30-henry choke and pair of 2-μf. condensers that comprised it became the standard amateur plate-supply filter. (Even today one runs across traces of the "30-henry" tradition.) The filter information was timely, because by now, 1924, the earlier expedients — raw a.c. and self-rectification — for getting plate supply for c.w. transmitters were beginning to be frowned upon. The modulation that such supplies put on the signal had no particular advantage for 200-meter oscillating-detector reception, and there was a growing feeling that these modulated signals were broader than could be tolerated under crowded conditions.

Later, in 1925, Dellenbaugh covered the problems of half-wave smoothing and filter-choke design. It would be hard to overemphasize the influence that these exerted on the amateur plate supply. Taken with a couple of other classics by the same author that came along much later, in the '30s, these 40-year-old articles still say the last word in plate-supply filter design.

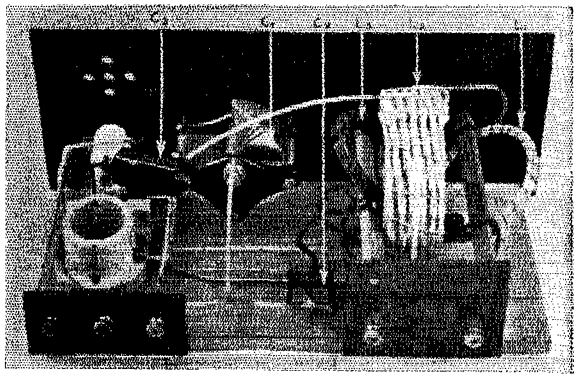
Receiver Revolution

A modest-looking article in December 1923 *QST* touched off an explosion in receiver philosophy, one whose effects were felt for many years to come. On "Short Wave Tuner Design," by Karl Hassel of 9ZN, it initiated an era of searching examination of r.f. losses in components and equipment.

Hassel's article ended the reign of the variometer in amateur tuners, and set the pattern for the condenser-tuned regenerative-detector-plus-one-stage-of-audio which became the standard amateur short-wave receiver for more than a decade. A persuasive followup by Kruse in February 1924 *QST* added detail on "low loss" — the term shortly became a byword in the entire radio industry — construction, with examples of complete tuners that met the low-loss criteria. Two of these, one built by Perry O. Briggs, 1BGF, and one by F. H. Schnell, 1MO-1XW, were duplicated by amateurs all over the world; one knew in advance that a QSL card, particularly from overseas, would almost invariably list the receiving equipment as a "1BGF" or "Schnell" tuner.



Maybe the original, but if not, at least a very early version of the electrolytic capacitor. Picked up from *The Radio Experimenter* (Australia) and printed in August 1924 QST, this homemade job used aluminum dishes stacked in a two-gallon crock. No mention of the capacitance, but an assembly of 10 dishes was said to be good for 1500 volts.



The 1BGF tuner, a widely built low-loss receiver based on principles outlined by Hassel in December 1923 *QST*. The accompanying article on "Low Loss Tuners" in February 1924 *QST* supplied the "low-loss" catchword that dominated receiving-component descriptions (and advertising) for several years thereafter.

Fig. 1

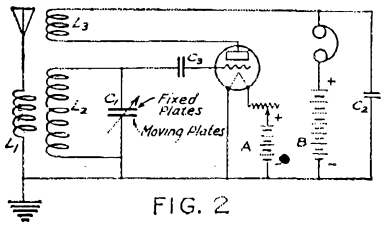


FIG. 2

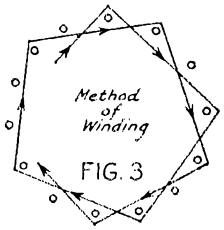


FIG. 3

Both these sets, incidentally, used basket-weave coils, and that method of coil construction thereupon became a favorite. Ribbed forms, too, were used widely. Both types resulted from attempts to eliminate any insulating material, and with it losses, from the coil's field. Coils even were wound on no forms at all, the turns being held together with string knotted along the winding in cable-lacing style. Tuning condensers got critical attention, too, although here there was not much the amateur could do except pick the best available and create a demand for something better.

By the end of 1925, experience, backed by measurements which the radio profession was learning how to make, had eliminated most of the excesses that had accompanied some of the low-loss attempts. The residue was a healthy respect for the benefits that accrued from careful attention to details in receiver construction. It was also rather definitely established that the regenerative detector followed by an audio amplifier took second place to *no* other system for amateur short-wave work. Not that r.f. amplification and superhets lacked attention. Far from it. *QST* at this time was full of articles on both types of receivers. But with the tubes and components available, a low-loss regenerative receiver never came off second best in any competitive test, and usually was far out in front.

Actually, most neutrodyne and superhet receivers were designed for the 200–600 meter range, to cover both amateur and broadcasting wavelengths. There had been early amateur work as far down as 100 meters, as recounted last month, but it came to an abrupt halt for most amateurs in the first part of 1923, with the ruling by the Department of Commerce that amateurs did not have the blanket authority, under the 1912 radio law, to operate below 150 meters. Only those with experimental licenses could move down. (Schnell and Reinartz had "X" licenses for their work with French 8AB.) In late July 1924, the 80-, 40-, 20- and 5-meter bands were assigned to amateurs, but only to those who applied for license modification. It was not until January 1925 that all amateurs were free to use all bands. These regulatory maneuvers over an almost two-year period slowed down the mass move to shorter waves, giving "200" a somewhat longer lease on life than it otherwise would have had. The situation is reflected in the attention given to amateur-plus-broadcast tuning-range design.

Until the short-wave bands were opened to all, tuners invariably covered everything there was to be covered in one sweep of the tuning dial. With discrete bands available from 5 to 200 meters this had to change, and the plug-in coil came on the scene. The next logical step, spreading a band over the dial, was rather slow in coming; the first mention of the desirability of a more favorable tuning rate seems to have been in December 1925 *QST*. With it, receivers began to be "amateur-band," and to acquire some of the characteristics we take for granted today.

There were perhaps some fringe benefits, if one could think of them as that from the amateur viewpoint, of being confined to 200 for a while. One was the single-control tuning idea, exploited in both the neutrodyne and the superhet by J. L. A. McLaughlin and described in *QST* during 1924. Forty years ago, this was a real technical achievement.

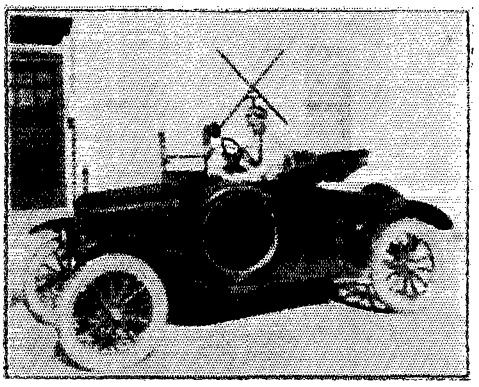
The Wild Waves

From the time that Hertz' experiments proved the Maxwell theory of electromagnetic radiation, it was known that light waves and radio waves were the same thing, the difference simply being one of wavelength. Radio waves therefore should obey the known laws of optics, and Hertz had shown that they did. Marconi's successful transmission across the Atlantic, over the curved earth, shocked the physicists into hunting for an explanation consistent with known wave behavior, and the Kennelly-Heaviside ionized-layer hypothesis was the most reasonable one in sight. It assumed that there was an ionized shell miles above the earth that acted as a conductor, confining the waves to the space between it and the earth and guiding them around the earth's curvature.

There was no direct proof of the existence of such an ionized region. Neither did the simple waveguide theory account for some of the things that amateurs regularly observed in their 200-meter work, the fading of signals being one of them. In the final report of the ARRL-Bustands fading tests, published in September 1923, it was suggested that fading might be caused by a combination of effects, including both transmission over the ground and reflection from the ionized region, along with absorption in a postulated lower ionized layer.

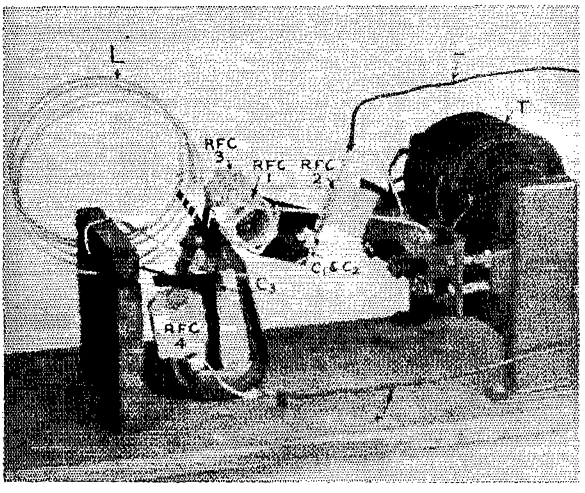
The reflection idea was seized upon later, when shorter waves were being explored and the existence of both skip zones and farther-out zones of strong signals was discovered. A further complication was the fact — and truly a marvel to the amateur of that day, used to 200-meter behavior — that the shorter waves such as 20 meters worked in the daytime but not at night. This was Utopia to a generation used to sitting up to all hours in order to "get out"! But it needed an explanation.

Over a period of several months, Reinartz had carried out tests with stations at varying distances on 20, 40 and 80 meters, and in April 1925 *QST* offered an explanation for the different



The original amateur mobile station, 6GD-6BKA. The equipment was a hand-carried portable using the same circuit and components for both transmitting and receiving. *QST*'s editor gleefully applied the name "transceiver" to it, crediting Matty, 9ZN, with having coined the term some years earlier.

behavior of signals on these bands. It was based on the reflection idea and the assumption that the ionized layer height was different for different wavelengths. It was not accepted by everyone, particularly the physicists, who insisted that the assumptions in it could not be reconciled with the known optical laws. Considerable discussion followed, one contribution of particular interest being a letter from G. W. Pickard which asserted that refraction rather than reflection was the logical explanation for wave bending, and suggesting that if the frequency was made sufficiently high, the wave would not be bent enough to get back to earth at all. In October of the same year a comprehensive article by Taylor and Hulburt of the Naval Research Laboratory described transmission experiments carried out by the Navy, much of the work involving amateur cooperation, and offering a theory based on refraction in an ionized region at substantially fixed height, but varying in its characteristics both diurnally and seasonally. In view of the limited experimental data available, and in the absence of any direct measurement of the ionized region, the theory outlined in this article is remarkably close to the currently known



Getting on 5 meters took some care, when the band was first opened. This oscillator, shown in October 1924 *QST*, used a C-202 tube with the base removed—a step necessitated not primarily to reduce tube capacitance but to eliminate high-frequency losses, which caused bases to get hot enough to blister. The circuit here is the series-fed Hartley, using basket-weave chokes.

mechanism of the ionosphere. Thanks to data obtained with the help of amateurs, the radio world was well on the way toward solving the mysteries of long-distance radio transmission.

Antennas

Before space runs out on us, a quick word about the antennas of the era. With operation going to waves as short as 5 meters, amateurs began to get free of the ground. Frank Jones, in May 1925 *QST*, described 5-meter experiments using a Hertzian-type antenna with reflectors — really going back to the beginnings of radio! In June of the same year a note from Pickard described the Zepp antenna, consisting of a half-wave dipole with a quarter-wave two-wire feeder — the first instance of a true transmission-line feed, although single-wire feeders of unknown performance characteristics had been used by a few experimenters.

For the most part, however, the amateur antenna of the day was an "antenna" with a practically identical "counterpoise" wire under it, the combination being more-or-less center fed. It was worked at about its fundamental frequency on long wavelengths and on harmonics at the shorter waves. That it did pretty well is established by the DX records of the time, which as far as actual distance goes were just about as good as those we hang up today.

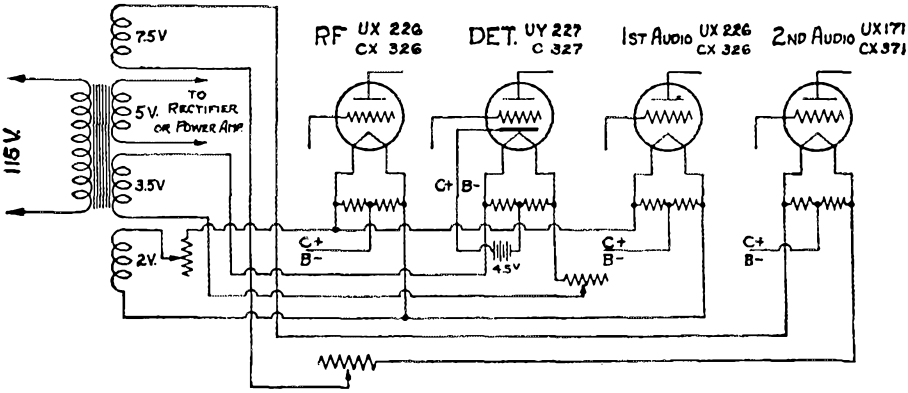
Advertising: The Broadcast Boom (Part II)

Conflicting claims for batteries, B-eliminators, power units as sources of plate power for tubes in broadcast reception were getting a little too strong. In November 1927 Grigsby-Grunow-Hinds shouted "Warning!" and declared that such statements as "No batteries, no eliminators, your light socket supplies all power" were "absolute falsehoods." However, a.c. was being used for filament, actually heater, supply with certain new tubes and in August of 1927 General Radio said, "complete a.c. operation" with "the newly announced a.c. tubes." The first Arcturus a.c. tube ad appeared in November.

Advertisers' interest in amateur radio began to accelerate in 1926 and 1927. In May of 1926 Grebe first described the CR-18 with coils for the 200, 80, 40, 20 and 10-meter bands. Parmco's short-wave receiver came out in June 1927. Plug-in low-loss coils for receivers were advertised by Aero, Gross, Teco, Chi-Rad, Seattle Radio Lab. Pilot's first ad was in November 1928.

De Forest announced the H Tube in January 1926 and in July included two rectifier tubes, the HR and 9R. The UX-852 was brought out by RCA in May 1927. National Radio Tube's Rectobulb appeared in July. Dubilier condensers "for . . . amateur transmission" came out in January 1926, Tobe condensers in February 1926, and Flechtheim in October 1927. REL commenced its advertising campaign in April 1926. In the same issue of *QST* American Sales offered a c.w.-phone transmitter that "can be used on 40 and 80 meter bands with slight changes." Arsco advertised "Complete transmitter installations 5 to 1000 watts" in March 1927. "For the twenty meter band" said Cardwell in June about its

Complete A. C. Operation



For the past several seasons the trend has been toward complete battery elimination. Many satisfactory plate supply units operating from A. C. have been developed but filament operation from an A. C. source has presented more of a problem due to the larger currents required and increased expense in the rectifier and filter circuits.

The newly announced A. C. tubes offer an excellent solution to this problem. The above diagram shows how to adapt the filament wiring of the popular type of receiver to A. C. operation by use of General Radio parts especially designed for this purpose.

T-199 transmitting condenser. In December 1926 General Radio offered quartz plates.

General Radio took notice of v.h.f. activity in 1927 by bringing out a 5-meter wavemeter in June.

High-voltage rectifier tubes were fairly new, but high-voltage rotary rectifiers had been offered by Marlo, Advance and Stahl since 1924. In August 1927 Rectifier Engineering Service began to push the mercury-arc rectifier.

Recognition was given by several advertisers to new tubes, new circuits and new frequency allocations during 1928. In February Thordarson printed a diagram of a power supply for a 210 transmitter, saying, "This unit when in operation in the 9JC transmitter was reported from coast to coast at R 5 with a pure d.c. note." Utility Radio's high-voltage condensers were recommended in the same month for tuned-plate, tuned-grid circuits. Amrad's Mershon condenser which had been displayed for years as excellent for receiver supply use was advertised in March for "power supply devices employing the 210 tube." REL offered a supply in May with power output for two UX-852s or one 204A. In July Weston declared that its Radiation Ammeter "will give you the exact amount of current supplied to the antenna at the wavelength of 10 meters now being advocated." REL announced a new wavemeter for the 7000-7300 kc. band in September.

Crystals for amateur use were advertised in 1928-1929 by Scientific, Precision, Research Engineering, Master Optical, J. T. Rooney, Mort Kahn (yes, he's the same Mort Kahn, now W2KR), West Coast Radio Labs, Bethesda Crystal Lab, American Piezo Supply.

Shielding for receivers was consistently recommended by Aluminum Company of America. In February 1928 National Radio Tube brought out the Inductron, a plug-in coil sealed in the glass envelope of a vacuum tube.

Television with scanning discs received a play in 1928 from National in June, Clarostat and Baldor in August, Esco in September. In February of 1929 Raytheon advertised the Foto Cell as a TV sending tube and the Kino Lamp as a TV receiving tube.

New code-teaching machines and methods of increasing code speed began to make their appearance. The first Teleplex ad was in April 1927, Dodge Radio Shortkut in January of 1928 and Candler in May 1928.

Radio Schools of the late twenties included West Side YMCA Institute and Radio Institute of America in New York City, Eastern Radio Institute and Mass. Radio School in Boston, Federal Radio and Railway Institute in Chicago and Gulf in New Orleans.

In 1929 RCA brought out nine new tubes for amateur transmitting, some of them destined to be ham favorites for many years. They were the UX-866, UX-860, UX-865, UV-211, UV-845, UX-842, UV-849, UV-851, UV-872. National

Radio Tube offered a new rectifier, a mercury vapor tube called the R-3.

New receiving tubes in 1929 were the Cunningham CX 345 and C 324, the de Forest Audions 410 and 422. Pilotron and Triad tubes were first shown in October and Eveready Raytheon in August.

The first ad on a publication that is as useful to hams today as it was in 1929 was printed in the January issue of *QST*. You guessed it — *the Radio Amateur Call Book*.

Radio service men were seriously recognized in 1929 with instruments being offered by Hickok, Jewell, Weston and Supreme.

Expeditions were used as a basis for ads through 1929. In August 1926 the Karas receiver advertisement showed the American Museum Greenland Expedition. Burgess batteries were used by Commander Byrd on his North Pole flight. Cardwell talked of its contribution to the University of Michigan Expedition in 1926 and George Dyott 1928 Brazil Expedition. "We are depending on your product" was the Pyrex quotation in 1928 from Byrd Antarctic Expedition's radio engineer, and in 1929 Formica, Burgess and Sangamo used this famous explorer's adventures in their ads.

With the exception of a very few insertions by firms like Crosley, Browning-Drake and Silver-Marshall, BCL advertising had disappeared from the pages of *QST* by July of 1929. For the last half of the year ads were directed to amateurs: meters, transformers, chokes, resistors, condensers, batteries and other components; coils including "The most efficient short-wave coil ever made" as modestly described by Transcontinental Coil; transmitters and kits; receivers, not forgetting the introduction of Pilot's Super Wasp in June and National's SW-4 in July of 1929.

Stores in 1929 included Radio Specialty, Wholesale Radio and Leeds in New York City, Barawak in Chicago, and Cameradio in Pittsburgh. Manhattan Electric Bargain House and American Sales in New York concentrated on surplus.

Circulation of *QST* was between thirty-five and forty thousand. The cost of a one-page ad in 1929 was $175.

30th ARRL SWEEPSTAKES

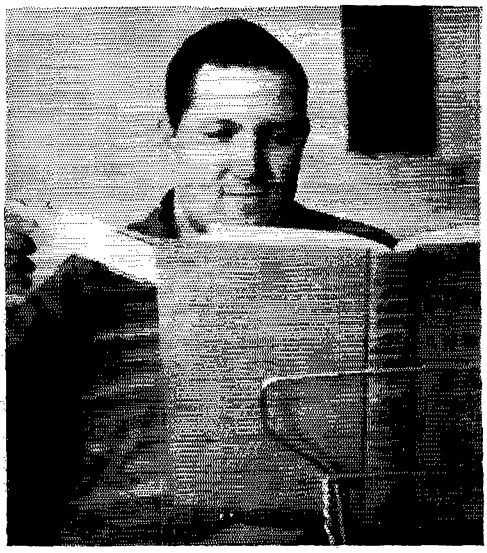
C. W.-Phone-Club Results

COMPILED BY ELLEN WHITE,* W1YYM

"The Sweepstakes contest was a tribute to the editorial coverage provided by *QST*. To my surprise, few contestants in the Sweepstakes were not familiar with the new format. It certainly did not present the problems which I anticipated." — *W9IOP*

MAY 1930 *QST* contained a report by E. L. Battey (now SVØWAA) on the first "All-Section Sweepstakes Contest." Thirty-four years later, with this issue, we report the 30th ARRL Sweepstakes results, the same contest but evolved to an interesting degree. The 1st and 30th SS had a good deal in common; open to all amateurs in the ARRL Field Organization, QSOs with as many different amateurs as possible, an exchange of information, 2 points for each completed QSO, use of the section as multiplier, etc. However, the first SS lasted a full two weeks and required a *complete* message exchange (text at least 10 words long). The 30th SS (Nov. 9–11, 16–18) required just a simple message-preamble exchange. No guesswork, just plain old-fashioned record copy, running a total of just 40 hours out of a possible 66.

The basic objective of the SS has always been to introduce some aspects of message handling to the fraternity. A proper message contains a preamble with information in precise order, not guessed at nor anticipated. This is in the way of a re-introduction to the changes in the required preamble of the SS message. Sure it was stiffer, it was meant to be. As W9IOP's quote shows, the hams were up to it. In general the new format was very popular although a few felt they missed the signal report.



Research math major K5MDX isn't fooling us one little bit It just looks like Dave is figuring a way to come up with even more phone QSOs/hour to top the phones in '64 too!

Poor conditions? Quiet sun? You'd have been hard pressed to know it during the SS! A total of 2189 reports were received for the 30th Sweepstakes representing 73 sections on c.w. and 68 on phone; just 26 logs fewer than in '62.

Everyone is a winner in the SS. The fun of competing on a section level can't be topped. Whether your goal is to work all multipliers, top last year's score, beat out your buddy, smoke-test the station or add to your club's aggregate, the SS affords THE opportunity. Special congratulations go to each phone and c.w. section leader for that special effort that earned the award.

Old Timers

The new exchange in the '63 SS (using the year first licensed for a "CK") afforded everyone a chance to say "hi" to the OT's. A goodly number reported their results too. Active in the c.w. portion were: *1912* W8DG; *1913* W3WV; *1914* W3TN; *1915* W4ZM, W8AL; *1916* W1VG, W3HB, K4EN, W6FAR, W9RRC; *1919* K2BG, W4JA; *1920* W1BDI, W1TS, W3KT, W3PQ. Phone actives were: *1914* W2JB; *1916* W3HB; *1919* W2BEI; *1920* W5KC.

Of the above, W4ZM was the "oldest" OT to break 100K while Louisiana's W5KC copped the phone section award once again.

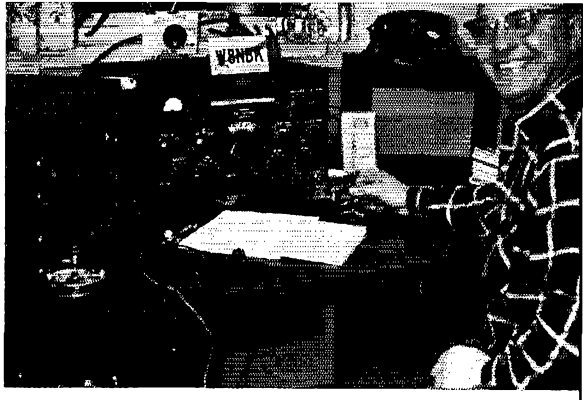
Club Scores

While it was no record year, score-wise, for clubs, a total of 87 clubs were found eligible for the competition, earning 101 club awards. Frankford took the gavel and the lead from the Potomac Valley Radio Club, turning out more members than the previous year for an aggregate of 4,880,836. Meanwhile, second-place PVRC's W4KFC and W3ZKH again took the club awards for outstanding c.w. and phone performances amongst the club's 46 entries.

A happy surprise, however, was the continuing improvement shown by the Suffolk County Radio Club, up about 250K points over '62, with a well-earned third place. Other noteworthy gains were made by the South Jersey Radio Assn. 6th to 4th, the Sioux City Amateur Radio Assn. from 20th to 6th, the Tusco Radio Club from 25th to 10th and the Motor City Radio Club from 17th to 11th. *F.B.!*

A large portion of the clubs continue to split into teams, competing among themselves for high score. We trust all the winners have by now enjoyed their steak dinners, courtesy of the losers!

* Ass't. Communications Manager, ARRL.

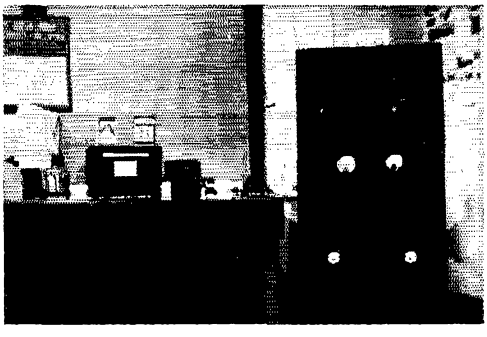


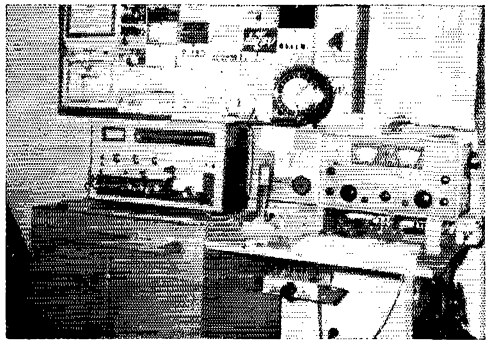
With better than 189K and over 1000 QSOs Arkie, W8NBK, has good cause to flash the Ohio victory smile, This Tusco RC member used a 32V-1-75A-4, quads on 15 and 20, doublets and longwires on 40 and 80.

Quotes

"Use B4 (meaning before) to signify worked before." — *K3JJG (opr. W3CGS).* . . . "The KZ5 boys must have gone into hibernation this year." — *W3MWC.* . . . "I need a new QTH. I live between a factory and a church and my antennas look silly hidden in that 80' space between the building. I'd probably get just as good results by loading the wash line." — *K3LSC.* . . . "Lots of fun and I liked the new changes in the information exchanged." — *K3NJW.* . . . "Many thanks to all the operators who made my first contest a very enjoyable one." — *KN3ZOL.* . . . "My wife says this is the last SS for me." — *K3JQU.* . . . "The statisticians and astrologers should have a ball with the dates and times." — *W3MCG.* . . . "Good idea to change the preamble so the dates were meaningful. It was slower and harder work but it sure separated the men from the boys." — *W3RNY.* . . . "I think the new rules stink." — *anonymous.* . . . "Planning on operating from KZ5 in the '64 SS." — *K3KMA.* . . . "Missed the first weekend because of a canoe trip then almost missed the second weekend because of pneumonia." — *WA2WLM.* . . . "Worked 678 QSOs before my birthdate appeared in this my first "for real" SS." — *K2KTK.* . . . "I started out only to check out my new QTH but was surprised to work 64 sections with my exciter and temporary antennas. In fact, the 14 and 21 Mc. antennas were indoor!" — *K1RTB/2.* . . . "The family thought I'd gone around the bend when I shrieked for joy when KP4CH came back to my CQ SS." — *K2ODL.* . . . "7 Mc. very good but 80 was by far the best for contacts." — *W2LNQ.* . . . "Was working towards W6ISQ's "AA" award but fluffed 3 DX sections plus Vermont." — *K9YRA.* . . . "Every SS I get a service call from one certain police radio system. I thought I might get by this year, but sure enough, about 2100 the first Sunday evening, they lost a plate bypass in the station transmitter." — *W9NIU.* . . . "Congratulations to all for their 100% courtesy and patience." — *K9PDV.* . . . "It was quite late in the contest when I realized that the fellas making all the contacts were staying on one frequency while I was wearing myself out turning the VFO knob." — *K9UIJ.* . . . "I like the idea of the check as year licensed and date as month and day of birth, please keep it that way." — *W9DGA.* . . . "Worked 250/51, all while rockbound on 40 with a 6AG7-6146." — *WA9FUH.* . . . "Neat logs this year thanks to the recopying job done by K9ZMS. However, Glenn learned from his tedious, self-imposed chore. Next year back to carbon paper!" — *K9ELT (opr. W9YT).* . . . "I'm goin' home next year, phooey on this /9, /7 and /0 junk." — *WA2BEX/0.* . . . "New rules seemed to catch on quick but missed my signal strength. I must say that on 20 I couldn't handle the pileups answering my CQ SS. Thanks to those who waited. I'm glad it only comes once a year and so is my wife!" — *W0CUC.* . . . "W0CUC was wonderful competition, we had a real ball. Watch that boy next year for national competition." — *W0SMV.* . . . "Dec. 25th is quite an appropriate birthday for a minister, eh?" — *W0AIH.* . . . "Hastily threw together a station at my new QTH. XYL gave me the unheated attic and it was 40 degrees all weekend up there. Ever try twiddling a bug with heavy gloves on?" — *K0IJL.* . . . "My rain gutter did a fine job on 80 until it started to rain." — *WA0DJF.* . . . "Don't like the new format giving the birthdate. New boys don't seem to keep crosschecks but otherwise they do a good job." — *K4LPW.* . . . "My most thrilling moments were when I received number 999 from W9IOP and number 43 from W0TDR who was trying to work 74 sections in 74 QSOs." — *WA4JCD.* . . . "This is my tenth consecutive year for a clean sweep." — *W4CVI.* . . . "My younger cousin, an avid astronomy enthusiast called me on the phone Sunday morning of the first weekend and asked me if I watched the "brilliant aurora display." Grrr!" — *K8HLR.* . . . "My first sweepstakes and it was quite an experience to hear the final tuneups at 2245 GMT that first weekend, the test signals and the general restlessness on the ham bands; even a few premature CQs!" — *WA8HBS.* . . . "This year the SS seemed to have more zip to it, I think because of the new check and date system making it more interesting." — *K8DHT.* . . . "And I didn't even work a KL7." — *KL7AOL/8.* . . . "I think I would have had 100 more contacts if I hadn't had to repeat. Every SS contestant should copy W1AW tube-table practice transmissions to eliminate repeats." — *W8OYI.* . . . "Fifteen meters sure turned out to be a winner." — *W8CSK.* . . . "I think that the idea of having a check and date that means something is indicative that someone is thinking creatively." — *W8CHT.* . . . "Still the greatest contest of them all." — *W2TER.* . . . "For young operators, the SS teaches the fine art of communication and demonstrates above all the blessing of brevity. Or, you can't get anywhere with super-

In the 1934 SS W6FMU (left photo) was active in East Bay in his first SS with a 6L6 tri-tet osc., 6L6 buffer and 35-T final; antenna a 2-wavelength on 14 Mc. rhombic. The receiver used was the then popular National FB7 with a regenerative RF stage. In this SS Herb continued to be active from Utah, as W7POU. Current rig (right) is pretty evident. The keying unit underneath is the W4DFR homebrew keyer. W7POU feels that his keying actuator is unique being made of two micro switches entirely constructed otherwise of plexiglass.





TOP TEN

Single Operator

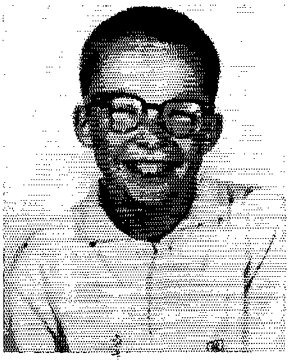
C. W.	*Phone*
W9IOP	K5MDX
W5WZQ	W7BSW
W4KFC	W3ZKH
K6ASL	W5KC
WA4NGO	K5ALU
K4LPW	K6CYG
K4GSU	KØSCM
K4TEA	K9BGL
K6VVA	W4BVV
K5RHZ	W1BU

fluous, long-winded calls." — *WA2OJD*. . . . "Check QSO #80, it's that 75th multiplier, the rarest of the rare, the Hudson Section!" — *WA2ODA*. . . . "The whole operating desk was covered with brown paper taped down with masking tape. This was my scrap paper, no separate pieces of paper to fidget with." — *WA2KSD*. . . . "Sweepstakes are fun. I was in the first one and am still going strong." — *W2ECO*. . . . "Sure like the new preamble, it's fun to find out who the other old buzzards are. Biggest thrill was giving WØCXN his last section." — *WØMVG*. . . . "The first SS I've been able to put in a full 40 hours, due to being a St. Louis police officer weekends off are rare." — *WØWYJ*. . . . "My 9th SS and at the end of each one I've asked 'where was Arkansas'?" — *WØQWS*. . . . "Thanks to the several SS'ers who moved off when I called the Missouri c.w. net together, and tie on those who didn't." — *KØFPC*. . . . "Near the end of the contest, when I was sure that no one who owned a CK lower than my 16 had enough ambition to be on c.w., W3WV gave me CK 13. While I was recovering from the shock, W8RQ called me and said he had been 1VG many years ago. So, a few of us OTs can still telegraph, I'm happy to report." — *W1VG*. . . . "The original contest broom, with the award, is here on the shack wall. After 33 years it is just a bit battered, like the OM, but it represents two weeks of hard work, much more work than that of this SS, 1930; 153 stations in 43 sections, 1963; 187 stations in 46 sections." — *W1ADW*. . . . "Hated it all the way but can't wait till the next one." — *K1UUK*. . . . "First time I've tried carbon paper and it works fine except I always finish a sheet when a pileup is calling me for a N. H. multiplier." — *W1AER*. . . . "Enjoyed handing out R. I. to the gang." — *K1EWL*. . . . "It's off to college for me next year so this will probably be my last SS from Montana. I'm sure W7HAH and K7NHV won't miss me. Hi!" — *K7CTI*. . . . "Always pleased to send Montana QSLs, answering cards if at all possible on the day they are received." — *K7KME*. . . . "The '63 SS was a slam-bang affair, as usual. No records, but lots of fun." — *W7OEB*. . . . "Surprisingly an excess of VE8's, but a lack of KZ5 and VE1." — *KU6FIF*. . . . "WA6GFY's 2-L 7 Mc. beam up 70' ran circles around my inverted vee." — *K6VVA*. . . . "Biggest kick: VE8XM answering my CQ for his #4." — *WA6TKV*. . . . "The next time I lease an apartment it won't be under 60 KV transmission lines." — *W6OKK*. . . . "We were shooting for 100-K and W6ISQ's "AA" Award but with only 86-K and 68 sections the next best thing was to have John T. speak at our club meeting the Tuesday following the SS." — *W7YAQ, chief op. W6YX*. . . . "Fine contest but more operators should use BK and know what it means." — *WN6FZH*. . . . "Relations stay home, relations stay home, relations stay home." — *K6RTK*. . . . "I would have worked more stations but you didn't send enough logs!" — *WA6VML*. . . . "I fought Murphy's Law and lost!" — *K8MTI, opr. W4VOV*. . . . "I like the change in the 1963 rules. My CK-19 brought my 73 QT replies as well as several requests for verification." — *W4JA*. . . . "This was the best one yet. I like the changes in check and date, particularly the use of your license date. Of course I'm biased about the check, I worked only two who were licensed earlier than I, W3WV '13 and W3TN '14 and heard the real McCoy, W8DG '12. I lay claim to having the highest score for the group of amateurs licensed pre-WWI." — *W4ZM*. . . . "Actually I found the new exchange no great burden and using the year first licensed for the check proved to be rather interesting. More SS'ers are old timers than I suspected and some of the best ops are still wet behind the ears, license-wise." — *W4DVT*. . . . "QSOs per hour down from last year. Don't know whether due to new rules, conditions or old age — probably all three!" — *W4GF*. . . . "Neatest Virginia log W4HTV's." — *W1YYM*. . . . "I finally got sick of hearing 'Merry Christmas' — instead of 'QSL'. Am I the *only* ham who was born on December 25?" — *K4WVT*. . . . "Thought the CK and Date were very poor ideas at first blush but by the 3rd QSO I found this the most interesting part of the SS and I've been in 25 or so of them." — *W4JUJ*. . . . "QSO conditions from E. Fla. compared with L. A. when I was K6CTV." — *W4ANGO*. . . . "Enjoyed the new vitality of the SS, it makes it just that much better with more unknown elements in the exchange." — *K6SXX/4*. . . . "In '48 a 24-hour stint was Kicksville, in '63 the same thing is Endsville . . . something has changed!" — *W4BRB*. . . . "This was *the best* lesson in widespread listening I've ever had, even found new country #396." — *W4CKB*. . . . "Finally had to catch a KZ5 on 15 phone and ask him to QSY to c.w. to work all 74. But how did I miss W9IOP?" — *K4TEA*. . . . "Congratulations to Ohio and the Canadians for great turnouts." — *K7SVB*. . . . "Still get many who can't seem to savvy either SB or SBar and still a few that actually argue there is no Santa Barbara section!" — *W6YX*. . . . "Did not enjoy rules change, thought it unnecessary." — *W5DWT*. . . . "Noticed the lack of participation in me own section

Left to right, phone winners all: K6LSG manning the Air Force Academy station KØMIC to top Colorado and Rocky Mt. Division honors; WA2CLQ high E. N. Y. and Hudson Division with almost 100K; W1NJL portable in Maine at Colby College hampered by everything except enthusiasm and ability.

Club	Score	Valid Entries	C. W. Winner	Phone Winner
Frankford Radio Club	1,880,836	62	W3CGS[1]	.....
Potomac Valley Radio Club	4,107,803	46	W4KFC	W3ZKH
Suffolk County Radio Club (N. Y.)	1,310,672	50	K2DGT	K2HQR
South Jersey Radio Assn.	991,684	30	WA2HSP	WA2EIY
Rubber City Sweepstakes Hotshots (Ohio)	917,687	40	W8OYI	W8KDW
Sioux City Amateur Radio Assn. (Iowa)	593,494	13	W9CXN	KØMMS
King Philip Amateur Radio Society (Mass.)	576,918	11	K1DIR	W1BU[2]
Germantown Radio Club (Pa.)	570,819	18	K3MBS	K3SYV
Oak Ridge Radio Operators' Club (Tenn.)	544,708	11	K4LPW	W4BBL
Tusco Radio Club (Ohio)	540,214	10	W8NBK	K8RFU
Motor City Radio Club (Mich.)	499,554	25	WA8CZH	W8QFM
Nashua Mike and Key Club (N. H.)	481,590	16	K1AEG	W1EKO/1
Southern California DX Club	455,967	1	W6NKR	.....
Connecticut Wireless Assn.	449,328	8	W1EOB	.....
Fort Myers Amateur Radio Club (Fla.)	401,833	11	W4WYJ	WA4GYA
West Park Radiops (Ohio)	379,343	10	K8CFH	K8AAG
Westside Amateur Radio Club (La.)	363,584	9	W5BUK	K5LNW
Ohio Valley Amateur Radio Assn.	337,515	4	W4CVI	.....
Order of Boiled Owls of Ohio	330,602	4	W8ETU	.....
Central Michigan Amateur Radio Club	316,522	11	W8VPC	W8RXY
Milwaukee Radio Amateurs' Club	305,850	7	K9KGA	.....
Radio Amateurs of Greater Syracuse	289,770	8	K2KTK	WA2PQG
York Radio Club	289,185	11	W9ZAB	W9ZYL
Huntsville Amateur Radio Club (Ala.)	288,349	5	.....	.....
Northwest Amateur Radio Club (Ill.)	283,864	7	WA9APT	.....
Sioux Falls Amateur Radio Club	282,418	3	.....	.....
Roanoke Valley Amateur Radio Club (Va.)	279,748	15	K4IKF	K1IGY/4
Inglewood Amateur Radio Club	278,608	6	W6TGF	.....
Forx Amateur Radio Club (N. Dak.)	263,198	6	KØIVQ	.....
Rochester Amateur Radio Assn.	262,516	24	WA2HUV	WA2SNI
Order of Boiled Owls of New Mexico	259,017	3	.....	.....
Lake Success Radio Club (N. Y.)	258,457	8	WA2TJA	W2CWD
Order of Boiled Owls of New York	255,858	3	W2AYJ	.....
Tri-Town Radio Amateur Club (Ill.)	244,682	9	K9CSW	.....
Lynchburg Amateur Radio Club (Va.)	241,576	5	W4DVT	.....
Saint Clair Amateur Radio Club (Ill.)	238,444	6	.....	K9BGL
North Penn Amateur Radio Club	235,617	11	K3HTZ	W3EWE/3
University of Colorado Amateur Radio Club	228,316	3	.....	.....
Detroit Amateur Radio Assn.	228,000	6	K8DCP	.....
University of Denver Amateur Radio Club (Colo.)	227,961	11	.....	W0REQ
Tri-County Radio Assn. (N. J.)	220,857	8	WA2ASM	.....
Waupaca Amateur Radio Club (Wisc.)	216,298	9	K9WIE	.....
Horseshoe Radio Club (Pa.)	213,921	6	W3KQD	K3SIQ
1200 Radio Club (Mass.)	210,910	5	K1WJD	.....
Nittany Amateur Radio Club (Pa.)	195,850	4	W3NEM	.....
Starved Rock Radio Club (Ill.)	192,916	11	W9NIU	W9RHV
Richmond Amateur Radio Club (Va.)	186,580	6	W4FJ	.....
Argonne Amateur Radio Club (Ill.)	181,808	6	W9RCJ	W9GQY
Hamfesters Radio Club (Ill.)	181,729	6	W9LNQ	.....
Union County Amateur Radio Assn. (N. J.)	174,762	7	W2GBY	WA2TOA
Denver Radio Club (Colo.)	173,500	3	KØVEN	.....
Candlewood Amateur Radio Assn. (Conn.)	165,355	5	K1WNK	.....
5 Towns Radio Club (N. Y.)	162,875	7	WA2RUB	.....
Ohio State University Amateur Radio Club	154,851	3	.....	.....
Aerospace Amateur Radio Club (N. J.)	151,617	6	K2KFP	.....
Parma Radio Club (Ohio)	149,618	6	K8BQY	.....
Telco Amateur Radio Club of Manhattan	142,537	8	W2LQP	WA2EXI
Providence Radio Assn. (R. I.)	133,705	3	.....	.....
Delta Radio Club (Tenn.)	133,349	6	WA4FDR	.....
City College Radio Club (N. Y.)	127,981	4	WA2TKL	.....
Eagle Rock Wireless Assn.	125,774	3	K3VPF/6	.....
Kanawha Radio Club (W. Va.)	124,872	4	.....	.....
Oak Park and River Forest High School Radio Club (Ill.)	122,092	4	.....	K9BZV
Metuchen YMCA Radio Club (N. J.)	120,503	3	.....	.....
Van Wert Amateur Radio Club (Ohio)	101,950	3	.....	.....
Waukegan Township High School Radio Club (Ill.)	98,886	3	WA9ALR	.....
Licking County VHF Club (Ohio)	98,749	4	K8ZSZ/8	.....
Joliet Amateur Radio Society (Ill.)	96,536	3	.....	.....
Chippewa Amateur Radio Club (Ohio)	92,778	6	W8BAA[3]	.....
Mount St. Michael Radio Club (N. Y.)	85,803	5	WA2PUM	.....
ARTICS Radio Club (Pa.)	81,116	3	.....	.....
Bronx High School of Science Radio Club	80,441	6	WA2UXZ	.....
Blackstone Valley Amateur Radio Club (R. I.)	78,848	3	.....	.....
Eagle Rock Radio Club (Idaho)	78,155	7	K7KBY	W7DMP
Nutley Amateur Radio Assn. (N. J.)	69,129	9	WB2AHM	WA2TMT
Morton West Amateur Radio Club (Ill.)	55,298	3	K9ZXG	.....
Sammamish Totems Amateur Radio Society (Wash.)	49,528	3	.....	.....
Rock Creek Amateur Radio Assn. (Md.)	47,010	7	K3QDD	K3QDC
Forest City Amateur Radio Club (Ohio)	44,259	4	.....	W8SUS
Atlanta Society of Teenage Radio Operators (Ga.)	44,175	3	.....	K4KAZ
Central Michigan Amateur Radio Club	40,790	3	.....	W8RXY
Chiburban Radio Mobileers (Ill.)	40,596	3	.....	W9QXO
Chicago Radio Traffic Assn.	27,004	3	W9REC	.....
Canton Amateur Radio Club (Ohio)	26,333	3	.....	.....
Central Connecticut Amateur Radio Club	25,096	3	.....	K1TVG
Dayton Amateur Radio Assn. (Ohio)	3,431	3	.....	.....
Bishop Stang High Radio Club (Mass.)	1,857	4	.....	K1WJQ

[1] K3JJG, opr. [2] W1HIV, opr. [3] W8YPT, opr.



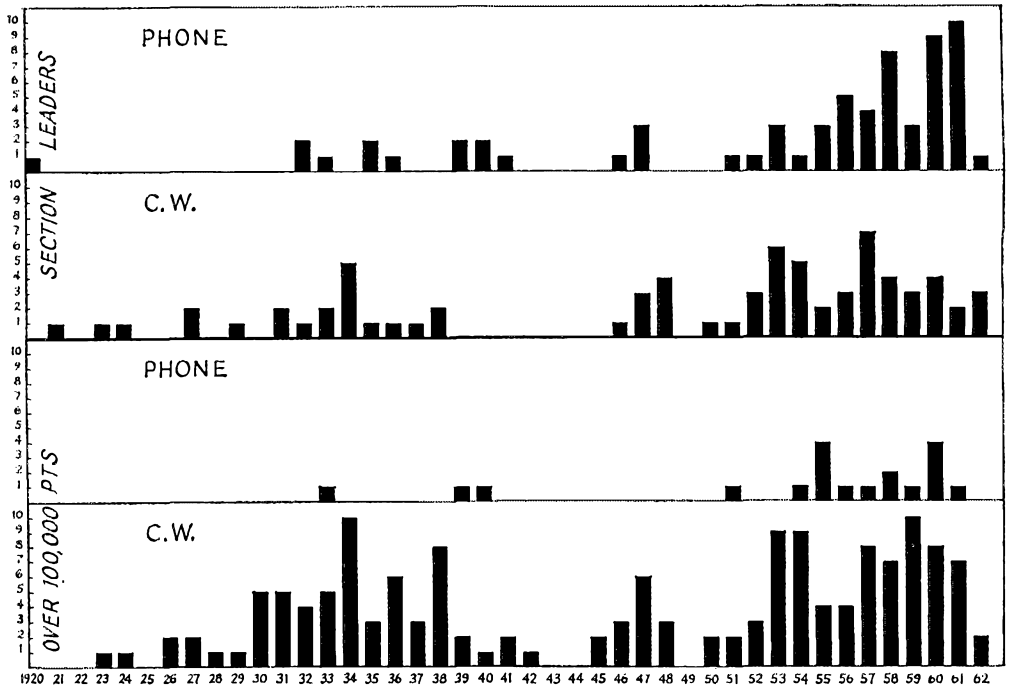
11-yr. old K7WQO has been licensed just about a year and enjoys hamming greatly. David helped with Arizona c.w. QSOs for 180 contestants.

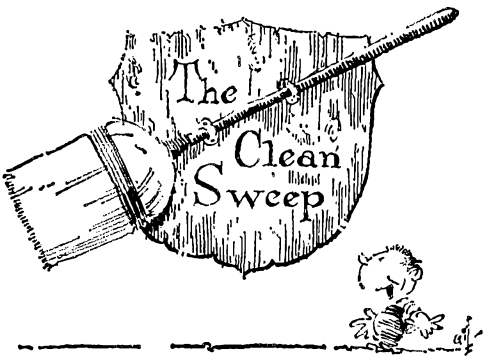
and also in Quebec." — *VE1MX*. . . . "Best part of the SS was reluctantly getting Nr 1 from W1OCD in Vermont at 4 A.M. after 5 minutes of coaxing." — *VE3FUX, opr. VE3UOW*. . . . "My main reason in entering was to give my new experimental antenna relay a real workout. This is a miniature magnetic reed s. p. d. t. relay that switches the antenna back and forth between transmitter and receiver at the highest keying speed I can manage (it'll actually follow up to 60 w.p.m. It worked perfectly." — *VE3AU*. . . . "Liked the new format but still would like to see RST added next year." — *VE3DH*. . . . "My first contest since I was VE4SX in '59. A 2-element beam for 20 lay in pieces in the basement and my procrastination probably cost me a few section multipliers." — *VE6MC*. . . . "All of the boys I contacted were very curteous and cordial." — *VE6AKV*. . . . "No excuse for not getting a VE8. RH DL CD CW RG and myself active. I spent hours ragchewing with VE8RH cause no answers to our CQs." — *VE8DX*. . . . "Sideband accounted for 90% of our contacts and was the solution to the heavy QRM on 40 and 80, while 6 produced many quick contacts and potentially is an excellent band to increase phone scores." — *K3KLQ*. . . . "Maybe Gus will go to VE8 next phone SS." — *W3ZKH*. . . . "Since moving to NDak from W5HGA I find that we are rare." — *W0IDH*. . . . "Great phone contest, lots of fun." — *KØKWK*. . . . "Now if I keep on increasing my phone score each year and can live long enough, I'm bound to finish top in the section *sometime*." — *K8GPC*. . . . "How those phone boys stand it I'll never know. My hat is off to them but I think next year will see me back on c.w." — *K8QJH*. . . . "Wow I thought the DX contest was rough while I was in Liberia as EL2X but this phone SS takes the cake." — *K2RAR*. . . . "Didn't anybody remember two-meter phone?" — *WN2FCB*. . . . "Conditions were better the second weekend on 15 phone." — *KØUWZ*. . . . "Both KØSCM and I scored above 110-K points and handed out over a thousand two-ways on sideband. Les and I are both 17 and used identical rigs and antennas throughout the contest period. This year the laurels go to him, but I'll be back next year with a little more experience and determinations; two basic contest-winning ingredients." — *KØCVA*. . . . "By the way I would have been lost without your check sheet of stations worked." — *K1THQ*. . . . "In 28 years of ham radio this was my first SS entry and was my face red when I found out that I never even *heard* another entry from my own section of Vermont!" — *K1PNE*. . . . "Had a good time on phone but I'm getting older and slower all the time." — *W7BSW*. . . . "The

NOVICE CERTIFICATE WINNERS

KN1FEB	WN2JEE	WN5GYW	WN8HMU
KN1FNT	WN2JER	WN6CXR	WN8HQR
KN1FNA	WN2KLD	WN6FZH	WN8KXO
WN2HKK	KN3WQD	WN6GKG	WN9HRS
WN2INR	KN3ZOL	WN6HIL	WN9HIZ
WN2IQG	WN4MCV	KN7YEM	WN9JQQ

A bar graph like this, which correlates the actual numbers of logs received with the year of original licensing of the individual hams concerned, can indicate many SS trends. For example, phone and c.w. section leaders and high-scoring phone men are those licensed within the past decade. High-scoring c.w. operators are of the mid-thirties as well as the past ten years. Or, you might say, '34 was a vintage year for A-1 advocates. For the sake of space conservation, W4ZM (licensed in '15 and over 100K c.w.) was way over that-a-way to your left.





really funny thing about the whole phone part was that my family moved right in the middle and left me sitting in a completely vacant house, save for the radio gear. No some people take the Sweepstakes seriously, but not *me!*" — *WA6SLU*. . . . "I was particularly impressed this year with the courtesy of nearly every phone contest operator. Several times stations would stand by for me to complete a contact even though they were being called on the same frequency. This sort of operating makes contesting a pleasure and reaffirms my faith in the gentlemanliness of most ham operators." — *WA4FIJ*. . . . "I was extremely surprised at the phone activity on 10 and the lack of it on 20." — *WA6JRD*. . . . "After reading the article "Amateurs Anonymous" the XYL understood a little better my reactions to the SS." — *WA6SNA*. . . . "Living on a farm doesn't always work out the best for a phone SS. Besides the usual time lost feeding cattle, the wolves got in the sheep and I missed a shot at the wolf and a new multiplier at the same time." — *WA5ALB*. . . . "Found conditions not as favorable from VE6 this year as last." — *VE6OR*. . . .

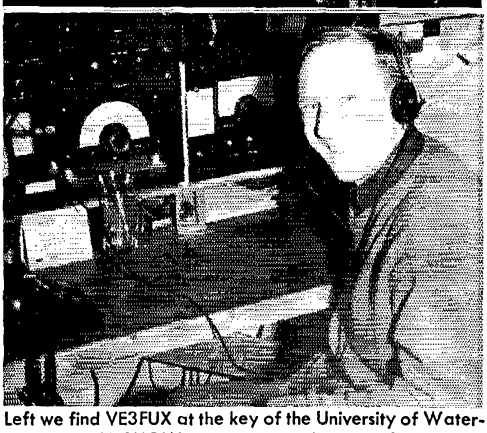
"I continue to be amazed at the good fists and snappy operating of the newer licensees in the SS. Lots of CK 62'ers, for example, you'd never recognize as neophytes from their fists." — *W9WHF*. . . . "Personally I think I worked just about every county in Ohio." — *WA2NPU (opr. K1NAN)*. . . . "The new message format is quite unsatisfactory. I found the license issuance year info. very interesting and would suggest the following for the exchange: Nr Stn RST Section Time License Year." — *W4DQS*. . . . "All 130 of my phone contacts were made without benefit of once calling CQ. Maybe next year I'll call CQ and see if I can make 260 contacts." — *K7RUR*. . . . "Pleased that, in general, the VE stations seemed more plentiful this year." — *W4LYV*. . . . "Hope I helped some of the WAS boys out with Arkansas." — *K5ALU*. . . . "The new date is a good idea and it certainly equalizes things and eliminated the 'some send it and some don't' situation of previous year." — *K9DWG*. . . . "Most of the stations I worked were licensed in the 50's and 60's" — *W8MXO*. . . . "I think the new rules are just fine and made the SS even better than before although it was perhaps a bit slower." — *W8NBK*. . . . "For those who like to keep phone records here are two top honors group, a worthy goal for any phone SS'er. A3-1000 QSO Club up to '62; W6AM (W6FRW, opr.), K2AAA, K6EVR, K5MDX. 200-K Club; W6AM (W6FRW, opr.), W7BSW, K6EVR, K5MDX. Seems like the west coast dominates!" — *K5MDX*.

THE CLEAN SWEEP

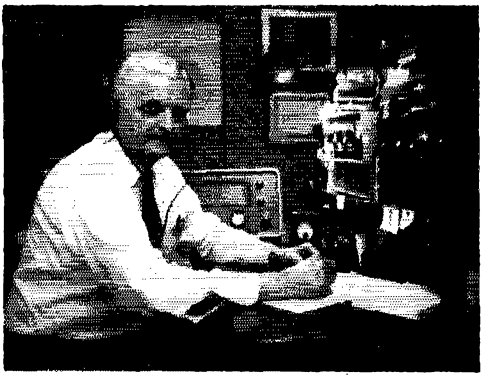
Worked All 74 Multipliers

W1BIH	W4DQS	K4TEA	W6UTV	W9RCJ
K2DGT	W4FRO/5	W4YFA	K6VVA	W9RQM
K2JOK	K4GSU	K5MDX*	W7BSW*	W9ZAB
W3CGS	K4LPW	W5WZQ	K8HLR	WØCXN
W4CVI	WA4NGO	K6ASL	W9IOP	WØDU
				WØEQN

* Phone



Left we find VE3FUX at the key of the University of Waterloo station VE3UOW in an almost dead tie for Ontario honors with (above) VE3AWE who held that fine edge for the VE3 award. The center photo shows VE6OR, high Alberta and VE phone while the top snapshot finds L. A. phone leader K6CYG in a W6-winning pose.



"The SS is grand the way it is." So says OT W4ZM, over 125K c.w. with an HX-50/75A-4, 3-L tribander and 80-meter center-fed antenna. Ed is one of our longest-licensed participants and contributes regularly to the PVRC aggregate.

C. W. SCORES

Thirtieth Sweepstakes Contest

Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is award winner for that Section unless otherwise indicated. . . . Likewise the "power factor" used in computing points in each score is indicated by the letter A or B. . . . A indicates power up to and including 150 watts (multiplier of 1.25 c.w., 1.5 phone), B over 150 watts (multiplier of 1). . . . The total operating time to the nearest hour, when given for each station, is the last figure following the score. . . . Example of listings: W3CGS 186,388-1008-74-A-40, or final score 186,388, number of stations 1008, number of multipliers 74, power factor of 1.25, total operating time 40 hours. . . . An asterisk denotes Novice certificate winners. A double asterisk denotes Technician certificate winners. Multi-operator stations are grouped in order of score following single-operator station listings in each section tabulation.

ATLANTIC DIVISION

Eastern Pennsylvania

W3CGS[1]	186,388-1008-74-A-40		W3ISE	97,493-	619-63-A-36
W3BES	183,890-1045-71-A-40		K3JGJ	96,525-	585-66-A-35
W3MFW	171,000- 950-72-A-38		W3HBA	82,150-	530-62-A-24
W3ALB	156,960- 872-72-A-35		W3QMZ	81,224-	580-71-B-34
W3MWC	155,946- 846-73-A-36		K3MCO	73,429-	488-61-A-31
W3GHM	151,710- 850-72-A-34		K3LJZ	62,775-	405-62-A-31
W3NOH	146,453- 849-69-A-35		K3NFA	60,973-	421-58-A-36
K3JCT	145,453- 797-73-A-29		K3HNP	56,003-	393-57-A- –
W3HHK	139,795- 770-73-A-32		W3EVW	55,088-	339-65-A-24
W3KFQ	134,685- 738-73-A-37		W3KT, 3	54,458-	411-53-A-24
W3WJD/3	131,765- 909-73-B-40		W3AEM	53,863-	319-62-A-26
W3WPG	126,650- 745-68-A-34		K3OMP	53,395-	362-59-A-31
W3MBS	122,310- 681-72-A-34		K3LSC	45,961-	392-59-B-36
W3CPS	119,600- 770-65-A-35		K3YQJ	42,630-	351-49-A-35
W3DAO	107,280- 596-72-A-34		W3DBX	40,950-	246-66-A-22
K3NDG	105,995- 633-68-A-36		W3JET	34,980-	318-55-B-34
W3KDF	103,944- 732-71-B-40		W3NCW	33,350-	230-58-A-28
W3BIP	103,410- 575-72-A-37		W3ADE	32,550-	310-42-A-25
W3EQA	103,295- 575-73-A-35		K3NJW	31,960-	273-47-A-33
K3HTZ	102,300- 821-66-A-38		W3ORU	29,600-	301-50-B-11
K3MNJ	101,673- 607-67-A-30		W3GHS	29,500-	250-59-B-15
K3IPK	100,574- 660-61-A-27		K3GNJ	28,458-	281-51-B-16
W3GRS	98,550- 540-73-A-24		W3EER	27,685-	226-49-A-20
			K3PSU	26,723-	259-42-A-31

ORS/OPS WA2VYS led E. N. Y. c.w. competitors displaying contest proficiency galore in addition to her well-known traffic handling abilities.

K3MUT	26,500-	270-40-A-37
W3GSD	26,460-	252-43-A- –
K3LWR/3	25,715-	271-38-A-38
K3VDU	23,220-	196-48-A-27
K3USH	23,056-	299-31-A-28
W3BYX	21,045-	183-46-A-14
K3TRZ/3	20,336-	248-33-A-23
K3NUM	19,035-	215-45 B- –
K3TEJ	18,450-	181-41-A-35
K3RFB	17,297-	177-49-B-25
K3RDM	16,583-	210-33-A-22
K3RZM	14,705-	173-34-A-31
K3TSQ	14,220-	158-36-A-24
K3RRA	14,050-	141-40-A-15
K3PBL	14,025-	170-33-A-29
W3DVC	13,493-	129-42-A- 7
W3NHX	12,548-	120-42-A-25
K3VCL	12,090-	124-39-A-25
K3TPI	11,089-	104-23-A-14
K3MVO	11,063-	150-37-B-14
W3ABZ	10,433-	107-39-A-10
W3GSY	10,080-	112-36-A-20
W3CBH	10,073-	119-34-A-21
W3CHU	8944-	104-43-B-12
K3WQK	8539-	115-33-A-14
W3CBF/3	6163-	73-34-A-13
K3NVJ	5948-	96-26-A-22
K3YVG	5285-	82-28-A-16
K3NTD	5075-	73-28-A-12
W3ARK	4991-	81-31-B- 4
W3SDE	4698-	89-27-B-14
K3RHC	4675-	85-22-A-15
K3YOP	3623-	67-23-A-30
W3EAN	3540-	59-24-A- 3
W3JKX	2613-	57-19-A- 9
W3FNK	2123-	51-19-A- 9
K3OHU	2304-	49-19-A-13
W3MC	1924-	41-19-A- 8
K3LOW	1785-	34-21-A- 3
K3UUY	1600-	33-20-A-10
KN3NZU[1]	1350-	42-15-A-23
W3NF	1296-	41-16-B- –
K3TOY	975-	30-13-A- 7
KN3ZKH	383-	20- 9-A-11
K3TTL	112-	8- 7-B- 1
KN3YZR	38-	8- 3-A- 2
K3UVA	35-	7- 2-A- 1
KN3YOZ	5-	2- 1-A- 1
KN3FLG	3-	1- 1-A- 1
W3DQG (K3SPS, W3DQG)	118,138-	727-65-A-40
W3AHX (W3s AHX GOQ)	112,860-	627-72-A-39
W3ABT (5 oprs.)	74,528-	529-57-A-31
W3SJ (K3s HUA IAM)	57,787-	336-60-A-40
K3VDH (K3s IVA VDH)	13,016-	136-39-A-31
K3PWM (K3s MHD PWM)	4920-	82-24-A-20

Maryland-D. C.

K3JQU	182,226-	1020-73-A-39
W3MSR	178,211-	980-73-A-40
W3MVB	161,878-	887-73-A-40
W3TMZ[2]	156,100-	892-70-A-40
W3GRF	148,044-	1019-73-B-36
W3MCG	124,428-	701-71-A-40
K3JIQ	120,400-	688-70-A-35
W3MFJ	112,285-	662-68-A-39
W3AEL	105,525-	630-67-A-26
K3JYZ	99,050-	566-70-A-40
W3PRZ	98,843-	576-69-A-38
W3AYD[3]	94,530-	694-60-B-35
K3CVT	92,125-	550-67-A-22
W3ZVJ	85,800-	535-53-A-40
W3JTC	67,438-	415-65-A-21
W3RNY	64,766-	464-57-A-33
K3QFG	64,200-	428-60-A-30
W0GKY/3	49,385-	288-68-A-29
W3KZQ	49,335-	299-66-A-30
W3WG	40,787-	251-65-A-26
W3TN	39,345-	258-61-A-32
W3KDP	36,124-	255-57-A-12
W3AFM	34,320-	266-65-B-15
W3EAX	33,000-	220-60-A-19
W3HVM	26,393-	207-51-A-17
W3KA	26,000-	210-50-A-13
W3WV	24,354-	185-66-B-19
K3QDD	24,240-	255-48-B-12
K3URZ	18,866-	194-39-A- –
W3LDD	18,260-	166-55-B-21
W3HKF	18,000-	200-15-B-30
K3GZK	17,688-	149-50-A-17
K3KMA	17,485-	136-52-A-23
K3OKC	15,864-	178-37-A-18
W3QC	8597-	100-38-A-17
K3VPZ	2380-	64-17-A- 1
K3UFV	2295-	54-17-A-12
W3PQ	1680-	40-21-B- –
K3OSX	999-	24-17-A- 3
W3HB	690-	23-12-A- 7
K3YJE	38-	8- 2-A- 2
W3GQF (6 oprs.)	78,016-	615-64-B- –

Delaware

W3IYE	120,690-	671-72-A-35
K3NHL	108,503-	629-69-A-38
W3TGF	71,885-	538-54-A-40
W3DRD	36,165-	221-66-A-16
W3CIAF	26,898-	208-53-A- 7
K3SHD	21,000-	200-42-A-22
K3COO	20,125-	176-46-A-13
W3VTT	10,400-	104-40-A-15
W3RJZ	5760-	80-36-B- –
KN3YSW	500-	21-10-A- –
KN3YHR	23-	3- 3-A- –

Southern New Jersey

W2SHM	130,650-	804-65-A-39
WA2BLV	129,060-	717-72-A-35
W2HDW	125,730-	767-66-A-35
WA2WLN	121,720-	719-68-A-40
W2QDY	108,588-	595-73-A-38
WA2HSP	102,383-	619-66-A-33
W2PAU	93,926-	559-69-A-31
K2ERC	75,208-	452-67-A-37
K2CPR	73,000-	400-73-A-23
WA2IEK	72,930-	566-66-B-38
W2FYS/2	72,230-	466-62-A-33
W2REB	62,811-	503-63-B-33
W2FSX	55,650-	423-53-A- –
W2EBW	51,456-	402-64-B-39
WB2FJF	41,100-	350-60-B-30
WA2CUB	40,260-	334-48-A-16
W2SDB	36,908-	264-57-A-31
W3YLJ/2	29,613-	259-46-A-11
WA2KOK	24,915-	229-44-A-26
WB2BNR	22,418-	229-42-A-22
WB2EDH	21,796-	187-47-A-37
K2DNA	19,744-	176-45-A- –
K2BG	13,200-	150-44-B-11
W2APD	12,758-	128-42-A-16
W2ZVW	12,635-	133-38-A- –
W2BPT	9538-	110-35-A-21
K2HBY	8628-	120-29-A-14
WA2WLM	7250-	100-29-A-10
K2JXX	6928-	82-34-A- 7
WA2WLY	6806-	87-33-A-40
WA2WTL	6201-	68-41-A-13
WB2ARC	5125-	111-20-A-19
WA2EMB	4565-	90-22-A-19
WA2WVD	4520-	60-32-A-14
WN2HKK*	4230-	79-24-A-40
W2MCK	3780-	56-27-A-21
K2QQK	2441-	47-21-A-10
WA2LBL	1007-	30-19-B- 7
WB2APG (2 oprs.)	184,781-1013-73-A-40	
WA2UOF (WA2s MES UOF)	37,320-	313-48-A-30
WA2KWS (WA2s KW8 OAA)	34,055-	278-48-A- –
WB2DCW (WB2s DCW KMW)	16,320-	200-34-A-27

Western New York

K2KTK	116,615-	826-71-A-38
WA2HUV	85,680-	505-68-A-27
WA2THY	77,025-	474-65-A-31
WA1JWV	62,650-	449-56-A-30
K1RTR/2	61,120-	382-64-A-30
K2LMX	47,163-	343-55-A-33
WA2PCW	40,670-	332-49-A-28
K2ODL	34,500-	230-60-A-31
WA2ZUF	33,916-	325-43-A-29
WA2RKS	22,330-	203-44-A-27
WB2WJO	21,015-	194-46-A-24
K2HVS	19,125-	161-50-A-17
W2CJQ	18,120-	151-48-A-14
W2GB	16,000-	200-38-B-17
WA2KIZ	15,908-	152-42-A-20
WB2EXW	7020-	108-26-A-23
WB2ARG	6773-	135-21-A-14
K2JBX	6345-	70-36-A- 7
K2SSB	6300-	90-28-A-10
WA2IKC	6032-	104-29-B- 5
K2YMM	5974-	89-27 A-23
W2YIK	5904-	82-36-B- –
W2EMW	5863-	67-35-A- 5
WB2GEG	5619-	79-29-A-15
WB2FPG	5135-	80-26-A-15
K2KBI	4880-	61-32-A-11
WB2HSK	4720-	90-24-A-14
WB2ARD	4284-	76-23-A- 9
WA2QMJ	4200-	85-20-A-11
WB2PWG	3413-	65-21-A-33
WB2CON	3025-	62-20-A- 5
K2UAN	2470-	55-19-A-13
W2GVH	1800-	50-18-B- 4
WN2JJI	1313-	39-15-A- –
WB2HQL	1155-	36-14-A-30
K2ZCD	840-	28-16-B- 7
WA2KKP	250-	13- 8-A- 3
WB2RRI	210-	13- 7-A- 4
WA2KQK (K2s KGQ 8SX, WA2KQK)	104,805-	617-68-A-36
WB2DGW (WB2s BYU DGW)	37,763-	286-53-A-31

Western Pennsylvania

K3NLC	115,375-	650-71-A-36
W3KQD	79,300-	488-65-A-38
W3NEM	76,425-	510-60-A-38

QST for

W3LIV	73,663-	415-71-A-39
K3OOU	72,050-	529-55-A-37
K3PYS	68,775-	462-60-A-24
K3MPB	45,116-	350-53-A-39
W3ZUH	33,871-	288-49-A-24
K3FEU	30,709-	228-57-A-30
K3TCY	24,031-	262-39-A-27
W3BBO	16,967-	183-47-B-25
K3EXE	13,594-	193-29-A-18
K3ELL	13,556-	121-45-A-23
K3WWP	11,258-	120-38-A-28
W3NUG	10,000-	100-40-A- 8
K3VXE	9364-	116-32-A-30
K3VYY	2599-	51-21-A-16
KN3WQD*	1781-	42-19-A-19
W3UHN	520-	16-13-A- 2
K3VAR	344-	26-11-A-19
KN3VXW (KN3s VXW YQR)	715-	32-11-A- 2

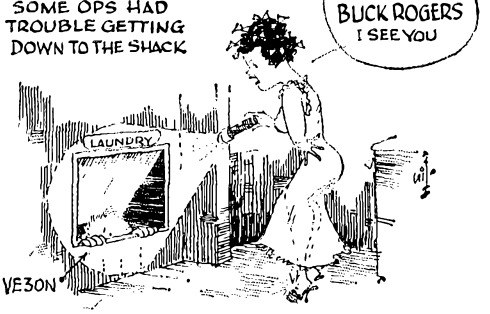
CENTRAL DIVISION

Illinois

W9ZAB	170,200-	920-74-A-37
W9RCJ	156,325-	845-74-A-38
W9QQG	139,338-	800-71-A-39
W9BUD	113,025-	693-66-A-40
W9LNQ	111,810-	613-73-A-37
K9FEN	101,920-	650-64-A-38
W9HAS	100,650-	610-66-A-27
K9ZSE	100,110-	565-71-A-37
WA9APT	84,243-	545-62-A-40
W9WHF	83,265-	551-61-A-38
WA9BKW	79,998-	602-67-B-28
W9OKM*	78,952-	556-71-B-32
K9DWG	72,450-	422-69-A-33
K9GSD	66,080-	474-56-A-35
W9GWA	63,315-	379-67-A-26
WA9EKJ	61,770-	427-58-A-39
WA9EBT	55,313-	380-59-A-33
WA9CYI	53,400-	360-60-A-40
WA9ALR	51,075-	345-60-A-39
K9IGR	49,280-	309-64-A-36
K9ZXG	48,068-	339-58-A-21
WA9FRO	47,778-	330-58-A-40
K9CSW	47,058-	383-62-B-27
K9YRA	45,500-	261-70-A-27
K9SLK	45,000-	300-60-A-36
K9RPX	42,893-	304-57-A-36
W9MXZ	42,390-	320-51-A-26
WA9CKQ	40,906-	301-55-A-34
W9OKI	40,788-	251-65-A-19
W9NIU	36,178-	250-58-A-37
W9DUH	31,568-	259-46-A-26
W9PNE	30,621-	263-39-B-11
WA9FBC	30,563-	248-50-A-37
K9JUU	29,835-	234-51-A-17
W9MQZ	28,751-	229-51-A-21
WA9AJF	28,210-	217-52-A- -
W9AGM	26,500-	200-53-A-13
K9DVK	24,563-	201-50-A-33
WA9DXA	24,093-	215-46-A-34
W9ZEN	23,850-	180-53-A-20
WA9GAM	23,748-	212-46-A-24
K9RVF	21,600-	189-48-A-31
W9ECY	20,350-	185-55-B-18
WA9DOC	17,388-	184-38-A-10
W9ACS	17,258-	178-39-A-10
WA9AAT	16,594-	148-45-A-14
W9REC	15,820-	113-56-A-16
W9KLD/9	13,950-	125-45-A-11
WA9ICQ	12,823-	115-46-A-22
W9ZSQ	12,750-	132-45-A-12
W9GMB	12,363-	117-43-A-11
W9GML	11,894-	158-38-B- -
W9MLR	10,550-	106-50-B-20
W9YDQ	8693-	92-38-A- 9
K9OWT	7794-	109-29-A-18
WA9HFU	7431-	105-29-A-21
WA9AQU	7020-	115-27-A-26
K9IWS	6860-	100-35-B-13
W9EYF	6753-	76-37-A-35
W9WR	6669-	88-39-B- -
WA9DPR	6256-	73-35-A-19
K9WEU	5850-	99-24-A-13
W9HPG	4515-	65-28-A- 7
W9YYV	4250-	68-25-A-15
WA9GEY	3815-	57-23-A-20
WA9DXD	3600-	63-24-A-10
K9DCV	3536-	67-23-A- 9
WA9CSN	3480-	61-24-A- 7
K9ZAF	3438-	55-23-A- 9
K9ISP	3325-	70-19-A- 6
W9QVE	2800-	56-20-A- -
WA9ERE	2475-	47-22-A-14
WA9GQT	2079-	33-21-A- -
WN9JQQ*	1650-	44-15-A-20
WN9HHH	1551-	47-17-A-16
W9YAC	1500-	40-15-A- 8
W9VOO	1463-	33-18-A- 6
WN9JGL	1331-	39-15-A-21
K9PDV	1211-	26-19-A- -
WA9DKM	1031-	28-15-A- -
WN9HEU	1031-	29-15-A-22
W9YYG	864-	27-16-B- 1
W9TAL	683-	22-13-A- 3
WN9H8S	600-	27-10-A- -
WA9DDM	446-	28- 7-A- 5
WN9JDV	375-	16-10-A-20
W9VBV	320-	16- 8-A- 1
K9SNS	270-	12- 9-A- 2
K9KUN	233-	17- 6-A- 4
WN9GQK	210-	16- 7-A-12
W9VPE	120-	8- 6-A- 2
K9IYV	88-	7- 5-A- 3
WN9JNU	80-	11- 4-A- 8
WA9CHG	3-	1- 1-A- 1
WA9EQJ (WA9s EQJ FEJ)	65,000-	409-65-A-40
WA9BMG (WA9s BMG FVZ, WØETU)–	49,733-	351-57-A-30
WA9FAR (WA9s ESH FAR)	13,890-	327-57-A-40
WA9BWH (4 oprs.)	30,144-	244-53-A-27
WN9GCM (WN9s GCM HPB JTN)	3594-	82-23-A-39
W9DNM (W9DNM, WA9ITA)	2274-	57-17-A-16
W9TOI (W9TOI, WN9JFU)	1420-	36-16-A-7

1417 of these special QSLs confirmed contact with W9IOP during the code portion of the '63 SS. Even though a non-smoker and a strictly social imbiber, Larry says the QSL card is an accurate description of how he felt at the end of the contest.

K9RJO	22,980-	195-48-A-35
WA9CVI	22,313-	181-50-A-19
WA9TTR	19,040-	136-56-A-28
WA9GDT	18,938-	156-50-A-16
W9GGK	13,975-	130-43-A-25
W9AQW	13,000-	132-40-A- 4
WA9EBR	12,580-	133-37-A-20
K9DWK	11,250-	100-45-A-10
W9DGA	10,238-	117-35-A- 5
W9QLW	8914-	104-42-B- 8
WN9IHZ*	4620-	84-24-A-31



Indiana

W9IOP	260,388-	1417-74-A-38
K9DHN	149,188-	859-70-A-40
WA9AUM	122,500-	700-70-A-39
W9BHR	96,560-	544-71-A-37
W9CSL	48,240-	307-64-A-29
W9CNG	37,280-	223-64-A- -
W9HNJ	33,920-	259-53-A-33
K9OIJ	26,325-	204-52-A-21
WA9ECX	25,872-	285-49-B-18
W9RRC	4128-	65-26-A-10
K9UKM	3156-	51-25-A- 2
WN9IZR	2543-	59-18-A-31
K9LNS*	2000-	42-20-A- 4
WN9HUP	1815-	36-22-A-12
K9FZU	915-	35-15-B- 8
WA9IRE	399-	16-11-A- 7
WN9IXQ	33-	10- 3-A- 9
W9HGP (K9OVK, W9HGP)	90,168-	663-68-B-40
W9YB (4 oprs.)	88,306-	659-67-B-40

Wisconsin

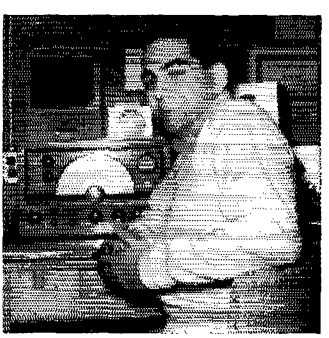
W9RQM	185,370-	1004-74-A-39
K9KGA	139,466-	813-69-A-40
W9ODD*	104,185-	625-67-A-36
K9WIE	72,695-	442-67-A-33
K9YBC	72,105-	418-69-A-26
WA9AIB	71,329-	415-69-A-26
W9RLQ	61,553-	444-58-A-28
K9GDF	58,575-	355-66-A- -
K9DKU	57,008-	345-66-A- -
WA9KAD	56,654-	374-61-A-22
W9FBC	43,863-	319-55-A-23
W9KNK	42,700-	244-70-A-36
WA9FUH	31,429-	250-51-A-27
W9DTF	27,094-	219-62-B-22
WA9FAB	26,933-	203-63-A-22
W9BLK	22,043-	252-47-B-27
W9CHD	19,388-	165-47-A- 9
W9TNF	17,850-	140-51-A-18
W9GMV	13,279-	135-49-B-13
W9KJW	12,331-	128-39-A-17
W9OVZ	10,350-	104-40-A-18
WA9FBO	10,163-	136-30-A-39
K9IZT	7920-	90-32-A-12
WA9AVZ	4624-	74-27-A- 8
WA9CWO	4531-	73-25-A-22
WA9GAR	4290-	70-26-A- -
K9WFH	3300-	55-24-A-18
K9CJP	3038-	45-27-A- 6
W9WUQ	2525-	53-20-A-16
WN9HRS*	1813-	45-22-A-22
W9JQV	1058-	24-18-A- 6
W9RKP	1000-	25-20-B- -
W9DPN	770-	22-14-A- 5
WA9EDZ	720-	25-12-A- 1
W9BCC	605-	22-11-A- 4
WN9IOA	375-	16-10-A-13
W9YT (K2CCW, K9s ELT ZMS)	118,296-	823-72-B-36
K9ELT (K9s ANJ ELT)	903-	19-19-A- 2

DAKOTA DIVISION

North Dakota

KØIVQ	93,888-	537-70-A-27
WAØAAD	75,375-	450-67-A-38
WA2BEX/Ø	74,183-	471-63-A- -
KØQWY	50,065-	324-62-A-17
KØQYD	46,905-	320-59-A-22
KØKLG	10,350-	113-10-A-23

Left to right, Miss. champ W4FRO/5 with a clean c.w. sweep and 150K; 17-year young K8HLR who bettered 105K in Michigan likewise made all sections, but placed 3rd in points; and WØCUC, who dispensed almost 1000 code QSOs from South Dakota.



WAØELO 260- 14- 8-A- –
KØOSW (KØs OSV OSW)
52,308- 343-61-A-25
WØHSC (4 oprs.)
47,386- 415-58-B-35

South Dakota

WØCUC 142,848- 997-72-B-40
WØSMV 133,144- 992-68-B-40

Minnesota

WØJPH 152,295- 862-71-A-40
KØWWW 96,313- 580-67-A-40
WØAIH 84,745- 503-68-A-18
WAØAXH 53,100- 366-59-A-37
KØZXE/Ø 44,170- 319-56-A-29
KØIJL 43,168- 280-62-A-15
WAØIJJF 42,111- 295-59-A- –
WAØDKA 15,919- 149-45-A- –
KØUZE 9555- 100-39-A-12
KØBPC 7040- 95-32-A- –
WAØCCB 4350- 65-29-A- 8
WAØAXG 3188- 51-25-A- 4
WNØFAA 371- 21- 9-A- –
WØKUI 360- 15-12-B- –
WNØFUR 315- 15- 9-A- 6
KØDHH (KØs DHH RCF)
157,590- 949-68-A- –
KØJFJ (KØs JFJ JFV JFY)
44,033- 317-57-A-30

DELTA DIVISION

Arkansas

WA5CBL 141,570- 800-72-A-31
K5TYW 100,820- 713-71-B- –
W5DRW 32,736- 264-62-B-25
W5DTR 336- 14-12-B- 2
WA5BBM (WA5s BBM BIB)
82,693- 569-62-A-38
W5YM (7 oprs.)
36,610- 270-56-A-40
WA5FOR (4 oprs.)
12,840- 120-48-A-20
WA5BBN (WA5s BBN BIB)
9215- 105-38-A- 8

Louisiana

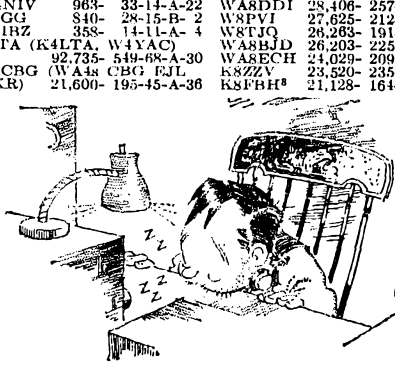
W5BUK 145,361- 802-73-A-38
W5ERR 67,920- 431-64-A-29
K5DGI 49,118- 333-59-A-10
W5SQH 32,625- 226-58-A-28
W5BYD/5 28,686- 219-53-A-20
W5YZL 25,848- 218-49-A- –
WA5BXF 20,100- 168-48-A-15
K5IGW 19,550- 170-46-A- –
W5TVW 18,810- 171-44-A-14
WA5CBQ 3575- 55-26-A- 5
K5SNH (K5s SNH YPS)
102,863- 636-65-A- –
WN5GEX (WN5s GEX GEY)
796- 30-13-A-16

Mississippi

W4FRO/5
150,868- 826-74-A-39
WA5CAC 11,655- 126-37-A-14
WA5ALL 4785- 66-29-A- 6

Tennessee

K4LPW 234,210-1276-74-A-40
W4SQE 84,490- 477-71-A-37
WA4FDR 80,940- 456-71-A-21
WA4CGA 76,456- 478-65-A-40
W4WZC 71,820- 459-63-A-22
WA4END 63,840- 460-70-B-32
W4YAU 63,318- 411-62-A-25
W4YAC 19,575- 174-45-A-17
WA4HRG 18,296- 183-41-A-13
WA4GAX 15,503- 168-39-A-19
WA4EPF 11,250- 100-45-A- 9
WA4EZV 8580- 169-26-B- –
K4QZV 8458- 83-41-A- –
WA4JCD 5250- 78-28-A-13
WA4KGX 2250- 45-20-A- 8
WN4NIV 963- 33-14-A-22
W4OGG 840- 28-15-B- 2
WA4IBZ 358- 14-11-A- 4
K4LTA (K4LTA, W4YAC)
92,735- 549-68-A-30
WA4CBG (WA4s CBG EJL FKR) 21,600- 195-45-A-36



W4BRB SAYS THAT OLD BEAT FEELING CAME ON FASTER THAN IT DID 15 YEARS AGO

GREAT LAKES DIVISION

Kentucky

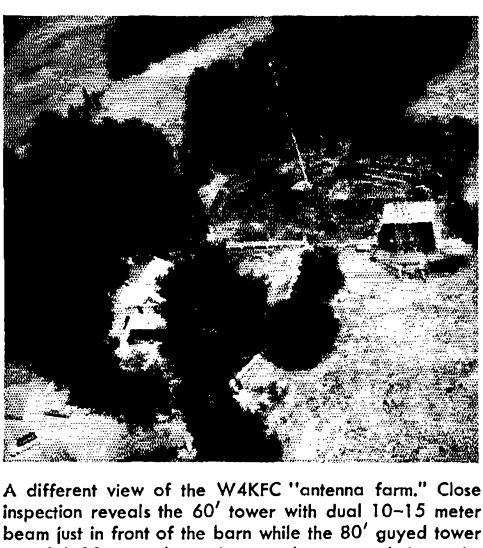
K4GSU 218,918-1198-74-A-40
W4CVI 138,843- 755-74-A-33
W4YFA 73,630- 398-41-A-29
W4RCV 47,120- 308-62-A-15
W4IBQ 43,243- 353-49-A-22
W4DHE 39,130- 305-52-A-24
WA4JUK 2750- 55-22-A-11
WN4PGO 220- 12- 8-A- –
W4JP (4 oprs.)
66,450- 451-60-A-40

Michigan

K8GRE[7] 140,875- 805-70-A-38
W8VPC 126,913- 715-71-A-39
K8HLR 105,450- 570-74-A-30
K8DCP 103,600- 602-70-A-39
W8DUS 94,435- 576-68-A-33
WA8CZH 78,120- 506-62-A-40
W8TRN 74,910- 454-66-A-35
WA8HBS 74,813- 525-57-A-40
W8PXA 74,538- 445-67-A-28
W8DQL/8 74,385- 543-57-A-25
K8GKX 70,913- 459-62-A-31
WA8COZ 19,294- 177-45-A-12
W8FX 19,280- 241-32-A-16
W8OQH 19,208- 199-39-A- –
W8CXS 19,200- 160-48-A-15
W8VWY 19,125- 171-45-A-16
K8TIG[9] 18,348- 210-44-B- 7
WA8HGR 17,400- 179-40-A-28
W8GTL 15,540- 168-37-A-12
W8MSK 15,170- 167-37-A-15
K8UFT 14,248- 142-41-A-16
WA8FRE 11,244- 136-35-A-15
WA8DXW
W8TKW 11,045- 96-47-A-25
K8UGG 10,668- 130-42-B- –
WA8DND 10,615- 99-44-A-16
W8EGI 10,250- 100-41-A- 7
W8MGQ 8990- 116-31-A-11
K8KQV 8400- 110-32-A-12
WA8FKY 7714- 100-33-A-17
WA8ETY 6210- 92-27-A- –
WA8JUG 5938- 101-25-A-22
K8SJQ 4872- 86-29-B-10
WA8HBJ 4725- 70-27-A-13
WA8DXC 4675- 86-22-A-12
WA8BNQ 4410- 63-28-A- 8
K8ZXQ 4350- 58-30-A-20
K8VJV 3025- 55-21-A-15
K8AKZ 2255- 41-22-A- –
WN8KXO* 1876- 44-19-A-35
K8UZG 1788- 30-26-A-12
K8YXB 1445- 35-17-A- 3
K8CVV 1275- 31-17-A- 6
W8OAF 1120- 28-16-A- –
WA8CYQ 1088- 34-16-B- 8
K8OOK 338- 14-10-A- 3
W8WYC 293- 13- 9-A- 3
K8BEB 10- 2- 2-A- 1
W8SH (5 oprs.)
70,700- 505-70-B-38

Ohio

W8NBK 189,253-1037-73-A-38
W8OYI 161,695- 886-73-A-40
W8LQA 151,851- 859-71-A-38
K8CFH 134,475- 815-66-A-40
W8ETU 125,460- 697-72-A-36
W8JSU 115,340- 632-73-A-37
W8CJN 113,423- 639-71-A-32
K8YUM 112,091- 637-71-A-37
K8SMA 106,433- 621-69-A-28
W8DCH 104,018- 605-69-A-36
W8ZCT 102,765- 608-68-A-37
WA8CHU 96,815- 580-67-A-40
W8LHV 95,584- 539-71-A-36
W8VQI 91,823- 550-67-A-38
W8DQG 89,668- 579-62-A-35
W8IBX 85,684- 474-73-A-19
WA8IDCQ 80,561- 522-63-A-40
K8WOU 80,372- 572-71-B-29
W8DHG 77,798- 451-69-A-39
W8GQU 75,888- 532-72-B-39
WA8EWT 75,653- 467-66-A-39
W8ERD 72,243- 409-71-A-29
WA8AJZ 68,040- 441-63-A-24
K8ANA 67,896- 380-67-A- –
W8BAA[10] 65,343- 482-69-B-23
W8NXN 65,178- 421-62-A-40
K8HGT 63,900- 360-71-A-40
W8KZH 60,375- 404-60-A-33
K8BXT 55,840- 352-64-A-39
W8OQV 53,360- 368-58-A-29
K8ORL 53,040- 416-51-A-39
W8RNF 68,256- 412-67-A-35
WA8DNZ 66,338- 470-58-A-31
WA8DJC 62,495- 431-58-A-18
W8MPD 59,138- 415-57-A-25
W8DM 57,000- 400-57-A-27
WA8CPH 56,063- 449-50-A-33
K8QLL 55,840- 351-64-A-22
K8RDE 47,644- 306-63-A-19
K8DHT 45,386- 320-57-A-31
W8SS 41,038- 245-67-A-26
KL7AOL/8
35,083- 255-55-A-31
K8ZOA 34,513- 254-55-A-16
WA8DDI 28,406- 257-45-A- –
W8PVI 27,625- 212-52-A-25
W8TJO 26,263- 191-55-A-19
WA8BJD 26,203- 225-47-A-22
WA8ECH 24,029- 209-47-A-10
K8ZZV 23,520- 235-42-A-34
K8FBH[8] 21,128- 164-54-A-21



A different view of the W4KFC "antenna farm." Close inspection reveals the 60′ tower with dual 10–15 meter beam just in front of the barn while the 80′ guyed tower with 3-L 20-meter beam is somewhat more obvious, pictorially and result-wise! Virginia c.w. men take heart, hams in the Clark family may just cut W4KFC operating time in one of these SS affairs!

K8CTP 50,400- 341-60-A-37
WA8HZE 48,878- 343-57-A-35
W8UPH 47,560- 328-58-A-21
K8ZSZ/8 47,520- 398-48-A-28
W8ECB 45,064- 298-61-A-15
W8MXO 43,706- 282-63-A-23
W8CSK 43,218- 296-59-A-29
W8APC 41,454- 330-63-B- –
W8EOG 39,010- 332-47-A- –
W8CLD 36,895- 314-47-A-18
WA8BUY 33,925- 230-59-A-30
W8EXI 31,775- 205-62-A-28
W8CHT 31,151- 176-71-A- –
K8EDQ 31,136- 280-56-B-20
W8KMF 30,805- 253-61-B-35
W8JUP 28,325- 208-55-A-18
WA8AJD 22,736- 213-43-A-15
WA8AJE 22,418- 183-49-A- 7
K4GMR/8 22,260- 216-42-A-27
WA8BZR 18,900- 176-42-A-13
WA8APY 18,725- 214-35-A-23
WA8HFP 17,700- 180-40-A-23
WA8ADA 17,599- 185-39-A-23
WA8GMY 17,238- 203-35-A-22
K8GKJ 14,880- 125-48-A-19
WA8ETX 13,114- 140-39-A- 9
WA8BRY 13,104- 193-36-B-26
WA8AWH 12,100- 123-40-A-11
W8OHO 10,400- 105-40-A-14
W8OYL 9788- 145-27-A-13
WA8EAS 8215- 109-31-A-16
W8AJH 8120- 102-32-A-18
W8NPF 7463- 100-30-A-25
K8NMG 7418- 69-43-A- 5
K8RXD 7350- 84-35-A-12
W8GMK 7242- 71-51-B- 8
K8PDF 7140- 110-28-A- 6
WA8REKJ 6665- 88-31-A- 9
W8AL 5693- 100-23-A-16
K8BQY 5600- 66-35-A- 5
WA8DZS 5475- 73-30-A-13
WN8HQR* 5164- 84-27-A-24
W8HMV 5135- 82-26-A-14
W8NHO 5075- 73-28-A-18
K8VZE 5074- 63-33-A- 8
W8SBM 4875- 75-26-A-10
WN8HVR 4658- 69-27-A-22
W8RAA 4650- 60-31-A- 5
W8CAR 4459- 63-29-A- 7
W8ZCQ 4118- 61-27-A- 6
W8PS 3983- 59-27-A- 5
WN8HPY 3969- 66-25-A-25
WA8DDS 3600- 60-30-B-13
WA8RQW 3420- 90-19-B- 4
W8NYS 3328- 52-32-B- 6
WA8HVY 3283- 51-26-A-24
W8DO 3200- 64-25-B- –
W8TGG 2860- 44-26-A-10
WN8HXR 2565- 54-19-A-13
K8VAK 2475- 45-22-A- 6
K8MMZ 2283- 42-22-A- 4
WN8GLE 2040- 48-17-A-24
WN8JFE 1975- 42-20-A-23
WN8HFI 1820- 63-14-A-18
W8PBS 1804- 41-22-B-17
K8LGB 1440- 32-18-A- 6
WN8KEU 1208- 38-14-A-27
K8MVA 1170- 26-18-A-13
W8YPT 813- 25-13-A- 1
WN8GYJ 780- 26-12-A-23
WA8EEW 613- 26-10-A- –
WA8GYS 613- 26-10-A-11
W8DAE 578- 21-11-A- 1
K8WDS 495- 17-12-A- 6
WA8IPL 480- 26- 8-A-10
WA8EWH 450- 20- 9-A- –
WN8JXF 330- 18- 9-A- –
WA8HWY 140- 8- 7-A- 2
WN8HJW 125- 18- 4-A-15
K8RMD 113- 9- 5-A- 4
WA8IOA 94- 8- 5-A- 7
W8LT (6 oprs.)
80,325- 641-63-B-40
K8UZW (K8s BQY NPH)
48,793- 430-59-B- –
WN8KOR (WN8s KOQ KOR)
13,653- 150-43-A-38

HUDSON DIVISION

Eastern New York

WA2VYS 84,525- 492-69-A-34
WB2BAL 69,596- 416-67-A-30
WA2HLH 60,525- 409-60-A-28
W2TER 59,538- 433-55-A-38
WA2PUM 32,500- 250-52-A-32
WA2YIO 27,450- 248-45-A-35
WA2OJD 24,024- 231-52-B-16
WA2DLV 12,000- 150-32-A-15
K2YXB 3822- 92-21-B- –
WA2LJM 3169- 85-15-A- 9
WN2JER* 3048- 58-23-A-28
W2NYH 2423- 51-19-A-12
WB2HBI 2000- 50-16-A-12
WN2HOK 1913- 55-14-A-27
WN2IDW 1031- 32-15-A-29
WN2LCJ 663- 33-10-A-24
WB2HTL 523- 19-11-A- –
W2UUV 252- 12- 7-A- –
K2UTV 130- 13- 4-A- 1

N. Y. C.-L. I.

K2DGT 197,580-1068-74-A-34
W2AYJ 164,798- 903-73-A-36
K2ZYR 127,575- 730-70-A-37
WA2TJA 121,089- 664-73-A-30
WA2RUB 116,573- 711-66-A-40
WA2YYJ 101,228- 614-66-A-40

W2CWD 98,753- 604-66-A-30
W2MZB 96,083- 557-69-A-30
K2JOK 94,165- 509-74-A-34
WA2PJL 89,016- 609-59-A-40
W2CWE 87,351- 526-67-A-40
WA2YLL 85,856- 606-57-A-40
WA2DNQ 85,405- 551-62-A-40
WB2BEV 84,739- 582-59-A-40
WB2CKS 82,960- 492-68-A-31
WA2TKL 81,979- 526-63-A-34
W2MTA 73,736- 558-53-A-32
WA2RMP 64,721- 531-61-B-23
W2BXS 63,085- 407-62-A-19
W2DID 53,550- 357-60-A-31
WA2EXP 50,593- 343-59-A-26
WA2UXZ 45,630- 355-52-A-23
W2MUM 45,225- 270-67-A-22
K2JQO 43,440- 362-48-A-31
W2GKZ 43,160- 332-65-B-15
WB2BDK 41,650- 300-56-A- –
WA2UNH 38,633- 303-51-A-35
WA2ODA 36,076- 295-49-A-29
WA2TGL 32,843- 231-58-A-29
WA2IMH 32,698- 226-58-A-18
K2UZV 30,141- 301-51-B-25
W2UAL 30,083- 288-42-A-24
K2AJR 29,316- 251-47-A-24
WA2QJU 29,250- 237-50-A 14
W2DUN 29,000- 233-50-A-32
W2JBQ 26,203- 223-47-A-12
WA2SJC 25,680- 214-60 B-30
WA2PVQ 24,938- 242-42-A 29
WB2BOM 24,688 200-50-A-25
WA2KSD 24,064- 256-46-B-13
W2OBU 22,688- 183-50-A-13
W2ZV 22,128- 167-53-A-36
WA2RUJ 22,050- 245-36-A-25
W2HAJ 21,608- 201-48-A-23
WA2VQV 19,125- 170-45-A-26
WA2VJE 16,875- 191-36-A-18
W2UNS 15,750- 210-30-A- –
WA2KHV 14,805- 140-42-A-14
WA2SDI 14,355- 138-44-A-26
WA2ZVJ 12,710- 126-41-A-11
K2CMV 12,688- 145-35-A- –
K2GIN 10,902- 119-46-B-28
W2AIZ 10,875- 150-29-A-29
W2NCG 10,830- 115-38-A- –
WB2EZG 10,040- 129-32-A-25
W2AHC 9938- 81-50-A-28
W2HAE 9450- 108-35-A-13
W2BPA 9435- 113-34-A-16
WA2RJZ 9223- 119-31-A-12
WA2VDA 9011- 134-27-A-26
K2BTT 8715- 125-28-A-11
W2AZS 8100- 90-36-A-12
WB2ATZ 7744- 89-35-A-19
WB2AEO 6885- 77-36-A-26
WB2IQM 5644- 112-21-A-18
WN2IQG* 5469- 93-25-A- –
WA2PDE 5145- 74-28-A- –
WB2HTJ 4821- 68-29-A-23
WA2WGN 4628- 93-26-A-11
WA2ZDS 4600- 92-25-A-16
WA2TNZ 4455- 66-27-A- 8
WA2VKO 4054- 72-23-A- 9
WB2EUH 3968- 71-23-A- 7
WB2EMJ 3540- 60-24-A-28
WN2HDQ 3300- 59-24-A-33
WA2YJN 2840- 72-16-A- 8
WB2BOL 2700- 60-18-A-11
WB2FPF 2625- 58-20-A- 9
WA2YJX 2423- 57-19-A-13
W2DBQ 2185- 38-23-A- 7
WA2JZM 2185- 48-19 A- 5
WB2DBW 2150- 48-20-A-14
WA2IKN 2048- 61-14-A- 8
WB2COW 2025- 47-18-A- 8
WB2GZB/2 1850- 38-20-A- 5
W2MQB 1064- 28-19-B- 5
WB2GDS 915- 31-12-A- 9
WN2GDM 881- 28-15-A-16
WB2CAN 829- 24-13-A- –
WN2FBZ 805- 24-14-A-10
WN2GIS 756- 28-11-A- 9
K2OFD 748- 24-13-A- 5
WN2HIR 690- 23-12-A-18
WA2TZY 674- 25-A- –
WB2EVC 390- 20- 8-A- 3
WA2VLK 374- 17-11-B- 1
WN2GDD 285- 29- 4-A-12
WB2EHB 125- 22- 5-A- 4
W2TNI 125- 10- 5-A- 3
W2OQI 120- 10- 6-B- 4
K2OHK 65- 7- 5-B- 1
WB2AZX 36- 5- 4-B- 1
WN2GUA 34- 5- 3-A- 2
WA2BEI 30- 4- 3-A- 1
WA2UAZ 20- 4- 2-A- 1
W2FPF 10- 4- 1-A- 1
WB2EQP 5- 2- 1-A- 1
WB2FCP 3- 1- 1-A- 1
WA2ZXL (WA2ZXL, WB2EQP)
47,840- 466-52-B-40
W2HJ (6 oprs.)
45,110- 353-52-A- –
WB2AKW (WA2YJF, WB2AKW)
42,900- 331-52-A-28
WB2HQT (WB2s CAZ HQT)
36,305- 274-53-A-31
WA2WIP (WA2WIP, WB2DPZ)
20,588- 186-45-A-18
WA2KOS (3 oprs.)
17,215- 160-44-A-39
WA2WPN (WA2s SJH WPN)
12,384- 131-48-B-15
WA2UZL (6 oprs.)
11,563- 125-37-A- –
WB2BPI (WB2s BPI DXM)
10,223- 145-29-A-15
WA2LQO (K2LTC, WA2FWV)
3658- 67-22-A- 7
WB2GOI (WA2WIU, WB2GOI) 1125- 39-12-A-13

Northern New Jersey

W2OIB 182,683-1001-73-A-39
WA2WBH 170,134- 960-71-A-40
K2GUN 152,029- 857-71-A-40
W2GGE 151,496- 856-71-A-36
W2VJN 132,780- 731-73-A-32
W2TSL 124,440- 733-68-A-36
W2NNL 122,595- 746-66-A-39
W2IMU 113,424- 619-73-A-39
W2LQP 86,640- 543-64-A-29
W2SJB 81,200- 510-64-A-40
K2KFP 75,040- 538-70-B-36
W2GBY 72,718- 493-59-A-38
W2DMJ 71,978- 457-63-A-26
WA2ASM 69,379- 442-63-A-36
W2HDT 69,231- 507-55-A-38
K2IYC 58,859- 416-71-B-26
WB2DEP 51,410- 392-53-A-33
WA2BGW 49,700- 355-70-B-32
WB2CZZ 45,385- 313-58-A-32
WB2CRX 45,030- 317-57-A-35
WB2AHM 41,231- 368-46-A-32
WA2ZKO 41,040- 304-54-A-32
W2CVW 39,294- 333-59-B-21
WB2CQQ 39,286- 300-53-A-38
WA2NPI 35,055- 311-57-B-38
WA2ZDN 31,875- 250-51-A-30
W2ANG 31,000- 200-62-A-17
W2ABL 28,140- 202-56-A-15
WA2MYB 26,840- 244-44-A-22
K2BMI/2 26,399- 221-49-A-14
W2SBW 24,675- 210-47-A-32
WA2NYS 23,320- 212-44-A-12
W2EWZ 22,103- 211-42-A-20
WA2VYZ 22,095- 246-36-A-22
W2NEP 22,005- 166-51-A-16
WB2FCT 21,446- 200-43-A-21
W2TWC 19,320- 210-46-B-10
W2DRV 18,813- 176-43-A- 8
W2LRO 16,538- 147-45-A-14
W2IBZ 14,535- 163-36-A-10
WB2GEZ 14,149- 185-33-A- 1
W2QNL 13,960- 175-32-A-22
W2EHN 13,223- 129-41-A-14
W2BVE 12,731- 147-35-A-11
WB2FFK 11,445- 111-42-A- –
K2PTI 10,028- 143-31-A- –
W2LYO 10,871- 112-39-A-12
WA2QPX 10,160- 127-32-A- 7
WB2EWI 9990- 150-27-A-30
W2ECO 9760- 122-32-A-16
WB2CST 8760- 114-32-A-37
WB2ERM 8550- 146-24-A-19
W2ZEN 8075- 95-34-A- 8
WB2EUI 6680- 84-32-A-11
WB2GKP 6420- 107-24-A-14
WN2JEE* 5753- 102-26-A-37
WN2GWT 4859- 96-23-A-36
WB2EZA 4844- 79-25-A-11
WN2FZP 4258- 79-26-A-13
WN2KSG 3525- 77-20-A-39
W2FSL 2650- 53-25-B- –
WB2EUK 2280- 48-19-A-16
W2OPE 1829- 40-19-A- 4
W2SLZ 1615- 34-19-A-10
W2GIX 1388- 37-15-A- 3
WN2JGD 1365- 43-13-A-18
W2MPP 978- 23-17-A- –
WN2JQC 509- 21-11-A- 7
WN2FYE 403- 25- 7-A-13
K2DMI 338- 15- 9-A- –
W2TJD 240- 16- 6-A- 3
WA2TOA 225- 10- 9-A- 1
WN2GFO 193- 11- 7-A- 6
W2DDT 180- 18- 4-A- 6
WA2PTS 140- 8- 7-A- 1
WN2GMK 83- 12- 3-A- 4
WN2KDB 70- 7- 4-A- 2
WA2PXL 63- 5- 5-A- 2
W2MNW 32- 8- 2-B- –
WN2GQM 12- 1- 1-A- 4
W2LWO 8- 3- 1-A- –
WA2WRB (WA2s APT JHE)
114,985- 754-61-A-40
WB2IOM (WB2s ICH IOM, WN2LKX)
193- 15- 7-A- 1

MIDWEST DIVISION

Iowa

KØGXR 146,625- 860-69-A-39
WØCXN 126,170- 682-74-A-37
KØAZJ 111,015- 683-66-A-37
WØEQN 105,358- 575-74-A-35
WAØASL 100,260- 565-72-A-35
KØVEJ 76,703- 505-63-A-38
KØBUU 74,750- 460-65-A- –
WØATA 62,144- 426-61-A-34
KØMHX 28,999- 205-57-A-15
WØBSY 28,875- 210-55-A-15
KØKGS 18,804- 154-49-A-14
WAØDGY 18,200- 140-52-A-16
WØJTC 8640- 120-36-B-20
WAØDFF 5138- 72-30-A-36
WØQVA 4686- 71-33-B- 4
KØGQY 2338- 45-22-A-16

South Texas champ, 2nd high c.w. score, all multipliers, etc. —meet W5WZQ. Dave is of the "start 'em young" theory and appears to be explaining all this SS business to his 3 year old son Mark.

WNØGTH 1296- 33-17-A- 8
WNØFSQ 225- 18- 6-A- 6
WAØFAL 10- 2- 2-A-10
KØJWL (KØs GLQ JWL, WAØDGZ)
11,609- 140-37-A-24

Kansas

KØBHM 152,075- 885-70-A-38
WØVFE 81,900- 506-65-A-38
KØKLW 76,548- 457-67-A-40
WØIEM 18,285- 333-58-A- –
WØMVG 43,656- 321-68-B-33
KØYGR 34,873- 243-58-A-25
KØEQF/Ø 25,500- 205-51-A-29
WØQNI 23,826- 192-49-A- –
KØPFV/Ø 23,040- 193-48-A-23
WAØAWX 11,025- 112-42-A-14
KØGZP 113- 8- 6-A- 2

Missouri

WØWYJ 151,585- 854-71-A-40
WØQWS 100,506- 633-65-A-40
KØZBO 92,260- 669-70-B-35
KØGSV 66,728- 433-62-A-39
KØCWP 56,806- 378-61-A-37
KØDEQ 40,480- 257-64-A-24
WØHOQ 29,340- 244-48-A-13
WAØBGV 24,500- 208-50-A-21
WAØCWV 21,615- 198-44-A-23
WØDU 20,868- 141-74-B-26
KØRNK 20,336- 172-51-A-24
KØFPC 11,055- 101-44-A- 8
WAØDGG 10,515- 112-38-A-18
WAØFND 7470- 83-36-A-10
KØJYM 6084- 81-39-B-10
KØRWL 2790- 54-24-A-18
WAØDSG 2625- 54-20-A-15
WØKIK 2460- 42-34-A- 8
KØJPL 2079- 50-21-B- 2
KØVJD 1050- 28-15-A- 2
KØETY 5- 2- 1-A- 1
WØQEV (WA9HBA, KØVJD)
9653- 99-39-A- 7

Nebraska

WØASO 196,226-1130-71-A-39
WAØDXR 21,806- 214-49-A-23
KØMUJ 10,120- 86-44-A-17
WAØEDH 1395- 36-18-A-19

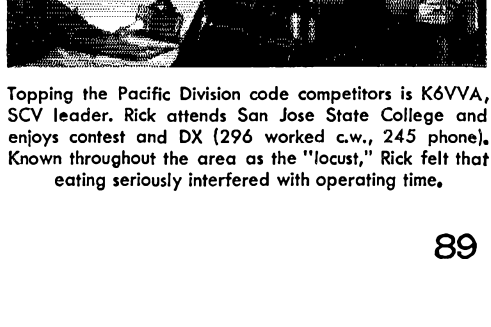
NEW ENGLAND DIVISION

Connecticut

K1ACC 101,745- 600-68-A-38
W1ICP[14] 95,676- 727-67-B- –
W1ECH[12] 92,480- 548-68-A-34
W1BIH 82,066- 560-74-B-24
K1PQS 61,945- 477-52-A-38
K1WNK 61,375- 500-50-A-40
W1IIV 54,339- 467-59-B-29
K1ZND 54,060- 453-48-A-32
W1BDI[12] 53,820- 313-60-A-30
K1SSH 48,995- 421-47-A-39
W1DDJ 39,015- 289-54-A- –
W1DIT 38,052- 303-63-B-34
W1ZJJ 35,126- 275-51-A-40
W1VG[12] 34,040- 230-74-B- –
W1FTX 32,640- 255-64-B-18
K1ZXA 30,983- 232-54-A-34
W1TS[12] 28,400- 200-71-B-23
K1PKQ 27,260- 234-47-A-23
K1ZXJ 24,480- 293-36-A-34
W1KE[12] 22,313- 175-51-A-10
K1YIG 22,100- 223-40-A-20
W1YYM[12] 21,600- 228-48-B- –
W1ADW 21,505- 187-46-A- –
W1OPB 20,580- 176-48-A-22
W1TX 18,980- 146-52-A- –
K1UUK 18,450- 206-36-A-29
K1YRP 15,448- 167-37-A-22
K1VQB 13,694- 159-35-A-21
K1UYZ 12,383- 193-27-A-20
W1IBM 9000- 100-36-A-16
K1TKS 8160- 102-32-A-12
W1EFW 5915- 86-28-A- –
K1LLJ 4054- 71-23-A- 9
W1CHR 3250- 50-26-A- 3
W1WEE 1318- 31-17-A-12
K1HKS 50- 5- 5-A- –
W1AW (W1s QIS WPR)
8288- 112-37-B- –

Maine

W1PDN 48,038- 311-63-A-39



Topping the Pacific Division code competitors is K6VVA, SCV leader. Rick attends San Jose State College and enjoys contest and DX (296 worked c.w., 245 phone). Known throughout the area as the "locust," Rick felt that eating seriously interfered with operating time.

K1NAN[13] 30,903- 266-47-A-33
K1MTJ 22,680- 191-48-A-23
K1GAX 10,450- 95-44-A-15
K1UXZ 8168- 100-33-A-21
W1NJL/1 10- 2- 2-A- 1

Eastern Massachusetts

K1DIR 124,319- 864-73-B- -
K1WJD 120,360- 709-68-A-31
K1SNO 86,360- 635-68-B-37
W1MQV 69,000- 500-69-B-33
W1EPE 55,680- 435-64-B-38
W1AQE 55,100- 382-58-A- -
W1KEE 49,336- 324-61-A-34
K1CUD 48,438- 316-62-A-30
K1RWZ 48,100- 370-52-A-35
K1ZHS 46,710- 350-54-A-36
K1ZFY 30,195- 275-44-A- -
K1UCA 26,550- 229-50-B-39
K1YKT 25,761- 280-37-A-27
K1TCE 25,650- 257-40-A-23
W1MRQ 20,460- 165-62-B-20
K1TWF 18,194- 189-41-A-24
W1RSR 16,512- 172-48-B-23
W1PLJ 16,121- 172-47-B-19
K1UDU 15,300- 225-34-B-15
K1WQY 15,161- 155-39-A-15
K1RYQ 14,220- 162-36-A- -
K1VVE 12,705- 126-42-A-14
K1SZN 10,965- 175-43-B-31
W1EOA 10,062- 129-39-B-13
K1VUT 9840- 126-32-A-22
K1RHZ 7816- 89-37-A-11
K1LAD 7685- 108-29-A-12
W1NS 4455- 56-27-B- 4
KN1FEB* 4000- 73-25-A-14
K1ZMP 3360- 56-24-A-18
W1PR[14] 3015- 70-18-A- 6
K1ESG 3000- 80-15-A-20
W1WIZ 2352- 56-21-B- 3
K1ZCI 1900- 38-20-A- 1
K1WJO 1680- 32-21-A-11
KN1ETP 1238- 37-15-A-22
K1VGM 150- 10- 6-A- 2
W1BCH (K1s OME QVT) 39,261- 332-49-A-35
W1KBN (4 oprs.) 39,159- 350-57-B-27
W1MX (5 oprs.) 38,500- 308-50-A- -
K1YNR (K1s VHS YNR) 23,125- 250-37-A-27

Western Massachusetts

W1EOB 114,172- 782-73-B-28
W1EZD 86,664- 628-69-B-34
K1IJU 50,325- 337-60-A-22
W1JYH 38,880- 270-72-B- 6
K1YMS 28,440- 320-36-A-36
K1LSW 18,620- 196-38-A-24
K1UQF 18,338- 164-45-A-32
W1AZW 13,444- 120-45-A-13
W1WF 8610- 109-41-A- 9
K1LNM 7758- 107-29-A-11
K1ITU 7688- 75-41-A-20
K1YST 3960- 88-18-A-10
KN1FNA* 2393- 52-22-A-34
W1BKG 280- 14-10-B- -
WN1AEV 90- 12- 4-A- 5

New Hampshire

W1AER 85,258- 513-67-A-38
K1AEG 70,742- 572-62-B-39
K1CXP/1 70,060- 454-62-A-39
K1NBN 64,232- 518-62-B-22
K1UHE 43,500- 300-58-A-27
K1PMY 41,456- 301-55-A-32
K1RKH 35,000- 250-56-A-22
K1BGI 20,200- 202-50-B-18
W1PEG 19,575- 224-45-B-29
W1IQD 17,625- 150-47-A- -
K1WPM 16,668- 235-36-B-24
W1BXM 6153- 107-23-A-18
W1CTW 2520- 42-24-A- -
K1MOZ 372- 16-12-B- 1
K1SIU 38- 5- 3-A- -

Rhode Island

K1LPL 126,000- 800-63-A-34
K1BAZ 43,031- 391-45-A-40
K1EWL 40,906- 303-55-A-25
W1RFQ 40,828- 350-59-B-25
K1USD 36,873- 316-49-A-27
K1BRJ 31,556- 251-50-A-31
K1DFT 26,125- 475-44-A-36
W1YNE 21,420- 211-42-A-21
K1QFI 13,448- 164-33-A-31
KN1FMT* 6598- 104-29-A-38
W1SXX 5175- 69-30-A- 9
K1JIV 5125- 82-25-A-23
WN1AGE 23- 3- 3-A- 2

Vermont

W1SWX/1 41,310- 243-68-A-21
K1UZG 39,585- 304-52-A-34
W1WFZ 30,130- 264-46-A-25
W90IJ/1 10,153- 131-31-A-12
K1IUS 4793- 71-27-A- 7

NORTHWESTERN DIVISION

Alaska

KL7CGE[15] 17,646- 179-51-B-24
KIAII/KL7 1120- 35-16-B- 2
KL7FAR (2 oprs.) 14,688- 144-51-B-14

Idaho

W7ZN 86,966- 662-67-B-37
K7KBY 56,560- 357-64-A-32
K7HLR 54,720- 384-57-A- -
K7CPC 46,655- 304-62-A-28
K7GJZ 26,810- 193-56-A-21
W7ZRF 8645- 91-38-A-21
K7PGG 6588- 88-31-A-11
W7DMP 289- 13-11-A- 4

Montana

K7CTI 134,750- 770-70-A-32
W7HAH 111,736- 647-71-A- -
W7FLB 56,606- 476-62-B-36
W7EWR 46,984- 283-67-A-25
W7EIH 40,664- 300-68-B-20
K7QCO 36,211- 250-59-A-37
K7KME 13,388- 128-42-A-13
KN7YEM* 3080- 50-28-A-24

Oregon

W7TDK 122,184- 858-72-B-40
W7DIS 100,215- 620-68-A-37
K7BPR 79,365- 487-66-A-38
W7WLL 58,370- 449-65-B-39
W7IWD 43,400- 280-62-A-29
W7FKF 22,058- 175-51-A-21
W7LD 13,581- 144-41-A- -
K7GIP 4611- 61-31-A- 9
K7RQZ 450- 16-12-A- 5
W7JAZ 48- 7- 4-B- -
KN7WPC (KN7s VJR WPC) 2274- 62-17-A-40

Washington

K7KPM 92,990- 558-68-A-40
K7KDK 89,430- 542-66-A-39
W7OEH 85,271- 601-71-B-29
K7JHA 70,070- 502-70-B-33
K7QMF 45,023- 318-58-A- -
K7UKC 40,755- 386-57-B- -
K7JRE 32,270- 232-56-A-20
K7SRI 32,063- 283-57-A-40
W7TIQ 29,810- 274-55-B-30
K7UQG 28,819- 222-53-A-34
W7JC 27,540- 257-54-B-34
K7BZE 26,765- 214-53-A-24
K7BVZ 26,000- 200-65-B-25
K7MWK 17,250- 182-40-A-31
W7GYF 13,400- 180-52-A-12
K7EKX 8235- 92-36-A-18
K7SQT 3220- 56-23-A-14
W7ETO 2405- 37-26-A- 7
W7WRT 1060- 27-16-A- 4
K7VDQ 326- 15- 9-A- 1
K7QXL (K7s IAE QXL) 21,609- 224-49-B-30

PACIFIC DIVISION

Hawaii

KH6FIF 46,004- 374-62-B-30
KH6EYP 31,388- 235-52-A-29
W2BTQ/KH6 248- 11- 9-A- 4

Nevada

K5UYF/7 165- 11- 6-A- 1
K7UGE (7 Oprs.) 101,808- 732-72-B-32

Santa Clara Valley

K6VVA 200,725-1092-71-A-34
W6UTV 186,480-1008-74-A-39
WA6GFY[16] 178,056-1252-72-B-38
WA6RXM 93,188- 545-70-A-40
W6ASH 82,344- 564-73-B-23
WA6JSA 58,650- 345-68-A-25
WA6TKV 54,844- 340-65-A-36
WA6NYK 44,588- 309-58-A-21
W6JKJ 43,218- 293-59-A-15
W6CLZ 30,326- 257-59-B-24
W6CUF 29,875- 230-50-A- 6
W6OKK 25,480- 183-56-A-20
W6KHS 22,980- 196-48-A-14
WA6HRS 11,220- 110-51-B- 6
WA6PMK 8703- 59-59-A- 9
WB6ENI 6013- 95-26-A-23
WA6VAS 3300- 66-20-A-18
WB6BIG 3245- 59-22-A- -
WA6WXL 1913- 46-17-A-13
WA6WOA 1430- 45-13-A-15
W6LDO 338- 15- 9-A- 1
W6YX (9 oprs.) 86,275- 517-68-A-40
K6BXI (K6s BXD BXI) 25,665- 184-58-A-32

East Bay

W6KG 131,328- 912-72-B-40
WA6ECF 126,180- 704-72-A-35
K4CHE/6 65,025- 435-60-A- -
WA6VAT 61,285- 361-68-A-29
WA6KLL 60,694- 386-65-A-30
WB6BID 43,463- 300-61-A-32
W6TYM 39,193- 267-61-A-11
W6VPC 11,903- 130-46-A-18
WB6ETY 6750- 103-27-A-32
K6VZH 846- 24-18-B- 7
W6FAR 105- 7- 6-A- 1
KL7DTB/6 84- 7- 6-B- -

San Francisco

W6HJK/6 86,681- 518-67-A-40
K6ANP 84,755- 506-67-A-34
W6YC 42,240- 335-64-B- -
W6VLV 41,158- 282-59-A-34
W6YKS 17,650- 180-49-A-25
WN6FZH* 8168- 107-33-A- -
K6GRX 293- 20- 6-A- 2

Sacramento Valley

W6EGX 60,461- 350-69-A-32
WA6TVA 50,250- 336-60-A-32
W6ZGM 42,665- 344-53-A-39
WB6CIN 30,135- 248-49-A-34
K6EDE 21,600- 160-54-A-10
WN6GOU 619- 24-11-A-23

San Joaquin Valley

W6BVM 110,230- 625-73-A-33
K6RTK 94,500- 540-70-A- -
WA6VML 30,870- 252-49-A-30
WA6VPN 28,025- 190-59-A-40
WA6TZN 3965- 62-26-A- 5
WN6HIL* 3255- 77-21-A-32
WN6GUX 180- 14- 6-A- 7

ROANOKE DIVISION

North Carolina

W4LYV 107,128- 590-73-A-32
WA4CXR 74,736- 519-72-B-36
W4FDV 73,815- 518-57-A-32
K4EOF 52,000- 400-52-A-31
W4EVN 50,076- 342-59-A-28
W4OMW 44,098- 288-62-A-22
W4VON[17] 37,440- 280-52-A-20
K4QWQ 10,255- 150-28-A- -
WA4EYA 2915- 57-22-A-20
WA4ICU 1656- 123-25-A-12
WA4NKY 181- 20-13-B-11
W4WE (4 oprs.) 74,499- 704-57-B-40

South Carolina

W4BWZ 83,583- 500-67-A-40
K8JAD/4 43,549- 279-63-A-27
W4JA 25,014- 189-66-B-14
K4MUP 19,580- 178-44-A-13
WA4JHD (2 oprs.) 16,500- 167-44-A-19

Virginia

W4KFC 238,893-1317-73-A-40
W4YGY 175,860- 982-72-A-32
K4PQL 134,000- 850-64-A-40
W4ZM 126,720- 704-72-A-38
W4DYT 120,359- 664-73-A-36
K4MXF 109,725- 665-66-A-34
W4BZE 102,863- 634-65-A-20
W4GF 102,850- 607-68-A-36
W4VBX 102,255- 603-68-A-34
W4TKR 101,775- 591-69-A-40
W4HTV 95,713- 589-64-A-34
K4IKF 84,720- 532-64-A-31
W4WBC 78,750- 450-70-A-35
W3DQN/4 68,460- 501-55-A-35
W4PNK 67,860- 468-58-A-16
W4DLA 67,663- 479-71-B-37
W4IMXU 63,505- 493-65-B-30
K4QKY 53,550- 389-70-B-34
W4FZG 47,585- 308-62-A-20
K4WVT 47,408- 301-63-A-25
W4CQI 46,116- 380-61-B-31
W4JAT 28,700- 205-56-A-12
W4NLC 28,376- 246-47-A-28
W4NHX 26,325- 202-52-A- -
K4VWH 25,842- 219-59-B-24
K4YAM 22,625- 188-50-A-19
W4FJ 21,375- 150-57-A-15
WA4APG 21,125- 176-50-A-30
K4JQO 18,271- 156-47-A-29
W1DYE/4 16,625- 134-50-A-10
K4UYY 15,455- 141-44-A-27
W4JUJ 14,098- 133-53-B-10
K4RDU 12,240- 205-30-B-17
K4HUU 10,280- 129-40-B-14
W4SXE 9416- 107-44-A-11
WA4HBO 7343- 90-33-A- 1
WA4KQI 6345- 99-27-A-15
W4WRG 4095- 63-26-A- 6
WA4GPJ 3125- 50-25-A- 1
W4JXD 2281- 37-25-A- 5
W4PY 1900- 40-19-A- 1
WA4CB8 1025- 49-10-A-14
W3BOA/4 893- 26-14-A- 5
WN4LNA 690- 28-12-A-30
K4T8U 650- 20-13-A- 5
WN4QGK 313- 17-10-A- 6
WN4PRF 149- 12- 7-A- 7
W4PTR 2- 1- 1-B- 1
W4KXV (K3IFKJ, W4KXV, WA4JYV) 158,760- 883-72-A-35
WA4HQW (WA4s HQW HQX) 55,860- 401-56-A-33
K4KDJ (2 oprs.) 24,490- 158-62-A-16
K4CG (4 oprs.) 9669- 112-35-A-39

West Virginia

WA8DGE 65,678- 420-63-A-33
WA8EUC 50,299- 401-51-A-40
W8HRQ 50,160- 352-57-A- -
W8LMF 30,343- 229-53-A-21
WA8FCM 19,440- 216-36-A- -
WA8FIC 17,648- 181-39-A-20
W8CKX 6432- 101-32-B- 1
WN8HMU* 2408- 61-18-A- 1
W8JWX 2130- 36-24-A- 7
WN8GOV 1520- 35-19-A-13
WN8JQU 450- 19-12-A- -
K8TNY (5 oprs.) 21,823- 203-43-A-29

ROCKY MOUNTAIN DIVISION

Colorado

KØSLD 170,298- 963-73-A-40
KØVFN 106,420- 634-68-A-39
WØMYB 66,495- 404-66-A-33
WØETT 50,274- 401-63-B-18
WAØADE 25,688- 223-50-A- -
WØHTH 13,524- 138-49-B- 6
KØMNQ 2730- 44-26-A-20
WAØBXH 2386- 45-23-A- 9
WNØHIR 1170- 26-18-A-10
KØLMD 585- 19-13-A- 1
WØYQ (KØRTI, WØDXF) 58,000- 402-58-A- -
WØANA (WØETT, KH6CKJ) 2640- 44-30-B 2

Utah

W7QDM 107,284- 648-67-A-39
K7RAJ 94,180- 559-68-A-33
W7POU 47,038- 272-71-A-33
K7TEO 39,875- 300-58-A- -
W7BAJ 20,790- 189-55-B-10

New Mexico

W5CK 133,924- 762-71-A-37
K5STL 84,008- 492-69-A-22
K2JAD/5 24,684- 202-49-A-27
WN5IFX 666- 23-13-A-11

Wyoming

W7HRM 33,992- 304-56-B-14

SOUTHEASTERN DIVISION

Alabama

K4CFD 159,750- 944-71-A-38
WA4FAT 114,540- 825-69-B-40
W4USM 82,335- 506-66-A-28
W4NML 75,485- 488-62-A-39

VE8RH helped supply that elusive Yukon-N.W.T. multiplier and found conditions generally bad although VE8 c.w. activity plentiful.

K4ANB 37,510- 216-62-A-27
W4DS 22,275- 162-55-A-26
K4WOP (K4s BSK WOP) 10,925- 115-38-A- 7

Eastern Florida

WA4NGO 235,875-1286-74-A-40
W4DQS 197,580-1068-74-A-40
W4JTA 120,413- 752-65-A-40
K6SXX/4 102,300- 620-66-A-34
W4WYJ 100,470- 596-68-A-22
WØYFT/4 97,981- 645-61-A-32
W4KET 92,711- 560-67-A-32
W4BRB 74,649- 500-61-A- –
W4NTE 27,675- 205-54-A-31
WA4JKS 25,358- 227-46-A-27
W4DXL 23,660- 184-52-A- –
K4RQE 22,588- 139-65-A- –
K4KDN 20,981- 187-45-A- 9
WA4LCO 18,813- 154-50-A-24
W4ZOK 18,240- 160-57-B-38
K4EN 17,880- 149-48-A-20
WA4FKJ 12,653- 129-42-A- 8
W4CKB 10,952- 74-74-B-15
W4BSW 9090- 102-36-A-11
W4SMK 8769- 120-37-B- 7
WA4VU 7683- 100-39-B-12
WN4MCV* 6758- 88-34-A- 1
WA4HFB 6308- 83-38-B-24
WN4RPL 3255- 62-28-A-34
WN4OHO 3088- 61-26-A-23
WA4JYB (WA4s IXI JYB LBM) 28,178- 229-51-A-19

Western Florida

W4JJ[18] 140,799- 802-73-A-37
W4SRX[19] 91,348- 608-61-A-36
WA4IMC 21,000- 168-50-A-20
WA4IIF 17,273- 185-42-A- 1

Georgia

K4TEA 203,500-1101-74-A-40
K4BAI/4 86,880- 545-64-A-40
W4HOS 37,290- 226-66-A-26
W4WKP 21,908- 191-46-A-20
WA4FTM 20,591- 161-51-A-26
WA4HHK/4 18,660- 160-48-A-37
WA4GAY 18,546- 221-37-A-27
W4DXF 16,600- 168-40-A-16
W4HYW 5004- 71-36-B- 8
WA4JOB/4 2800- 60-20-A-12
WA4CJN 2778- 51-22-A-14
W8KNP/4 2003- 45-18-A- 3
WA4JEV 1163- 31-15-A- 5
WN4MMH 800- 39-10-A-17

West Indies

KP4BJU 16,826- 179-47-B- 7

SOUTHWESTERN DIVISION

Los Angeles

W6SBB 161,100- 901-72-A-40
K4PUZ/6 146,548- 807-73-A-40
W6NKR 102,565- 563-63-A-36
W6TGP 99,900- 556-72-A- –
WA6NON 96,350- 542-71-A-36
WA6TEV 92,650- 545-68-A-25
K3VPF/6 82,775- 485-70-A-37
WA6CRN 82,748- 502-66-A-37
K6STI 80,580- 480-68-A-32
W6OEO 77,187- 477-65-A-40
W6OIV 71,264- 524-68-B-35
K6VNX 68,816- 507-68-B-37
W6LS[20] 68,805- 417-66-A- –
WA6KHK 62,720- 400-64-A-40
WA6ZJC 60,085- 395-61-A-35
WB6AKZ 59,379- 368-67-A-28
K6LCQ 51,678- 398-66-B-40
WB6BIV 42,910- 312-56-A- –
WA6YLW 42,775- 290-59-A-30
W6QIL 40,635- 258-63-A-27
W6VNJ 40,326- 310-66-B-14
K6UYK 36,250- 250-58-A-21
WA6YBE 32,620- 244-56-A-26
WA6DPW 27,500- 220-50-A-17
WB6DEJ 24,500- 200-49-A-20
WB6CEG 21,125- 166-52-A-13
K6ELD 20,273- 154-53-A-17
WA6TMY 18,200- 150-52-A-26
K6HCY 16,700- 167-50-B-12
WB6ARH 15,620- 143-44-A-38
WB6DHG 15,600- 162-39-A-26
WA6MKW 15,136- 195-43-B-17
WB6CLY 12,800- 163-32-A-28
WB6AGT 8288- 112-30-A-14
WA6SLF 8099- 105-31-A-24
WA6UHL 7590- 96-33-A-19
K6DGX 6755- 100-35-B-12
WB6AHY 5894- 103-23-A-14
WB6GHK 2644- 74-15-A-20
WN6CXR* 2300- 54-20-A- 1
WA6USQ 1658- 51-13-A- 6
WN6DWO 1610- 48-14-A-17
WN6GEL 488- 22-10-A-15
WA6VMX 375- 13-12-A- 5
K6RMF 220- 12- 8-A- 3
WB6ETG 175- 10- 7-A- 1
WN6FUF 88- 8- 5-A- 1
WA6TWA 63- 5- 5-A- 1
K6YFZ 3- 1- 1-A- 1

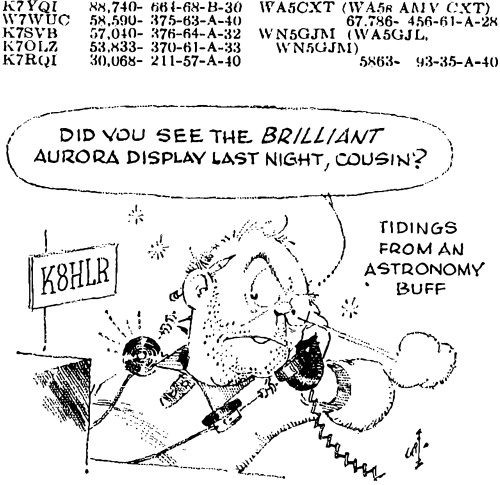
WA6WZD (WA6s WOY WZD) 59,133- 391-62-A-40
WA6LYL (K6s OPI QIP, WA6IKA) 39,525- 261-60-A- –
WN6DDS (WB6DWS, (WN6DDS) 1890- 50-18-A-16
WN6IAB (WN6s GNE IAB) 1591- 37-19-A-13
WA6UUN (4 oprs.) 1306- 28-19-A- 7

Arizona

W7ZMD 144,041- 820-71-A-34
K7YQI 88,740- 664-68-B-30
W7WUC 58,590- 375-63-A-40
K7SVB 57,040- 376-64-A-32
K7OLZ 53,833- 370-61-A-33
K7RQI 30,068- 211-57-A-40

Southern Texas

W5WZQ 253,173-1389-74-A-39
W5LZG 103,155- 611-69-A-27
WA5IHE 101,725- 635-65-A-36
W5LJT 81,420- 602-69-B-25
K5COU 76,883- 463-67-A-33
WA5ANS 60,000- 381-64-A-24
K5SPM 48,951- 265-63-A-17
WA5DDC 9116- 108-39-A-21
WA5AOO 5180- 80-35-B-12
WA5CJC 4463- 61-30-A-10
WA5ENK 2730- 44-26-A-22
WN5GYW* 1955- 40-23-A-30
WN5GZX 1206- 73-13-A-32
WA5CNR 128- 9- 6-A- 2
WA5CXT (WA5s AAIV CXT) 67,786- 456-61-A-28
WN5GJM (WA5GJL, WN5GJM) 5863- 93-35-A-40



W7KRW 28,910- 241-49-A-19
K7PSU 22,125- 177-50-A-27
K7KYQ 20,350- 189-44-A-28
K7WQO 15,941- 180-39-A- –
K7KGG 9135- 87-42-A- –
K7NHL 8835- 94-38-A-19
K7VUB 2389- 48-21-A- 9
KN7YQE 645- 26-12-A-17

San Diego

K6ASL 235,970-1277-74-A-38
W6JVA 88,750- 503-71-A-27
W6LRU 61,250- 350-70-A- –
WA6RUS 57,195- 369-62-A- –
K6MSG 54,900- 368-60-A-26
WA6WOZ 50,400- 320-63-A-40
WB6CGP 45,300- 308-60-A-34
WB6BRN 27,478- 190-58-A-30
WA6WVM 23,085- 182-57-A-19
K6EJK 11,305- 121-38-A-23
WB6HTH 4640- 58-32-A-15
WN6GKG* 914- 21-17-A-10
WA6LBP 699- 25-13-A-12
WN6GMM 550- 22-10-A- 1
WN6HPJ 320- 16- 8-A- –
W6YZD 171- 10- 9-B- 1
WA6PIB (WA6s PDE PIB) 52,195- 415-65-B-37

Santa Barbara

WA6OJM 78,574- 459-69-A-36
W6YK 77,106- 549-71-B-40
K6LBV 64,488- 390-67-A- –
W6GEB 44,080- 304-58-A-21
W6MLD 34,856- 255-55-A-36
K6LZU 23,386- 179-53-A-27
WB6GZE 20,797- 180-47-A-18
WB6DPV 17,888- 162-45-A-23
WA6KQD 248- 11- 9-A- 6
K6NCT (WA6UHF, W9YXX) 123,855- 718-69-A-40

WEST GULF DIVISION

Northern Texas

K5RHZ 199,800-1110-72-A- –
W5DWT 171,110- 969-71-A-33
K2EIU/5 165,510- 922-72-A-39
K5VLN 72,056- 474-61-A-17
K5BXG 66,665- 400-67-A-32
K5ZA1 65,894- 441-65-A-28
W5LMI 13,455- 121-46-A-11
WA5BXK 9548- 102-39-A-17
K5SOD 8775- 102-39-A-15
K3ZNP/5 5025- 66-30-A-22
K5YNJ 2271- 42-23-A- 4
K5PXV 1860- 32-21-A- 4

Oklahoma

K5OCX 184,860-1043-72-A-39
W5EUL 67,403- 418-66-A-37
W4SKI/5 43,950- 293-60-A-36
WA5DTM 12,735- 148-43-A-17
W5YJ 11,790- 139-45-B-20

Quebec

VE2AYU 35,616- 343-53-B-34
VE2BOW 17,670- 186-38-A-23
VE2AQJ 2975- 67-25-B- –

Ontario

VE3AWE 104,276- 605-69-A-38
VE3UOW[21] 104,018- 604-69-A-40
VE3BHS/3 94,545- 576-66-A-40
VE3DUR 91,874- 552-67-A- –
VE3TT 81,855- 482-68-A-38
VE3BPJ 53,944- 343-63-A-38
VE3AR 48,038- 310-63-A-19
VE3AU 45,120- 357-64-B-27
VE3BC 38,175- 258-60-A-40
VE3ACB 37,820- 248-61-A-25
VE3ON 31,200- 262-48-A-20
VE3DH 23,100- 166-56-A-14
VE3CKW 3589- 50-29-A- 5
VE3FHQ 1159- 31-19-B-16
VE3CNA 910- 28-13-A- 5
VE3EZM 70- 7- 4-A- 1
VE3UOT (5 oprs.) 47,850- 423-58-B-32
VE3RIT (7 oprs.) 16,848- 156-54-B-34

Manitoba

VE4UF 5310- 59-36-A- –
VE4UM (5 oprs.) 35,018- 250-58-A-30

Saskatchewan

VE5VP 66,000- 418-64-A-38
VE5JI 43,439- 301-59-A-31

Alberta

VE6MIC 50,453- 330-62-A-38
VE6AKV 9870- 105-47-B-26

British Columbia

VE7AGX 26,055- 200-54-A-30
VE7ZO 20,654- 206-41-A-35
VE7AGN 8543- 105-34-A-14
VE7BBL (VE7s BBL BNG) 31,135- 215-52-A-33

Yukon-N. W. T.

VE8DX 25,365- 180-57-A-20
VE8KH 14,504- 151-49-B-18
VE8CW 8921- 97-39-A-30
VE8DL 7452- 108-36-B-28
VE8XM 1058- 31-18-A-10

CANADIAN DIVISION

Maritime

VE1MX 48,749- 333-59-A-30
VE1AJH 13,735- 140-41-A-26
VE1DB 3835- 59-26-A- –
VE1AE 1640- 41-16-A- –

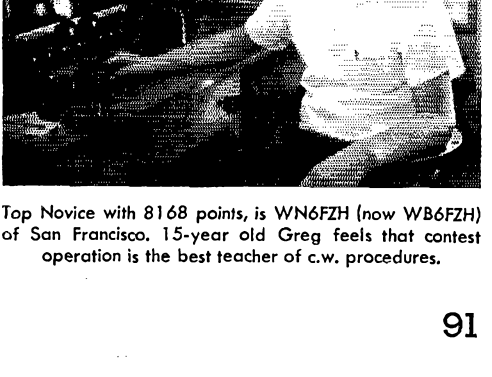
[1] K3JJG, opr. [2] W9SZR, opr. [3] W3IPO, opr. [4] W9YYG, opr. [5] W9AVZ, opr. [6] W8APN, opr. [7] W8CQN, opr. [8] W1CWU, opr. [9] K2SIL, opr. [10] W8YPT, opr. [11] W1YNP, opr. [12] Hq. staff, not eligible for award. [13] WA2NPU, opr. [14] K1SNB, opr. [15] WB6CNN, opr. [16] W7WJB, opr. [17] K8MTI, opr. [18] K4VFY, opr. [19] K1HZE, opr. [20] W1SAD, opr. [21] VE3FUX, opr.

Phone Scores

ATLANTIC DIVISION

Eastern Pennsylvania

K3RFH 50,481- 356-71-B-31
K3HYT 40,656- 242-56-A-28
K3MNT 36,143- 200-61-A-24
K3TGM 25,500- 170-50-A-23
K3SYV 21,318- 189-38-A- –
W3EWE/3 20,286- 139-49-A-31
K3TLY 15,990- 130-41-A-21
K3JXC 14,832- 103-48-A-18
K3PSW 14,025- 94-50-A-17
K3RSL 10,452- 136-26-A-16
K3IOK** 7470- 211-12-A- –



Top Novice with 8168 points, is WN6FZH (now WB6FZH) of San Francisco. 15-year old Greg feels that contest operation is the best teacher of c.w. procedures.

K3TYL 6800- 100-34-B-26
K3DUW 2751- 131- 7-A- –
K3VVG 1778- 40-15-A- 6
W3QIR 1558- 41-19-B- 3
K3LKB 1275- 25-17-A- –
K3TSG 1248- 32-13-A- –
KN3ZMJ 1035- 58- 6-A-19
K3TPS 864- 72- 4-A- 8
W3RAE 630- 21-10-A- –
K3NIL 549- 61- 3-A-27
W3PWC 525- 25- 7-A- 4
K3SOF 345- 59- 2-A-20
W3BRU 300- 25- 4-A- 5
K3LBI 288- 12- 8-A- 4
K3ZPL 234- 39- 2-A-31
K3ZAB 216- 36- 2-A- 9
W3BPM/3 30- 5- 2-A- –
K3DUY 23- 8- 1-A-35
W3ADX 12- 4- 1-A- 1
K3KLQ (K3s DVS KLQ)
100,913- 518-65-A-33
K3SUI (K3s SUI TVG)
7068- 80-31-A-22
K3YFD (K3s IHA WHX, W3LUW) 5598- 156-12-A- –
K3PWM (K3s MHD PWM)
174- 29- 2-A- –

Md.-D. C.

W3ZKH 150,660- 701-72-A-39
K3SZZ 59,535- 315-63-A-22
W3KMV 41,498- 254-55-A-37
K3VTZ 22,050- 183-42-A-38
W3OTC 14,207- 116-41-A-22
K3OGS 12,360- 103-40-A-15
W3ZVJ 6864- 88-39-B-40
K3VEM 4437- 51-29-A-21
K3SKU 3362- 45-27-A-13
K3QDC 1230- 42-15-B- 2
K3LFN 624- 16-13-A- 2
W3HB 446- 17- 9-A- 4
K3VTD 50- 20- 1-A-11

Delaware

K3NMY 32,700- 277-90-B-24
K3NVV 576- 16-12-A- 5
K3YHR 9- 2- 2-A- –

Southern New Jersey

WA2IZS 68,250- 325-70-A-35
WA2EIY 60,450- 310-65-A-31
WA2GSO 47,430- 255-62-A-22
K2OYE 35,256- 229-52-A-32
W2ORA 30,150- 202-50-A-34
K2PZF 29,940- 250-60-B-23
W2LBX 22,350- 149-50-A-33
WA2NEO 12,695- 110-39-A-19
K2DNA 12,078- 92-44-A- –
W2BLV 7995- 65-41-A- 9
W2EEL 6840- 60-38-A- –
WB2BNE 2940- 140- 7-A-24
WA2WMA 960- 64- 5-A-10
WN2KVC 773- 52- 5-A-12
WA2IEK 594- 18-11-A- 1
K2SXN 102- 17- 2-A- 4

Western New York

W2VDX 68,055- 349-65-A-35
WA2KTI 55,188- 292-63-A-40
WA2WMT
30,597- 218-47-A-24
WA2SEU 24,696- 205-42-A-23
WA2SNI 20,500- 206-50-B-33
WA2PQG 18,000- 150-40-A-34
K2CEI 14,469- 138-53-B-15
K2GXI 11,040- 92-40-A- –
WA2STD 10,464- 109-48-B-34
WA2AIL 9999- 101-33-A-10
WA2IKC 6032- 104-29-B- –
WA2KND 5670- 70-27-A-16
WA2OKG 3058- 70-22-B- 6

K2UCI 2912- 56-26-B-22
W2CZT 2132- 41-26-B- 5
WA2KVN 2112- 45-16-A- 9
WA2KIZ 855- 19-15-A- 3
WA2KMI 816- 24-17-B- 5
W2AMY 800- 25-16-B-10
WA2YFO 130- 13- 5-B- 2
WA2HWC 33- 11- 1-A- 1
WB2IRK 15- 5- 1-A- 1
WA2QMJ 6- 2- 1-A- 1
WB2CON 5- 2- 1-A- 1
K2ZCD 2- 1- 1-B- –
K2IML (K2IML, WA2YFO)
34,974- 201-58-A-24
WA2DVW (2 oprs.)
24,480- 183-48-A-24

Western Pennsylvania

K3SIQ 47,397- 259-61-A-31
W3SMX 27,783- 173-54-A-27
K3NOD 18,968- 140-45-A-21
K3KKI 3556- 64-28-B- 7
K3UIZ 990- 30-11-A- 5
K3NXO 375- 13-10-A- 3
K3UTR 360- 13-10-A- –
W3ZVA 3- 1- 1-A- 1
K3ELL 2- 1- 1-B- 1

CENTRAL DIVISION

Illinois

K9BGL 116,382- 574-68-A-40
K9VKH 109,206- 506-72-A-34
K9ZHN 57,330- 324-60-A-37
W9AJX 53,619- 293-61-A-40
K9ZBI 50,798- 280-65-A-28
K9BZV 47,603- 290-55-A-39
W9RHV 44,073- 249-59-A-34
K9MQI 42,966- 347-62-B-34
K9ZJV 29,400- 175-56-A-33
K9VFA 26,400- 176-50-A-15
W9PBY 25,546- 241-53-B-24
W9ATU 25,480- 230-56-B-20
WA9DKM 25,146- 128-66-A- 9
K9VSL 23,232- 183-64-B-19
K9WJS 22,320- 155-48-A-16
K9ZCT 21,889- 211-53-B-31
W9QXO 20,511- 132-53-A-23
W9GQY 20,196- 154-44-A-24
K9TAW 19,188- 123-52-A-20
W9OKM 16,720- 152-55-B-13
W9JJT 16,488- 115-48-A-15
W9JMY 13,806- 120-39-A-13
WA9CDI 12,816- 90-48-A-37
WA9CCQ 10,472- 91-39-A-10
W9NZS 9765- 78-42-A-16
W9CRN 9417- 72-43-A-16
W9ZYL 7728- 92-42-B-19
K9KHZ 7326- 66-37-A-10
K9JAW 6396- 78-41-B-12
K9VGT 4836- 58-36-B- 9
K9VYD 3996- 56-36-B- 4
W9PNY 3726- 46-27-A-14
WA9DCQ/9
2700- 36-25-A-10
W9PVT 2340- 30-26-A- 9
W9QDM 2214- 41-27-B- 3
W9TLC 1326- 34-13-A- 5
K9MSD 936- 20-16-A- 8
K9TBA 897- 23-13-A- 5
K9ZXB 858- 22-13-A-12
WA9GQT 840- 18-16-A- –
WA9PIH 594- 22- 9-A- 6
W9ECY 448- 16-14-B- 2
W9AJF 351- 13- 9-A- –
K9KKX 135- 9- 5-A-30
WN9KDM 63- 21- 1-A-10
K9TBZ 27- 9- 1-A- –
WN9IEU 9- 3- 1-A- 2
WA9CHG 3- 1- 1-A- 1
WA9BQF (WA9s BQF EKZ)
9666- 90-36-A-25

The U. S. Coast Guard Radio Station K4CG was manned by (left to right) WN4PRJ KN3WUW WN4PEE and WN4PDA (absent) during the SS. Equipment used was an Eico 720K/HQ-180 with dipoles on 80, 40 and 15.

Indiana

W9AQW 111,792- 559-68-A-40
K9PNV 100,800- 480-70-A-35
K9MAN 37,296- 261-48-A-16
WA9BWY 25,839- 163-54-A-20
W9EPI 25,137- 147-57-A-27
WA9CQG 23,006- 161-49-A-30
WA9BRD 21,546- 200-54-B-25
W9BUQ 19,278- 118-54-A-25
W9BF (6 oprs.)
53,196- 290-62-A-31
W9YB (8 oprs.)
37,050- 325-57-B-36
K9IXS (W9s AVZ FQN, WA9DFV)
3000- 41-25-A- 6

Wisconsin

W9VSO 46,410- 357-65-B-18
W9VZP 17,066- 161-53-B-11
K9VYM 15,582- 106-49-A-28
W9YT 13,590- 151-45-B- 5
K9LWV 2679- 17-19-A-10
WA9FBS 450- 15-10-A-16
K9JPS 221- 11- 7-A- 4
K9VER 136- 9- 8-B- 2
W9HHX (5 oprs.)
44,750- 464-50-B-31
K9AQF (K9s AQF CJP)
23,616- 164-48-A-17

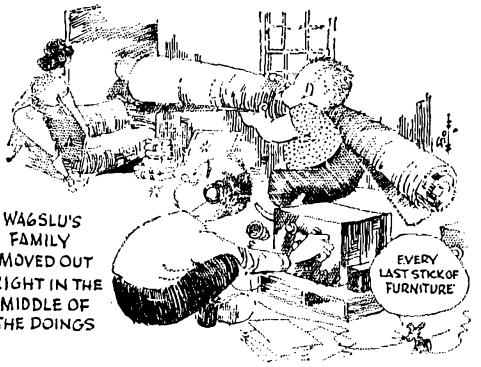
Tennessee

WA4AWG 66,360- 317-70-A-32
W4BBL 54,471- 409-67-B-19
K4LTA 45,384- 248-61-A-16
K4FJR 43,920- 244-60-A-32
K4UMC 36,928- 294-64-B- –
WA4DCP 34,240- 269-64-B-19
W4OGG 31,200- 260-60-B- –
K4AAE 24,539- 145-57-A-16
W4VRD 15,309- 122-42-A-15
WA4CUQ 14,648- 110-45-A-16
WA4FJH 13,068- 105-44-A-20
W4DNN 12,600- 100-42-A-17
K4IJG 10,271- 96-41-A-18
K4VOP 7722- 78-33-A-12
W4ZJA 3420- 48-24-A- 8
W4IGW 2160- 37-20-A- 5
WA4EPF 663- 17-13-A- 3

GREAT LAKES DIVISION

Kentucky

K4RZK 43,338- 350-62-B-31
W4BCV 18,368- 167-56-B- 5
K4ZQR 13,520- 130-52-B-11
WA4AXL 12,558- 91-46-A-11
W4VWU 4998- 60-42-B- 9
K4ZPN 2145- 35-22-A-19



DAKOTA DIVISION

North Dakota

KØKLU 87,251- 425-69-A-34
WØCGM 41,808- 312-67-B-27
KØVWG 41,015- 316-65-B-40
KØRSA 32,480- 186-59-A-19
WØIDH 22,797- 229-51-B-16
KØFRP 14,214- 103-46-A-39
WØHCO 8213- 96-43-B- –
WAØAAD 1040- 40-13-B- 2
WØCZL 855- 19-15-A- 4
WAØEWW (K9VFY, WAØEWW)
30,580- 278-55-B-22

South Dakota

WØPRZ 80,408- 381-71-A-25
WAØCPV 15,228- 111-47-A-16
KØWPC 6426- 59-60-A- 9
WAØDXL 6171- 62-34-A-22
WØHSC (KØRRZ, WØCZL, WAØFWC)
280- 14-10-B- 4

Minnesota

KØKWK 41,571- 244-62-A-27
KØQVF 17,100- 114-50-A-17
WØRYM 6160- 72-44-B- 7
WAØCAE 5301- 62-31-A-28
WAØALF 819- 21-14-A- 4
WAØFUR 378- 14- 9-A- 4
WØCIV (5 oprs.)
87,134- 441-67-A-40

DELTA DIVISION

Arkansas

K5ALU 125,670- 600-71-A-37
W5CGR 69,207- 504-69-B-34
WA5AER 16,383- 130-43-A-15

Louisiana

W5KC 149,100- 733-70-A-36
WA5BVR 50,368- 400-64-B-18
WA5ALI 41,828- 257-55-A-10
K5LNW 40,410- 226-60-A-30
K5UNP 15,795- 117-45-A-15
W5MAR 9090- 103-30-A- 8
W5LHS 6435- 66-33-A-16
W5QPS 1890- 35-18-A- 6

Mississippi

K5MDX 223,332-1006-74-A-26
W5YE (4 oprs.)
32,712- 287-58-B-37

(*Continued on page 170*)

Michigan

W8QFM 58,497- 317-62-A-40
K8YRO 56,430- 437-66-B- –
K8GPC 52,800- 276-64-A-39
K8QJH 40,622- 232-59-A-24
W8RXY 37,200- 200-62-A-18
WA8ASV 36,816- 208-59-A-32
WA8ETC 24,750- 150-55-A-24
K8LJD 20,178- 173-59-B-25
W8ARH 16,899- 131-43-A- 8
K8SFZ 14,319- 113-43-A- –
K8AKZ 13,200- 110-40-A- –
K8YGW 8910- 110-27-A-12
WA8ECD 7614- 86-36-A-15
W8TWA 6475- 88-37-B-10
K8SGA 4125- 55-25-A-20
W8QQL 3915- 45-29-A-11
WA8FRD 2340- 39-20-A-12
K8ZKH 2295- 45-17-A- 7
K8ZJU 1998- 37-18-A-11
W8FSZ 1292- 34-19-B- 5
K8BEB 264- 11- 8-A- 7
WA8CIE 195- 33- 2-A- –
WA8FRE 2- 1- 1-B- 2
K8NIH (K8s BBM NIH)
24,544- 208-59-B-40
WA8CQR (K9s ULF WMM)
663- 17-13-A- 2
WA8CUS (WA8s CUS JID)
123- 41- 1-A-22

Ohio

K8AAG 68,640- 352-65-A-31
W8DSI 48,642- 365-67-B-31
W8KDW 39,930- 243-55-A-14
W8ILC 38,940- 220-59-A-16
K8RFU 38,903- 228-57-A-26
K8JOR 36,540- 210-58-A-23
W8HQK 35,910- 286-63-B-25
W8EQA 28,215- 209-45-A-22
W8SUS 24,120- 201-60-B-17
WA8EFP 23,484- 206-57-B-23
K8BSV 21,672- 129-56-A-10
K8PBE 21,587- 180-41-A- –
W8SJU 20,064- 152-44-A-33
W8KCK 15,376- 124-62-B-14
W8OAC 15,100- 151-50-B-19
W8CHX 14,735- 105-47-A-17
WA8FQW 13,832- 182-38-B-26
W8BSR 13,163- 115-39-A-31
K8ZPF 13,068- 99-44-A-14
K8YFR 12,173- 130-47-B-15
WSBGO/8 12,168- 106-39-A-17
K8LCN 10,440- 87-40-A- 9
W8IQT 10,152- 108-47-B- –
W8AJW 9828- 85-38-A- 7
W8EUK 7990- 85-47-B-13

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

A FEW YEARS BACK, we had some very interesting correspondence with another amateur on the subject of "volunteers." This amateur objected to the use of this word applied to amateurs. "Some of our most stringent rules," he said, "can be found in amateur sports. But these amateur sportsmen do not consider themselves 'volunteers'; they participate in amateur sports because they like it."

Is a volunteer, then, necessarily one who agrees to perform a certain task, knowing that it will be distasteful? Not according to Noah Webster, it isn't. This authority states that a volunteer is "one who enters into or offers himself for a service of his own free will." According to that definition, we are certainly a bunch of volunteers. And still, our correspondent had a point. There is a difference between the volunteer who steps forward to perform a disagreeable military mission and the amateur who volunteers for participation in public service work. Our correspondent on the above occasion objected to the use of the word because he felt it connotes a kind of sacrifice, and he didn't consider his work as such; ergo, he wasn't a volunteer.

This brings us back to the old subject of amateur radio "fun" *versus* duty and responsibility as an incentive for the things we do with our hobby. Some critics have told us that we are going about our public service organizing in the wrong way because we put too much emphasis on our obligation to perform a service and not enough on having fun and *making* it fun. If we could make our emergency and traffic nets places for friendly rivalry, exercise of skills and just plain jolly good fellowship *as well as* for performing a public service, a great many more amateurs than now would participate — so goes this thinking.

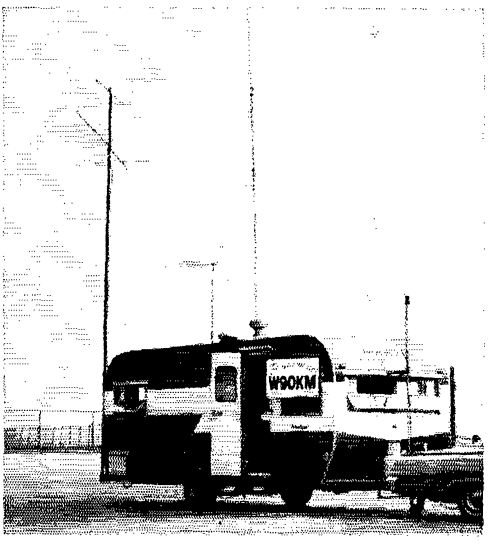
We are sure that this is so; in fact, we *can* think of several nets that are heavily populated by participants for just this reason. To all outward appearances, these networks are doing their job for amateur radio and their participants are thoroughly enjoying it. They get some traffic handled, in emergencies they are all quite active, and they get a *lot* of publicity — much more than the net that sticks strictly to business. The public doesn't usually appreciate the difference between an efficient net and one which is having a lot of fun but nevertheless doing its job — after a fashion. So why go all out to emphasize efficiency at the sacrifice of camaraderie and fun?

The values inherent in rendering a service are so many and so varied that it is difficult to meet this question squarely. We think the answer revolves mainly around *the actual service performed.* If we can divorce the question from all other considerations, we see quite plainly that the net which emphasizes efficiency and sticks strictly to business inevitably is capable of performing the greater service. Moreover, such a net attracts as participants mainly those operators who get their kicks (fun?) from using their operating skill, from knowing they are doing something useful, and from associating with other operators with like incentives. The net devoted primarily to good fellowship and sensationalism may attract more amateurs and get more publicity and public appreciation when the chips are not down; but there is no fraternity so close-knit as one whose members not only enjoy each other's company but who are proud of themselves and proud of each other in a dedicated service performed.

We think that there is room for and need for both types of operators and nets. Personally, we admire most those who separate fraternalism from service, but it is far better for an operator to be associated with a net partly devoted to service, for social or other reasons, than not to be associated with the service aspect of amateur radio at all. Just between us amateurs, however, let's not kid ourselves as to who is performing the greater public service.

Diary of the AREC

On July 19, Niles and Buchanan, Mich. were struck by a storm that kept the AREC, RACES and the Red Cross busy for the entire night and on into the next day. W8QQO



This mobile ham shack belonging to W9OKM was used by the AREC in Joliet, Ill. during their "Operation Lifeline" in which they provided communications aiding the transfer of patients from one hospital to another on Jan. 26.

* National Emergency Coordinator.

reports the following stations participating: *W8s* OFG LUH QQO MAI, *K8s* HYG ORY TZQ UYH. — *W8QQO, EC Berrien County, Mich.*

— • • • —

On Oct. 27, W9GJR received a phone call from a friend in Elgin, Ill. asking for help in locating a man to inform him of the sudden death of his brother. The man's name, the type, color, and license plate number of the car were known, and the fact that he was on his way to Florida pulling a trailer with a scheduled stop-over at a trailer factory in Jackson Center, Ohio, were the only facts known. On his second CQ, K8HGD answered, and advised that she was 25 miles from Jackson Center. K8HGD then called a representative of the trailer factory who in turn advised the party of the death of his brother. — *W9GJR*

— • • • —

On January 8, K5KZQ received a call from K5MWC informing him of a railroad train derailment and fire near Spring, Texas. Several tank cars had ruptured, spraying the wooded area with high octane fuel. Fire fighting equipment was dispatched to the scene, and WA5BUV and K5IIRX were also on hand to provide communications from the disaster area. The AREC net was activated with several Texas and Louisiana stations reporting in and standing by to aid in communications. Those participating were: *W5s* TCV TGA IHD AIR, K5ARA and WA5DZH. — *K5KZQ, Asst. EC Harris County, Texas*

— • • • —

During the last week of February, K1GHT provided direct communications between doctors in Boston and Ecuador so they could consult on treatment of a patient recovering from an unusual hand-graft. — *K1ZFL.*

— • • • —

July 18, 1963, Louisville, Ky. was the scene of a search for two boys who were believed lost, but it soon appeared that they were runaways. The AREC along with other groups were activated, and the boys, finally found, were returned to their homes.

— • • • —

The following is a thumbnail résumé of reports of various non-emergency activities in which amateurs participated but which we are not able to report in detail for reasons of lack of space. Chronologically, then:

Sept. 21–22 — The AREC of Calgary, Alberta provided communications for the Boy Scouts at Camp Gardiner.

Oct. 5 — In Aurora, Ind. the Dearborn County Amateur Radio Net provided routine communications for the Aurora Farmers Fair parade.

Oct. 20, 27 — The AREC in Rhode Island was activated to supply communications and courier service between clinics, state control and supply depots for the End Polio Clinic.

Oct. 25 — Eleven amateurs provided communications for the University of Wisconsin/Milwaukee Homecoming parade.

Oct. 29–31 — Nine AREC members aided the Sayreville, N. J. police in patrolling the streets.

The Central Illinois Amateur Radio Club of Bloomington, Ill. was on hand to patrol the streets and break up several groups of would-be vandals.

The AREC of Clyde, N. Y., aided the auxiliary police on each of three nights to curb vandalism.

The West Deptfron, N. J., AREC supplied five mobile units to augment police patrols and report vandalism.

The AREC of Burlington, Mass., received a letter of commendation from the Acting Chief of Police for their work on Halloween night.

Twelve mobile and one base station aided police in curbing vandalism in metropolitan Contra Costa County, Calif.

Nov. 3 — The South Kingston, R. I., AREC gave a demonstration of amateur radio communications to the Boy Scouts at Camp Aquapaug.

Nov. 7 — W9KQD gave a demonstration of c.w. communications to the Boy Scouts of Milwaukee, Wis.

Nov. 11 — The St. Clair County ARC, Egyptian ARC, Radiops ARC and St. Clair County, C.D., Ill., manned some 31 vaccination stations in a mass polio vaccination program.

Nov. 13 — "Operation Chessboard" was staged by members of the Lansing, Mich., AREC. Communications were provided between hospitals in a test of preparedness.

Nov. 16 — Members of the Baltimore Area AREC provided communications for the Maryland Cross Country Meet.

Dec. 2 — The AREC of Sebastian County, Ark., took part in a pickup and delivery service for donations to the Muscular Distrophy Fund.

Dec. 14 — In Henderson, Ky., and Evansville, Ind., the AREC assisted the local YMCA for the seventh year in a "Santa Clothes Drive."

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K3KGF, SCM of Delaware, reports "Operation Holiday Greetings" a big success. Mobile units of the AREC were set up in various shopping centers as traffic was accepted from shoppers. This traffic was relayed to the control center, and then on to NTS. Is this a possible means of getting more AREC men to handle more traffic? — *K3KGF, SCM Delaware.*

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On Dec. 24, K6MDD played Santa Claus for the 6th annual band opening to the North Pole sponsored by the SoCal Six Net. Children in the neighborhood of the members of the net spoke to Santa. — *W6GZY*

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WØALA of Wichita, Kansas, provided communications for a family to their daughter who is in the National Foundation for Asthmatic Children at Tucson, Ariz. on Dec. 25. This was part of a larger project by K7LJY to allow some 60 children in the Foundation to speak to their families on Christmas.

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District 4 C.D. of Brattleboro, Vt., furnished communications during an "accident" drill held in December. Communications lines were set up between the scene of the "accident," police headquarters, and the local hospital. — *W1FPS, Asst. RO Brattleboro, Vt.*

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On Feb. 2, the Baltimore AREC was called into action for a simulated emergency test, in the form of a lost-person search. Eighteen members participated, four mobile units and two walkie-talkies were used. The "lost person" was found within two hours of the start of the test. — *K3SGD, EC Baltimore Area.*

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VE7AAJ reports a Civil Defense exercise was held on Feb. 13 in conjunction with the Army, and aided the Forestry Radio when needed.

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We received *thirty-six* SEC reports for January, representing some 17,214 AREC members. This is eight less than the number of reports for Jan., 1963, and shows a decrease in AREC membership represented. Sections reporting: E. Mass., Colo., W. Mass., Minn., N. D., Wash., N. C., Ore., B. C., Nev., Ind., Ala., Alta., N. Tex., Ohio, Me., Okla., Va., Ark., NYC-LI, S. Dak., NNJ, Tenn., Kans., Mich., Ont., W. Pa., Utah, R. I., E. Fla., Ariz., Mo., S. Tex., SCV, Iowa, Ga.

RACES News

Members of the Outagamie Radio Club and RACES stations took part in two "open house" sessions of the new control center in the Court House Annex at Appleton, Wis.

The message handling exercise, held on two meters, utilized fixed and mobile stations located in the city of Appleton and outlying areas.

According to the c.d. director, all systems proved operational and many favorable comments were received from the visiting public. All in all, the entire operation was a huge success.

National Traffic System

A point of pride with NTS has always been its organizational tightness. During the past few years we have noticed somewhat of a decline in the tightness of NTS, brought about mostly by propagation conditions, but also by concessions to operator convenience.

Now there is every reason why either of these factors, or any one of many others, might affect any NTS net's operation, and rightly so. There may even be some merit to considering over-all changes in the NTS structure on the basis of such considerations — and such changes are under consideration almost constantly. But changing from one procedure we aren't *quite* satisfied with to another that has never been tried is a risky business; and when you set out to make several changes at the same time, the risk is multi-

plied. First thing you know, you are going to be in the position of changing the entire basic structure, which you had no intention of doing to start with.

Nothing wrong with this, of course, if it is deemed necessary. But before we do so, there are two very important questions we must ask ourselves. First, is there really anything the matter with the present setup that cannot be rectified by one or two *minor* changes? Some of us have a great tendency to want to sweep all before us and start from scratch. Second, can we be assured that any new set up will be better than the one we have at present, and if so, how? Note that we say *better*, not just as good; no point going to all the trouble and confusion of changing things if there will be no improvement.

An obvious rejoinder to the second question is: how can we find out whether or not it will be better if we don't try it? We can't, really, but application of a little logical reasoning will usually give us a pretty good idea. A certain amount of educated prognostication is required in any type of planning, the more educated the better. If the prognostication applied to the original plan was pretty educated to begin with, then that in *any* plans for change had better be even better educated, or you're not getting anywhere.

Meanwhile, let us not "break and flee" because the going is rough during this null in sunspots. CD-24 prescribes the meeting times of section, region and area nets in NTS, with certain alternatives available. The procedure should be to meet at those times if feasible. If not, to use alternatives as temporary expedients as required, but to keep ever in mind the desirability of returning to normal when temporary conditions requiring the change cease to exist. What sort of things do we call temporary? Why, propagation conditions and operator conveniences, to name two.

February reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
1RN	56	467	.326	8.34	71.9
2RN	58	720	.641	12.4	100.0
3RN	56	502	.345	8.9	87.3
4RN	53	852	.472	16.1	91.8
RN5	58	1097	.630	18.9	92.8
RN6	58	935	.508	16.1	99.8
RN7	58	373	.267	6.4	83.3
8RN	58	592	.326	10.2	85.7
9RN	29	928	1.049	32.0	95.7[1]
TEN	58	607	.454	10.4	59.2
ECN	29	125	.226	4.3	85.1[1]
TWN	29	280	.489	9.7	71.0
EAN	29	1638	1.010	56.4	99.4
CAN	29	1414	1.008	48.7	100.0
PAN	29	982	.704	33.9	100.0
Sections[2]	1430	8666			
TCC Eastern	116[3]	768			
TCC Central	92[3]	807			
TCC Pacific	99[3]	794			
Total	2117	22,547	9RN	10.4	2RN/CAN/PAN
Record	1802	28,659	1.183	19.1	1000.

[1]Representation based on one session or less per day.
[2]Section nets reporting (53). NJN, NJPTN, NJ6-2, 16N (N. J.); East Tenn. Phone, TPN, TN, Tenn SSB; AEND, AENH, AENJ, AENM, AENO, AENP (morn), AENP (eve.), AENR, AENS, AENT, AENY, AENS (Eve.) (Ala.); MSPN, MSPN (noon), MJN, MSN (Minn.); Ore. State; Wash. Sect; QMN (Mich.); SCN, SCCW (S. C.); QFN (Fla.); W. Fla. Phone; CN, (Conn.); Bun (Utah); NCSN, NCCW, NENE, CCEN, NCN late (N. C.); MDDS, MDD (Md.-Del.-D. C.); WSBN (Wis.); BN (Ohio); NEB (Nebr.); OFN (Ont.); NYCLIPN (N. Y. C.-L. I.); VSN VN, VSBN, Va. Phone (Va.); SoCal 6 (Calif.); Texas CW, NTTN; RISPN (R. I.).
[3]TCC Functions reported not counted as net sessions.

We broke the sessions record this month. Conditions seem to be getting better, and we may have some good traffic nights before long.

WA2GQZ reports that the 2RN Traffic Clinic is going strong with WA2VLK as manager. *WB2s* ALF, FZC, *WA2s* UWA, VYS and W2GVH received 2RN certificates and special mention went to WA2VLK and W2MTA. W4ZJY sent his last RN5 report this month making way for the new manager, K5IBZ. Welcome Bert. RN5 certificates were issued to *WA5s* CAC FNB, *W5s* DTA DTR UTW and

W4ORI and K4VSX (left) act as net control for the Atlanta South Zone RACES net on two meters, while K4DLE and others in the background control the 10- and 6-meter nets during the Sabin Oral Sunday Foundation vaccination drive held on Feb. 9 in Atlanta, Ga.

K4CNY. W8CHT reports improvement on 8RN and is hopeful that the net will continue to better its performance this year. WØLGG reports that WAØDOU earned a TEN certificate. W9DYG says CAN is going strong with a few "short skip" sessions in February. CAN certificates for 1963 were issued to: W1EMG, W2EZB, W2MTA, W3EML, *WA4s* AVM, EXA, *K4s* GHY, QCQ, *W5s* PPE, ZDF, *K5s* ANS, IBZ, *WA9s* AJF, AUM, ECY, *K9s* DHN, INF, ZLA, *W9s* AKV, HAS, QLW, WAØAOY, *KØs* GSY, FPC, ZPN, WØSCT. K4AKP/6 reports the need for two reps from each of the regional nets; this will help speed up the flow of traffic. W9QLW reports that representation from Ky. was down, but 9RN still going strong.

Transcontinental Corps. W3EML reports a majority of the failures to be with Station B, but things are looking up as more stations request TCC appointments and conditions get better. W4ZJY sends a fine news letter this month in which he has set up some new operating policies for the TCC-Central gang. W7DZX reports some troubles due to equipment failures among some stations, but hopes things will improve shortly.

February reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	116	74.1	1513	768
Central	92	94.6	1461	807
Pacific	99	76.8	1588	794
Summary	307	81.8	4562	2369

The TCC roster: Eastern Area (W3EML, Director)-*W1s* EMG NJM K1NEF *W2s* GVH MTA *WA2s* BLV KQG VLK W3EML *K3s* FHR GJD MVO *W4s* DLA DVT K4POA *W8s* CHT ELW K8NJW. Central Area (W4ZJY, Director)-W4ZJY WA4AVM *W5s* PPE QMJ K5CAY *W9s* AKV CXY DYG JOZ PTZ VAY *K9s* DHN ZLA WA9AUM WØs BDR SCA. Pacific Area (W7DZX, Director)-K4AKP/6 *W6s* EOT HC *K6s* DYX GID *WA6s* BRG ROF *W7s* DZX WST/6 ZB *KØs* EDH EDK VE7AGF.

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Net Reports:

Net	*Sessions*	*Checkins*	*Traffic*
7290	40	1420	615
Early Bird Transcon	29	93	73
8 Ball Traffic	41	298	482
Interstate SSB	29	1177	385
Northeast Area Barnyard	25	919	6
North American SSB	..	630	969

QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Who:

> HELP WANTED: Assistant to The Boss, would-be executive type. Start near the top. Long-established manufacturer of quality amateur radio equipment seeks experienced DX man for sensitive position. Aggressive, eager, determined, persistent, rough, tough and willing to relocate. On-the-job training with little to learn. Immediate assignment. Apply within.

We squeezed under this big sign posted outside Long Hall, venerable headquarters for the rites of spring, the annual May meeting of our DX Hoggery & Poetry Depreciation Society, and hurried to gallery seats. Chairman Halloran N. Scrimmin viciously gavel-whipped the rostrum for order. Several additional kegs of Old Haywire and an extra chorus of the Wouff Hong Song were finally required to quiet the tumult enough to let Watt Samata climb the stage and kick off the program:

A purebred among liddish breeds
Is Fatsig McBlabbab O'Deeds.
When working crosstown
This ignorant clown
Runs ten times the soup that he needs.

Watt went QRP in a hail of rusty Rettysnitches as several job applicants underwent interview at the rear of the hall. Yul B. Sari tried his luck next from the podium with

East-coaster Boomboom McPlenty
Is large on the lid lists of many.
His CQ-DXs
Tear up chunks of Texas
Just to work Europe on twenty.

Yul was indeed sorry after a riotous and accurate response from the audience. References for more would-be executives were being canvassed noisily in the foyer as Otto DeBandagan recklessly volunteered

A speedy-styled lid is Von Slurd;
His sending is somewhat absurd,
Electronic keying
That's great at V-V-ing,
Yet stumbles on every sixth word.

Poor Otto was blotto in no time under a one-two punch of fire and foam. The job mob in the lobby dwindled to three or four likely candidates while Ernest Lee Pleden fearfully delivered

The final of Kingpig O'Mold
Is never a sight to behold.
It makes all its static
Well hid in his attic —
Four kilowatts worth, we are told.

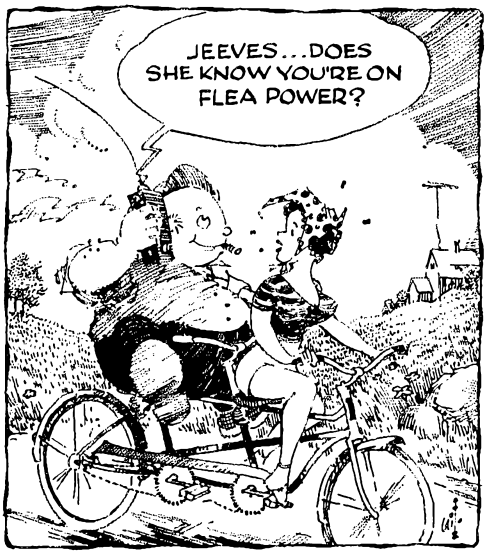
Wild outbursts from the mezzanine saved Pleden some bleedin' and signaled the selection of our lucky career hunter. He was a high-power man with plenty of recommendations. "When do I start?" he hollered as the sergeant-at-arms led him to the dais through a gauntlet of garbage.

The lights blinked, dimmed, and went out entirely except for an eerie purple glow onstage. There Mme. Leigh-Falcon's Teleportation Committee convened a quick seance. The hall grew strangely hushed. Our celebrated guest expert in the occult quickly established contact with the spiritual world (good DX for a portable) and checked into a high-speed phone net. The NCS shook the rafters of Long Hall with a tremendous roar — "HE'S HIRED!"

With a shriek and a tortured scream our successful job hunter disappeared in an explosive puff of yellow flame and fume. He was, you see, our elected DX Hog of the Year, and new chief tester at The Old Man's main Wouff Hong works, a *very* sensitive position.

What:

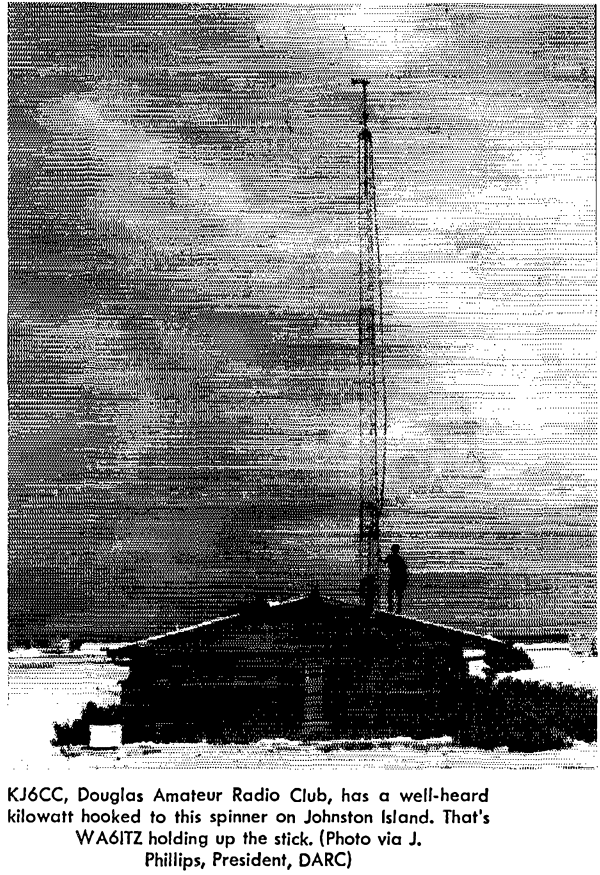
If some propagational pundits are prognosticating with precision, we should be entering the final year of sunspot decline for the current solar cycle. It must be noted, however, that the educated guesses of ionospheric engineers are not in unanimous agreement on this, and that most of them keep revising their guesswork as we go along. Despite his high visibility, Old Sol certainly manages to hide a key secret or two from those sunwatchers! But it does seem reasonable to conclude that DX conditions won't get much worse before they improve perceptibly in time to come. Meanwhile, the "How's" gang makes the best of things on good old



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

20 **c.w.** where the usual springtime splurge is enjoyed by **Ws** 1ECH 2GT 3HNK 4GTS 7DJU 8YGR, **Ks** 1TCE 3MNJ 3SLP 4JSZ 5YPS 8LNL 9CZV 9VQK ØAID ØJPL, **WAs** 2WIJ 2ZVJ 4CZM 5AER 5CTD 5EAM 6KHK 6TGH 6VAT 9ICQ ØAPN, **WBs** 2FMK 2GHI 2JJK 6DEJ 6FWW 6IFC and **KL7**CYS. They write highly of **APs** 2AR (14,063 *kc.*) 1300 *GMT*, 2KC 5CP 2, 5HQ (70) 13-14, **BV1**USC (15) 3, **CEs** 8CF ØAC (44) 5, **CN8s** FW (20) 13 GB GC, **CO2s** AP BB CO XX 13, **CPs** 3CD 5EQ 5EZ, **CRs** 6AI 6BX 6CH 6DX 7AD 7FN 12, 7IZ 7LU (53) 21, 8AD (40) 10-23, **CTs** 1DJ 3AE, **DM3**ZGL, **DU1**FM (95) 12, **ELs** 2AD 2S 7, 8AD, **EP2s** AO AS 17-20, BQ DM RW, **ET3**GC (15) 18, F2CC/**FC**, **FB8s** WW (39) 12, XX, **FG7s** XP XS (50) 21, **FK8s** AB 14-17, AT (48) 11, **FM7**WP, **FO8**AA (20) 18, **FS7**RT 16, **FR7s** ZD (38) 18-19, ZF, GD3FXN, **HAs** 1KSA 1SD 8UG, **HI8**LC, **HKØ**AI, **HL9s** KA KT 4, **HP1**IE 14, **HS1**AA, **HZ1**BF, **IS1**MIM 15, **IT1s** AGA SBT, **JA9**II, **JT1s** AG CA 4, KAA, **KCs** 4USB (18) 12, 4USK (50) 22-23, 6BK 5-6, 6BO, **KGs** 4AM 6AAY (45) 11, **KR6s** BQ GF JZ (25) 23, NT, **KR8**BD, **KV4s** AA CI DE, **KX6**DB (22) 0, **KZ5**WR 14, **LAs** 7IH/**p** 9MI/**p** (35) 21, 9PI/**p** (90) 15, **LJ2**F, **LUs** 3ZI 6ZM (12) 23, **MP4s** BBL BEL BEK 20, QBF, **OA4s** FM PF, **OD5**AX, **OX3s** KW UD, **OY2**H, **PJs** 2AE 2ME 3AH, **SLs** 2AD (5) 22, 3AG 8, 6BH, **SMs** 2CZT 3BPY/**9Q5**, **ST2**AR (69) 21, **SU1**IM, **SVs** 1AA 1AL 1BD ØWAA 7, **TA2**BK, **TFs** 2WIG 2WIM 3DX 3UR, **TG9s** AD FA, **TI2**LA, **TL8s** AC (50) 21, SW (10, 65) 22, **TN8**AF, **TT8**AM, **TU2s** AJ AW (28) 21, **UAs** 2BW 14, 9KOG, **UA0s** BL EW KCC KFG KSB KSS KYA RW 11, **UB5s** FW KAA 6, KNH QS ZV, **UC2s** KAC LM (10) 14, **UD6**AM 6, **UI8**BO, **UJ8**AB, **UL7**BG, **UM8**KAA, **UN1**BN 7, **UO5**BM (80) 15, **UP2s** KBC NR (5) 15, OM 0, **UQ2**KBC 8, **UWs** 4HB 9OU 5, **ØI**P 17-18, VEs 1MIW/VO2 8CS 8JJ 8OD 8RN, VOIs DH FX, **VKs** 9BW 5, 9GL 4, 9MV 13, ØDM 8 of Macquarie, **VPs** 2AV 2GAW (23) 23, 2KJ (29) 21-1, 4TR 6AP 6BW 22, 6PJ 7BB 7NQ 8GQ (45) 0-12, 8HD 8HJ (69) 0, 8HO 9BO 9L, VQs 2AB 2BE 2FT 15, 2JC 20, 2M 8AI (39) 18, 8BT 9HB, **VRs** 1B 1G 2EK, **VSs** 1EJ 1FZ 1LP 1LV (10) 12, 4BB (82) 15, 4HI (40) 8, 4RS 9AAA 9AAM 9ART (60) 20-21, **VU2s** GI GWZ KU KXZ MD ND VRZ, Ws 1DBN/VO2 5HJ/**KJ6**, WA6LED/**KG6**, **XEs** 1NE 21, 2HH 2HW, XW8AD (40) 11-12, YA1BW 9, **YNs** 1NAT 4RAR (45) 2-3, **YOs** 3CM 6KAF 8CF (20) 14, **YVs** 1DP 4BE, **ZBs** 1BX 1RM 2AE, **ZDs** 3A (1) 21, 6LA 8HB 7, **ZEs** 1BO 1JE 20, 3JJ 4JS 8JJ 8JW, **ZLs** 1ABZ 6 of the Kermedecs, 4JF 7 of the Campbells, **ZK1**BW (29) 6-9, **ZPs** 5OG 9AY, **ZSs** 3EW (55) 20-21, 7M (30) 20, 7R 9M (19) 19-20, **4S7s** EC (106) 6, NE 10, WP, **4U1**TU (11) 18, **4X4s** DK (40) 15, FA MR RH, **4W1**B (58) 20, **5As** 1TW 2TW 3TX 5TR (47) 23, **5B4s** OS (21) 22, TX, **5H3**JI, **5N2s** JKO 11-14, RAM, **5R8s** AB (15) 18-19, AI (30) 18, AJ (71) 19, AM BB, **5T5**AD (18) 0, **5X5s** IU 20, JG (40) 20, **5Z4s** ET GT IV (15) 19-20, **6N5**X 14, **6O6**BW (29) 17-18, **6W8s** AB (54) 9, AC (10) 18, DD (50) 17-18, **6**YAXG, **7G1s** G (10) 17-20, LX, **7X2s** FT NJ 17, VW 8-11, **9G1s** BY DZ FE (30) 21-23, **9K2s** AM AN (59) 13-14, **9L1s** NH (80) 18, TL 8, **9M2s** FR 7, NM, **9Q5s** AB TJ and **9X5**MH 15. Got 'em all? Confirmed? 599?

20 **phone** is merrily milked by **Ws** 2GT 5KNE 8EGR, **Ks** 3SLP 4JSZ 5HRR 5ZMS 8LNL 9CZV ØAID ØJPL, **WAs** 2WIJ 2ZVJ 4CZM 4KLT 5AER 5CTD 5EAM 6KHK 6VAT, **WBs** 2FMK 2GHI and 6FWW for such cream as **BV1**USG (330) 8-9, CEØZI/mm, **CRs** 4AD (126) 20, 7GF 7IZ* 9AE (110) 11-12, **CN8s** AQ AW GB, **CO8**BO, **DU1s** AH AN BSP (209) 8, JC. **EA8**CM (288) 8, **ELs** 2I 2V 3D 6B, **EP2s** AN* AR AU DJ RW, **ET3s** GC JK (115) 22, MEN USA*, F9RY/**FC**, **FG7s** XR XT, **FM7s** WS (124) 21, XR, **FK8**AU (256) 10, **GD3**ESV (280) 14-15, **HBØ**TL, **HCs** 5NW 8FN (346) 0, **HL9**KR (262) 9, **HS1S** (108) 14, **HV1**CN, **HZ2**AMS, **IS1s** MM VAZ, **IT1**TAI, **JAs** 1UT 6NP, **JT1**CA (109) 9-11, **KCs** 4USX 6BK (278) 8, **KG1s** CQ FH FY, **KJ6**BZ (254) 2, **KR6s** FQ (250) 11, MU, **KV4**CF 11-12, **KX6s** BQ DV 6, **LA9s** MP/**p** PI/**p** LZ1KDZ*, **M1B***, **MP4s** BBW BCC BDP QBF, **OA4s** KY ON, **OD5**AX, **OH0s** NC NI* RJ, **PJs** 2AA 3CD, **PZ1**AX, **SM2**ABX, **ST2**AS, **SU1AS***, **SVs** 1AA 1AB ØWB ØWFF* ØWG ØWGG ØWH ØWJJ ØWL ØWO ØWZ, TA2AR, **TF2s** WHI WIM WIN, **TG9s** AI* CZ, **TIs** 2EO 2PI 2SS 3AA 3AR, **TL8**SW, **TT8**AJ 8, **TU2**AU, **UAs** 2KAK* 9KCE ØBP ØRV ØSK, **UD6**BR, **UG6**AW 14, **UH8**BO, **UI8**AG, **UL7s** FA JA LV, **UM8s** FZ KAB, **UN1**CC*, **UO5s** PK RO, **UP2**KAF*, **UW3**DI, VE3FKH/**SU**, **VKs** 4JQ (240) 12 of Willis isle, 6KW 6MK 6RU 9XI, VO1s CM* DH, **VPs** 2AY 2KJ 2KM 3HAG (130) 23, 4TI 5LV 6KL 6KO 6WR 9BY 9DY 9FE, **VQs** 2AB 2WB 9HJB (102) 16, **VR4**EG* 10-11, **VSs** 4RS (118) 24, 9AAA (130) 19, 9ABM 9AE* 9MB 9PHH 17, **VU2s** NR RM (108) 14, W5HJ/**KJ6**, XE1s AB AZ CDX NE, **XW8s** AL AU (101, 305) 1, **YAs** AN BW, **YK1s** AA* (109) 8-9, AL* (160), YN1LH, **YS1s** MM RRD, **YU2**EQ*, **YVs** 1JL 2AS 3BW 4AK, **ZB1s** A AX BX* CE* CR, **ZD6s** LA PBD (105) 16-17, **ZEs** 1AA 1AC 1JE 2AC 7JR*, **ZL3**VB of the Chathams, **ZP5**DD, **ZSs** 2MI (125) 17-18 of Marion isle, **3A2**CP, **4W1**B (118) 17, **4U1ITU** (230) 13, **4X4s** AS DK FA HW*, **5As** 1TG* 1TW 4TK 5TK 5TW, **5B4s** GC RA, **5N2s** CKH HJA JKO, **5R8SR***, **5T5**AD (250) 9, **5U7**AC, **5X5**IU, **5Z4s** AQ ET HK RF 17-18, **6Os** 1KH 1WF 6BW, **6W8s** AB* AE* (100) 0, **6**YABL, **7G1**G, **7Xs** 2NJ 17, 2VW 2VX 3VW, **9G1s** BY DO (150), DV DY (310) 22, EC* EY, **9K2**AN, **9L1s** HX (116) 0, RO, 9M2s CR DQ, **9N1**MM, **9Q5s** AB (120) 23, JP, **9U5BB*** and **9X5**MH (250), those asterisks representing lonely non-s.s.b.ers.

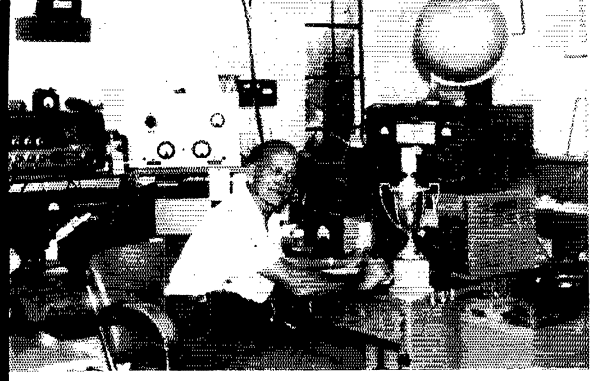


KJ6CC, Douglas Amateur Radio Club, has a well-heard kilowatt hooked to this spinner on Johnston Island. That's WA6ITZ holding up the stick. (Photo via J. Phillips, President, DARC)

160 **c.w.** rates an encore from last month's synopsis because the 1.8-Mc. fur is really flyin'. Old radar ears, W1BB, reports a March DXplosion by **VS1**LP (ex-EP2BK) who worked Stew, G3GRL, W6ML and **KR6**ML. G3PU got all the way over to Ws 6ML ØGDH and K5HRR, while **DL1**FF and some Gs captured **6**YACZ. Austrians now can ham on 1823-1838 and 1879-1900 kc., so **OE3**LI lost no time in two-waying with W1BB who has hooked 130 different 1.8-Mc. DX stations this season. K5JVF's Oklahoma vertical caught up with **HK4**EB (1802) 6, XE1OK (1828) 8, **YV5**AGD (1802) 8 and **6**YAXG (1808) 4, while W1ECH accounted for some 6YAs and **HR3**HH. Other DX stations reported active in late-season doings are dozens of Gs, **DJs** 2UC 3VC, **DLs** 2DF 7AA 9KRA, EA2CB, **GIs** 3JEX 3NZZ 6TK, **HB9s** CM EO, **HK7**ZT, **OE1**KU, **OHs** 2HK 2YV 3NY ØNI, **OKs** 1ADP 2KET 2QX, **PAØ**PN, **PX1**CR, VO1s BD DX, **VP2VL**, **ZBs** 1BX and 2A. Sure, it's almost summer, but the cool, shrewd heads are still lurking among that 160-meter QRN because the quiet season is bringing peak reception conditions to our colleagues in the southern hemisphere. Watch particularly for VK5KO (1808), ZL3s OX and RB (1876) around 1000-1200 GMT, and who knows what VP8s, ZSs, KC4s, etc., might barge through in the middle of a Stateside heat wave? Once again, for the benefit of recent 160-meter converts on our side, we refer you to the table on page 60, July '63 *QST*, for the lowdown on 1.8-2.0-Mc. frequency and power privileges in your area. One-sixty is booming DXwise as never before!

* * *

Space limitations, as usual of late, preclude inspection of other bands via the "How's" Bandwagon this month but we'll give 'em a good going-over in June *QST* with the help of (10 phone) W5ERY, KØJPL; (15 c.w.) W4HOS, KØJPL, WAs 5AER 5CIY 5EAM 6VAT 9ICQ ØAPN, WBs 2GHI 2IOM 6DEJ, WNs 2LLJ 5GZX, KN1FWE; (15 phone) W3HNK, Ks 7VMO ØJPL, WAs 5AER 5CTD 5EAM 6VAT, WB2s GHI IOM; (40 c.w.) Ws 3HNK 5KNE 7DJU 8EQA, Ks 1VWL 3SLP 4TWJ 5JVF ØJPL, WAs 2WIJ 5CIY 5EAM 6VAT 9ICQ, WBs 2GHI 6DEJ 6IFC, WNs 5GZX 6IPR; (40 phone) Ks 1VWL 4TWJ, WB6IFC; (80 c.w.) Ws 1SWX/1 7DJU, Ks 1EYY 3SLP 5JVF 9UOV,



5Z4ERR, a prominent DXer over the years as VQ4ERR, is proud of the K6MLS Trophy he won as the second single sideband enthusiast to confirm two-way s.s.b. QSOs with 300 countries. TI2HP was No. 1 and W8PQQ placed third. (Photo via K2s HEA and MGE)

WA5AER; (75 phone) W3HNK, K1VWL and WA5AER. It's tough being torn between spring sunshine and spring DX prosperity. How about an outdoor hamshack right next to the barbecue pit?

HEREABOUTS — W1TS of ARRL Hq., who was stuffing QSLs into shoeboxes before most of us had tried shoes, assays the current state of the confirmational art from a typical W/K viewpoint: "According to my records covering the last six years of DXing, if you work only one station in each country, there are 155 countries that are sure bets for a QSL. There are 56 more where the chances are 3 out of 4 or better, and 27 others where the odds are at least 2 out of 3. From only 2 countries (in almost 300) do you stand less than a 50-50 chance of getting a QSL on your first contact. One of these is Antarctica whose otherwise excellent record, despite its remoteness, is spoiled by reluctant CE9s. The other, with the poorest record of all, will go unnamed, but a well known K prefix is used and the country bisects another which, although less affluent, boasts a QSL record of 80 per cent." . . . . . Bogaches, riel, lek, kyat, forint, agorot, kip, won, zloty, leu, somalo, baht, kurus — egad, K7CNO has been studying postage rates from the DX end. If you have a question in this regard, unanswered by the *Callbook's* quarterly tables or your local post office, perhaps an inquiry with self-addressed stamped envelope to Leonard will clew you in. . . . . W5ERY must know the QSL secret, too. Of 221 countries worked only UO5-land is holding out on Allen . . . . . Despite recent radiational evidence to the contrary, the KT1 prefix has been kaput for a decade or so. Similarly, W0HMP has no FP8 QSL connections . . . . . "We normally process cards and envelopes twice a month," explains ARRL QSL Manager K6ENX of the Six branch. "Envelopes with single-rate postage attached are mailed out as soon as each contains at least five cards. An envelope containing one card is mailed out within two months, and envelopes for which no cards have been received are mailed out every four months with notices to that effect. . . . Unless you know you have a large amount of QSLs coming we suggest that no more than single-rate postage be attached to each envelope. Excessive amounts of attached postage waste your money and often delay an envelope until sufficient cards arrive to utilize the postage attached." This system works well for K6ENX and clients. Your local ARRL QSL rep may have an equally effective routine of his own . . . . . A healthy crop of "QSLers of the Month" this month — CN8FW, CR7IZ, EA4CR, ET3GC, FG7s XK XS, G3HCT, HC2WG, HIs 4ARM 8MIN, HK3s RQ VV, HL9KT, HP2MR, HR3DW, KC4USX, KV4AA, KX6DB, KZ5BL, LU2JV, M1M, MP4QBG, PJs 2AE 5ME, PZ1CK, TG9FA, TT2LA, VPs 1TA 2KJ 2SY 8GQ, VQ2W, VR2EH, W6ICM/KM6, YN4CWH, ZD6OL, ZEs JAV 3JJ, ZS3EW, 4X4HH, 5N2JKO, 5X5JK and 9Q5AB, plus QSL aides Ws 2CTN 2HMJ/4 4SSU, K9PNV and G5GH — all nominated in "How's" correspondence from Ws 1SWX/1 2GIX 2QJP 5ERY 7MKW 7QB 8YGR, Ks 3SLP 7VMO 8RXD 9VQK ØJPL, WAs 2WIJ 5CTD 6VAT 8AJZ 9ICQ, WB2s GHT and HNQ for punctilious and punctual pasteboard production. Any recent quick QSLers over your way worthy of commendation here? . . . . . Help! W1SWX/1 wants hints on hunting the QSLs of CEØAT, HI8MM, ZK1AR; W4GTS will settle for a PZ1BH push; W6YEJ needs a nudge toward VP2KI's wallpaper; and WA2WIJ wonders about one FP8CN QSLwise . . . . . Help available: WBs 2FCT 2JJK and 6JKR offer their good offices as QSL agencies for DX operators in bona-fide need of such assistance.

EUROPE — W1ECH of ARRL Hq. hears from ZB2AE: "ZB2A will be happy to pass on QSLs for any Gibraltar stations." . . . . . "QSL returns have been poor so far," laments TF2WIE (K6MRR) who hopes things will get better. "I've grown tired of sending cards with scant response, so I'll QSL only on receipt hereafter." . . . . . "We three stations on Rhodes are the object of many pileups, and hundreds of QSOs are quickly accumulated," observes KL7DNL of SVØWDD. "As the minimum mailing rate to any country except the U. S. A. is fifteen cents, cost alone prohibits 100-per-cent QSL direct." . . . . . "All QSOs of SV1SV, station of the 11th International Boy Scout Jamboree, have been QSLd via bureaus," writes SV1AT to W1LVQ . . . . . "W/Ks seem to be bad QSLers," remonstrates LA5FG. "We of club station LA1H have QSLd 100 per cent with poor returns, only 40 per cent from the United States. We want cards even for contest QSOs because we seek several certifications. LA1H lacks only a South Carolina QSL for WAS."

SOUTH AMERICA — LIDXA understands that W5JLU still assists with FY7YE QSLs for operator Mario only, but a change in QTH has slowed Len down. W5JLU now answers to 912 Atlanta, Nederland, Texas . . . . . According to WGDXC some of VP8GQ's log transcripts were lost en route G3PAG. They will be replaced — patience, please.

ASIA — "If anyone needs a QSL from BV1USF operator Dave, K9HDQ, he's now active as K9HDQ/7," learns K7VMO. "Self-addressed stamped envelopes with QSO data to 2949 N. Flanwill, Tucson, Arizona, will do the trick." . . . . . DARC QSL chief DL1BA says TA2NK has no QSL connections with DJ2NY or DARC and thus must be tagged ungood . . . . . "JA7CEK desires QSLs for his previous activity as JA6ZD," states friend KA7DR. Mitsuo's new JA7 address follows.

AFRICA — "I answer all cards via the same route received," 5X5JK tells W5ERY. We assume International Reply Coupons and s.a.e. are required for direct response . . . . . "TU2AE, on holiday in France until June, is always 100-per-cent QSL," testifies Gilbert's friend F2MO (PX1MO). "For his DXCC he requires overdue confirmations from CR5CA, HP1CC, M1B, TI2s GL or HP, VP4s PS or VS, VQ1MH, ZDs 7BW and 9AP." F2MO himself is shy a QSL from ET2US for a September 13, 1962, encounter . . . . . Hammarlund DXpedition, P.O. Box 7388, GPO, New York, N.Y., 10001, may be able to supply QSLs for recent CR5SP, HZ2AMS, MP4s MAP TAX, OH2AH/Ø, VK9XI, VP8HF and ZD6PBD contacts, according to memoranda from W2GHK . . . . . UBA QSL boss ON4OQ tells W1ECH that the bureau address for 9Q5 9U5 and 9X5 stations is QSL Bureau, P.O. Box 1459, Leopoldville, R.C.

OCEANIA — "I continue to handle QSLs for ZL1ABZ of the Kermedecs, and ZL4s JF LY and OG of the Campbells," writes ZL2GX to NCDXC's *DXer* . . . . . "Johnston island is manned mostly by tourist personnel," observes WGDXC's *DX Bulletin*, "so, when you QSO a station there, be sure to get the name of the operator and QSL via APO 105, San Francisco, unless instructed otherwise." . . . . . LIDXA hears that VK0NL cards for Heard work of a year or so back are emanating from VK2EG . . . . . WA2WUV of LIDXA is willing to assist DXers in this hemisphere toward QSLs from VS4LX and 4XK . . . . . Time to examine this month's collection of specific postal data, remembering that they are necessarily neither "official", complete nor accurate. You know, *caveat emptor* and all that sort of thing. . .

BV1USF (see preceding text)
BY1PK, Box 427, Peking, China
CP5EZ (via W2CTN)
EL2AD, B. Martin, Monrovia, c/o Dept. of State, Washington, D.C., 20521
EL2I (via W9UC)
EL8S (to WØAUF)
ET3AV (via W3AAZ)
GC3s NQF RFS RPB (to G3s NQF RFS RPB)
HE9LAC, R. Maeder, Schaan, Escher Str. 425, Liechtenstein
HH2M, Box 488, Port-au-Prince, Haiti
HI7RXB, Apt. 2, La Romana, D.R.
HI8NPI, R. Duran, Box 145, San Cristobal, D.R.
HK2WC, A. Munoz, Box 855, Cucuta, Colombia
HK3RQ (via W2CTN)
ex-JA6ZD (to JA7CEK)

JA7CEK, M. Onishi, c/o Coast Guard, 21 Kamihamacho, Tsuchizakiko, Akita City, Akita pref., Japan
LA1H, NRRL Harstadgruppen, P.O. Box 263, Harstad, Norway
LU4ZI, c/o J. Juncal, 1261 Tigre, Buenos Aires, Argentina
LX3AX (to ON5AX)
OA4NQZ (via RCP)
OZ4LP/mm (via OZ4KY)
PZ1BX, Box 2003, Paramaribo, Surinam
SV0WDD, G. Boese (KL7DNL), USCGC *Courier* (WAGR-410), APO 223, New York, N.Y.
TF2WIE (to K6MRR)
TI2KZ, P.O. Box 952, San Jose, C.R.
TI3AA, Box 4589, San Jose, C.R.
TT8AJ, M. Oumar, Box 235, Ft. Lamy, Tchad
TT8AM, Savelli, Box 44, Ft. Lamy, Tchad
UM8FZ, B. Meshevtsev, Flat 9, Boronbaera 102, P.O. Box 21, Frunze, Kirghiz S.S.R., U.S.S.R.
VP2GAW, S. Antrobus, La Bique, St. Andrews, Grenada, W.I.
VP3RW, Box 622, Georgetown, Br. Guiana
VS4XK (see preceding text)
VS5CW (to VS1CW)
W4VCA/KH6, P. Kearins, Qtrs. 1226B, APO 958, San Francisco, Calif.
W6ICM/KM6, J. Fox, Navy 3080, Box 19, FPO, San Francisco, Calif.
W7WFJ/mm, J. Hill, Spec. Svc., USS *Enterprise*, FPO, New York, N.Y.
XT2AU (via VE4OX)
YA4A (via K4KMX)
YN4GJ, Box 769, Managua, Nicaragua
ZB1BX (via W2CTN)
ZS6BKO/Ant, c/o Weather Bureau, Pretoria, S. Afr.
ZS6EQ (via SARL)
4U1SU, Box 11, Geneva, Switzerland
4W1B (to HB9YZ via USKA)
5B4CZ (via W2CTN)
5R8AJ, C. Fontaine, P.O. Box 13 bis, Tananarive, Malagasy Republic
5R8BB, P.O. Box 1634, Tananarive, Malagasy Republic
5Z4DW (to GM3PYA)
6YAUC, Physics Dept., U.W.I., Kingston 7, Jamaica
7X3VW, R. Perrier, Rue du Transformateur 7, Colonbes Bechar, Algeria
9G1DV (via W2CTN)
9L1NH (via RSGB)

Providers of the preceding individual recommendations are **Ws** 2GIX 4GTS 4HOS 4JGW 5ERY 5KNE 7MKW 7QB, **Ks** 1VWL 3SLP 5JVF 7VMO 9UOV ØJPL, **WAs** 2WIJ 6VAT 8AJZ 9ICQ, KA7DR, LA5FG, R. Walsh, DARC's *DX-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2CM), Florida DX Club *DX Report* (W4HKJ), International Short Wave League *Monitor* (12 Gladwell Rd., London N.8, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N.Y.), North Eastern DX Association *DX Bulletin* W1BPW, K1NOL), Northern California DX Club *DXer* (W6HVN) and West Gulf DX Club *DX Bulletin* (W5IGJ). Takes a heap a helpin' to make a "How's" a home!

Whence:

EUROPE — More DX contests on the Continental calendar this month. EDR (Denmark) kicks tiings off with the 13th OZ-CCA Contest to be held (c.w.) from 1200 GMT on the 2nd to 2400 the 3rd, and (phone) May 16th-17th, same times, on 3.5 through 28 Mc. Everybody works everybody in this one, exchanging the usual RS- or RST001, RST002, etc., serials, a given station to be logged once per band, and the warery is "CQ AW". Each OX OY and OZ contact counts 6 points, other contacts count 3 points each, and this point total is multiplied by the sum of band-countries for final score (each W/K VE PY LU VK and ZL call area is considered a separate country in addition to the regular DXCC List). Entries must be mailed on or before June 15, 1964, to be eligible for certificates to be awarded high scorers, so rush an IRC-accopmanied request to EDR Contest Committee, P.O. Box 335, Aalborg, Denmark, for contest summary sheets specified as necessary . . . . . Russia's annual c.w.-only U.S.S.R. DX Contest takes the DX stage from 2100 GMT on the 9th to 2100, the 10th, on 3.5 through 28 Mc. You may use the entire 24-hour contest period but each log entry must cover no more than your best solid 12-hour stretch. Everybody works everybody else in this one, but QSOs between amateurs in one "populated place" (cross-town QSOs) are not considered proper. "CQM" is the contest call, the usual RST001, RST002, etc., serials will be exchanged by non-U stations, U.S.S.R. stations will transmit RSTs plus oblast (district) numbers, and a given station can be worked but once per band. Each completed contact counts one point, this total to be multiplied for final score by the number of different ARRL DXCC countries accumulated during the fracas. Log entries go to the Chief Judging Board, P.O. Box 88, Moscow, and must be mailed by June 1, 1964. Certificates of merit will be available to certain high-scoring participants, and your submitted logs may help you qualify for such U.S.S.R.-issued sheepskins as W-100-U (100 different soviet stations) and R-150-S (150 different countries). The sample log shown on p. 25, April '62 *QST*, may be informative . . . . . In the PZK (Poland) 1963 SP DX Contest, U.S.A. c.w. honors went to Ws 3MSR 2WZ 3QLW 8UMR 1NS 5KC 4HOS and K8AVP in that order. No W/K phones filed entries, but VE3EVK represented Canada on phone and c.w. For the home crowd SPs 5XM 9KJ 8CK 8HT and 9AHA paced mike men, while SPs 1HU 7HX 5ALG 5ZA 5ADZ and 8HT led the codehounds . . . . . Gibraltar gist from ZB2AE via ARRL Assistant Secretary W1ECH: "ZB2s A and AE, working mostly c.w. and some a.m. on 20 and 15 meters, will be joined by four more ZB2s shortly. ZB2J is coming back from England, ZB2U is building a single-sideband rig, ZB2AG also is rebuilding, and ZB2AH will be back on sideband soon." . . . . . TF2WIE is due to pack up his Ranger, 2-B and dipole for return to K6MRR this month. Bob wearies of the usual PSE-QSL-73 QSO and would rather engage in friendly rag chews. Neighbor TF2WIL is operated by WA4MFS, according to WA2WIJ . . . . . Club station LA1H, north of the Arctic Circle, scored some 7000 QSOs in 1963, 2000 with W/K customers. LAs 5FG and 9OI do most of the operating . . . . . K3CUI notes in Russia's *Radio* that UA3s AW CT and AN lead c.w. DXers in the U.S.S.R. with 207, 192 and 189 countries confirmed . . . . . ON4QJ anticipates a Monaco manifestation this summer . . . . . ZB1CR has collected some 6000 multimode QSOs on 10 through 80 meters in two years on Malta . . . . . That UB5ARTEK is said to be no rarer than the Crimea.

ASIA — EP2DM tells WB2FMK he's given up on spotty 21 Mc. and now concentrates daily DX efforts around 14,075 kc. at 1230-1430 GMT. Javad's DX-35, HQ-150 and other accessories are going strong but the EP2DM quad succumbed to gusty winds . . . . . Ex-HL9KE states that 34 HL9K and HL9T call signs are allotted for use by U.S. personnel. Full particulars on qualifying for Korea amateur authorization are available for the asking from the Signal Officer, Eighth U.S. Army, Attn. Radio, APO 301, San Francisco, Calif. Transmitters are limited to

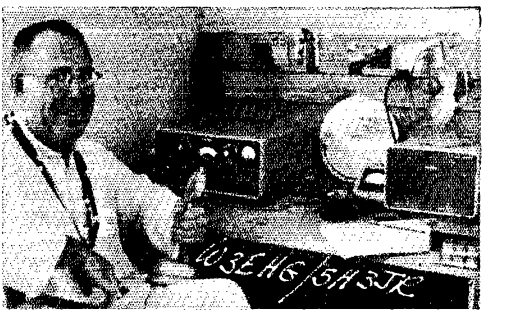
9M2DQ is well heard in the U.S.A. around 14,120 kc. at 1200–1300 GMT. Jim, a snappy QSLer of renown, answers flocks of W/Ks when those rare good openings come along, but he also relishes the relaxation of a good rag-chew. (Photo via W4NJF)

100 watts of antenna power, and communication with Redbloc countries is prohibited . . . . . BV1USA should be active on single sideband with a new Collins layout by this time, according to ARRL Assistant Communications Manager W1YYM. BV1USA activities manager E. Graham describes Taiwan American Radio Club's new BV Award, details obtainable from TARC, Hq. USARSCAT, Box 8, APO 63, San Francisco, Calif. . . . . XZ2KN writes W5AI, W5VA to the effect that amateur radio in Burma was officially curtailed beginning in January . . . . . "Ex-HL9KH (W9WNV) dropped by at 4 A.M. one Sunday just before I left Okinawa," recounts ex-KR6LJ. "We had quite a get-together with about 50 other OMs. At present there is plenty of DX activity by KR6s with stiff competition for top dog." . . . . . Oriental addenda via the clubs press: A Powerstat courtesy Ws 2GHK and 5EZE should help HZ2AMS foil treacherous line surges. Meanwhile, Jordan remains stubbornly opposed to DXpeditionary overtures by Angus and others. . . . G3HCL and/or VS1LX may take WA2WUV's s.s.b. portable for an Andamans-Nicobars outing. . . . LU2XL hunts off-shore Arabian oil when not fishing for DX with a KWM-2 and dipole around 14,270 kc. . . . 9K2AN has a DX-100, SB-10, SX-42, rotating dipole and other skywires on 80 through 10 meters, c.w., sideband and a.m. Nasir favors 7025 kc. and multiples thereof at 1100-1400 and 1900-2100 GMT daily except Sunday. Call 9K2AN in Persian, Arabic or Urdu to get the jump in pile-ups, OMs. . . . YA1s AN and BW still offer Afghanistan on 20 c.w. around 1300-1400 GMT.

AFRICA — 6O6BW (K4JLD) writes W1WPO, "My new prefix seems to have the band stirred up and I'm having a ball. I do wish U.S. stations would give honest and accurate reports, however. A rough count shows 74 countries worked in my first ten days of operation on 20 c.w. and s.s.b. Nil on 15 meters, at least during my normal 1200-1900 GMT operating hours." . . . . . 9G1FE took a few weeks off for vacation, according to K3SLP, and then put his KWM-2 back on 20. Neighbor 9G1DZ, who schedules WØEQN Saturdays at 2200 GMT on 14,110 kc., tells W7DJU he'd like to settle down near Seattle soon . . . . . K5SAM says the boys pile up on ZS2QK/a too heavily, causing him to QRT abruptly . . . . . W1ADW forwards a news clipping about VQ1IZ's quick QSY from Zanzibar. Irv observed radio silence by communicating with offshore destroyer *Manley* by heliograph and semaphore. Can *you* wigwag in a pinch? . . . . . Forty- and 80-meter favorite ZS1A celebrates his retirement with a temporary shutdown and relocation. K5JVF thinks Eric ought to settle down in some such spot as ZS9 or Marion isle . . . . . W8GIU hears from CR6FW that Angola amateurs are forbidden to QSO Iron Curtain stations while other CR/CTs can do so . . . . . Africa oddments thanks to clubs and groups: FB8WW's fast c.w. gargle sneaks through from Crozet isle on 14,040 kc. around 1500 GMT, multipath at times. . . . VQ8s BFA BFB BFC and BFR are VQ9HB's aliases for current action on Agalega, St. Brandon, Chagos and Rodriguez isles. . . . 7X2s DD, c.w.; VR, 14,190-kc. a.m.; and VW, 14,115-kc. s.s.b., keep Algeria audible. . . . 5T5AD, 14,250-14,270 kc. at 1800-1900 GMT, would stick with it longer if the gang eased up on the fast English. How would *you* like to handle pile-ups in QRQ French? . . . ST1WP has 'em queued up on 14,120-kc. sideband at 1530 GMT. . . . 5X5JG, 14,135 kc., schedules W4RLS each Wednesday at 1845-1930 GMT. . . . There's talk of 14-Mc. FB8YY in French Antarctica. . . . 7G1s G and NN throb the 14-Mc. c.w. mob.

OCEANIA — CR7LU writes ARRL Treasurer Dave Houghton of Timor activity by CR8s AD on c.w. and AE on a.m., usually from 1200 to 1400 GMT . . . . . Kwajalein comments by WA6HRS, recently KX6DB c.w. whip *pro tem*: "KX6 is not a rare one on voice, there being half a dozen sideband stations active. On c.w., however, only Ross of KX6AJ holds the fort after KX6BK's departure. On a previous trip to Kwaj I put KX6BU on 40 phone but nobody seems to tune down to 7150 kc., the upper limit of the KX6 phone subband. KX6DB's kilowatt and beam really get attention on 20!"

EP2DM's DX-35 and HQ-150 do brisk business around 14,075 kc. at 1230-1430 GMT or so. Javad also likes a go at 21-Mc. DX when the bounce is right. (Photo via WB2FMK)



5H3JR hangs out on 14,270 kc. at 1900-2000 GMT with stacked Vees aimed Statesward from a remote mission in Nyambiti, Mwanza. A four-811s linear amplifier, courtesy QSL manager W2SNM, has since been added to this layout. He's W3EHG back home. (Photo via W2SNM)

. . . . . "I usually operate c.w. near 7020 and 14,030 kc., single-sideband on 7220, 14,327 and 21,440 kc.," declares W5HJ/KJ6 . . . . . PARA (Philippines) operated DU4DM near Mayon volcano on DX bands in mid-February, according to W3EFZ . . . . . K6AJG and XYL personally hobnobbed with DU1s BSP HR RC, HS1AA, JA1s BRK BYJ CO EF UM YL, VSs 1LV 6DS and other DXers during their recent Oriental tour . . . . . Club periodicals provide more Pacific ponderables: FP8CB, with WA2GGB, tried his DX luck from French Oceania during the ARRL Test, gear courtesy WA2WUV (HC8CA). . . . W4KKA audits weather patterns in VS9-VQ8-VK9 regions. . . . WA6QAU put FO8AA back in business with a pair of 6DQ5s. Philippe reports F2HM and 6W8CB/mm attending meetings of the French Polynesia Radio Club, Tahiti. "We are reconditioning all available radio equipment including the National at FO8AA, an SX-42, two receivers at the weather station and an RCA marine model. Next come the transmitters."

HEREABOUTS — RSB (Bermuda) invites U.S. and Canadian amateurs to frolic in its 1964 Bermuda Amateur Radio Contest, a single-operator shindig, on two week ends this month. Combine c.w. with phone on 3.5 through 28 Mc. from 0001 GMT May 4 to 0200 the 5th, and May 17-18, same times (cross-mode QSOs *are* permitted in this one). W/K/VE/VOs give RS or RST reports to VP9s, while the latter send RS or RST plus parish names. Scoring for non-VP9s: Each Bermuda station worked per band counts 3 points, this total to be multiplied by the number of band-parishes contacted (watch for these parish abbreviations on c.w.: Dev., Geo., Nam., Pag., Pem., San., Smi., Sou., and War.). To be eligible for certificate awards of merit, plus a grand trophy guaranteed to get you a suntan, GMT-only logs must be postmarked no later than June 30, 1964, and mailed to RSB Contest Committee, P.O. Box 275, Hamilton, Bermuda, together with a signed statement that all rules and regulations have been observed . . . . . Ws 1KQY 2GT 6NAZ and VE3ADV rejoice at the return of old-time DX favorite CX2AJ to the airwaves. Enzo's rhythmic r.a.c. was a 14-Mc. bandmark a quarter century ago, and his Donald Duck QSLs were famed throughout the world. Now retired at 70 with plenty of time for hamming, yachting and fishing, CX2AJ hunts old DX cronies on c.w. or phone, 10 through 80 meters . . . . . "I look for Africa and South American stations on week ends," notifies KL7CYS, a 20-meter c.w. hound with 120 watts, a TH-4 beam and RME-6900 receiver. Bob roams 14,001-14,050 kc. at 0700-1300 and 2300-0200 GMT . . . . . W4OPM relays FM7WQ's thanks to all who chipped in to get Pierre back on the air after a knockout by hurricane Edith. Watch for the new FM7WQ HT-37 around 14,125 kc. on week ends at 2000 GMT or so . . . . . CO2ZQ, YV5AGA and W4UAE recently got together for an enjoyable personal three-way at Miami . . . . . W9NN finds OX3DL trying the key at KC1USK . . . . . W5MQG looks forward to a 15-month Pakistan USAF tour commencing early in '65 . . . . . WN6FHH wants more c.w. DX to use 7150-7200 kc., but most overseas amateurs aren't licensed to operate that high on 7 Mc. K5JVF's current peeve is the lack of 40-, 80- and 160-meter interest evidenced by most recent DXpeditions. QST

QST for

YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

Her letter prompted it all! Ethel Smith, W7FWB (now K4LMB), YLRL's first President, shown 25 years ago when YLRL was just an idea.

Happy Birthday YLRL

MAY I offer my congratulations to the YLRL on the event of its 25th anniversary. The organization today is a far cry from the little handful of YLs who banded together in 1939 and it certainly has surpassed the fondest dreams any of us had at that time.

We figured there were probably 1000 licensed YLs in the world in 1939. I imagine there will be that many at the convention in Columbus, Ohio this year. Today the YL is an accepted part of amateur radio and the girls are active in every phase. I'm proud that I had a chance to play a part in its beginning and take pleasure in extending my congratulations to those YLs who have carried the torch high throughout the past 25 years. May the next 25 years bring as much more accomplishment. 33, Ethel, K4LMB"

These words received from Ethel Smith, the first President of YLRL, make a fine introduction to this anniversary greeting. May 1964 marks the 25th anniversary of the Young Ladies' Radio League, this country's major women's radio organization.

The original officers of YLRL — President, Ethel Smith, W7FWB (now K4LMB); Vice Pres. and Activities Manager, Carol Keating, W9WWP (now Carol Witte, W6WSV); Secretary, Enid Carter, W9NBX (now Enid Aldwell, W6UXF); and Publicity Chairman, Anita Bien, W8TAY (now W4JCR) — could hardly have realized the scope or the extent to which their ideas would grow. Their work so ably begun has been well carried forward by subsequent officers. The full extent can best be appreciated by considering next month's celebration at the 5th YLRL International Convention.

The Convention Committee has announced the following detailed program for YLRL's 25th anniversary celebration which will be held June 19–21 at the Nationwide Inn, Columbus, Ohio:

Friday — all day — meet the YLs. All girls: please bring a QSL card and put it on the bulletin board at the registration desk when you pick up your ID card. Please cooperate 100% with this effort — it will make for so much more fun. All meals Dutch Treat this day.

Saturday — 9:30 A.M. — YLRL business meeting conducted by President Blanche Randles, K1IZT.

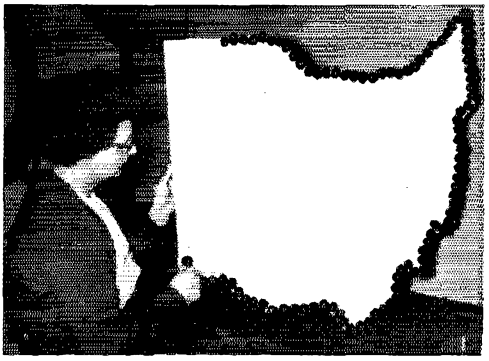
Coffee break.

1:00 P.M. — YL luncheon, with recognitions and surprises.

7 P.M. — YL and OM's banquet. Guest speaker will be Enid Aldwell, W6UXF, whose topic will be "CQ Happiness." Co-author, with Dr. William R. Parker, of the book *Man: Animal and Divine*, Enid now works with the Parker Foundation of Human Relations. Her forthcoming book *Dear Anne* deals with personality problems and how to overcome them. A co-founder and first secretary of YLRL when she was W9NBX, Enid is one of few charter members who will be a 25-year-continuous member of the organization.

For OMs on Saturday — 9 A.M. — An all-day trip to the Center of Science and Industry. This is a new building which houses the Columbus Radio Club, as well as a planetarium with scheduled shows, and many interesting projects. Universal Service, commonly known as Gibby's, is easily accessible to the Center for OMs who like radio stores.

Sunday — All guests remaining on Sunday are



Ruth, W8LGY, adding the finishing touches to the Buckeye State you will see at the YLRL convention in June.

* YL Editor, *QST*. Please send all news notes to K1IJV'S home address: 139 Cooley St., Springfield, Mass.

invited to be guests of the Buckeye Belles at Brunch in the Hospitality Room. The Lancaster Hamfest is 35 miles away for those who might like to attend.

The Buckeye Belles are planning many things that will make this an outstanding affair.

Deadline for registrations is June 12, 1964. Mail your registration to Elizabeth Isham, K8UKM, 474 Darbyhurst Road, Columbus 4, Ohio. A complete YL ticket is $10.00 (registration $2.50, YL luncheon $2.50 and banquet $5.00). A complete OM's ticket is $5.00. Absentee tickets are available for $1.00 for those unable to attend in person (also see *Harmonics*).

All YL clubs and groups interested in displaying their certificates, scrapbooks, trophies, etc., should make arrangements with Betty Kisel, K8WZT, 37955 Aurora Road, Solon, Ohio.

Migrate to the Buckeye State in 1964!

Kentucky's SCM

The work and responsibilities of a Section Communications Manager are held in high regard by radio amateurs. When election results favor the distaff side of radio amateurs, it is always with pride that the event is reported on these YL pages.

The recent election of Pat Schafer, K4QIO, as SCM of Kentucky is just such an occasion. There have been several YLs in past years who have held this position, but currently there are just two. Pat now shares the honor with Helen Mejdrich, WØOPX, in Minnesota.

Pat, her OM, George, K4GWA, and their four children live in Louisville, Ky. Since obtaining her Novice license in 1959 and her General in 1960, Pat has been an active YL in the amateur radio field. She is a past secretary and past president of the Amateur Radio Transmitting Society (ARTS) of Louisville. She enjoys DXing and hopes to mail her confirmations for 115 countries in soon for DXCC.

Photography, archery, target shooting, and piano lessons are but a few of Pat's other interests. All her activities make her another busy YL operator.

Who, Me?

That was Vivian, WA8EMN's first reaction when invited to learn about amateur radio. "Who, me?" The year was 1960, at which time Vivian was in a Detroit, Michigan rest home suffering from spinal injuries, the results of an automobile accident in 1941. Another patient was studying to become a "ham" and invited Vivian to learn along with him. After listening to the beeping and various tones emanating from his receiver, Vivian just yelped: "Who, me?" He went *on* to get his Novice license while she learned the code just to be polite.

It wasn't until 1962, when she was seriously ill, that Vivian started to study radio theory diligently in order to occupy her mind. It was then that the radio bug really bit and she received her Novice license in June, 1962, her Conditional in February, 1963, and has been an active ham ever since.

(Left) Pat Schafer, K4QIO—SCM of Kentucky.

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(Below, left) Ruth Rice, WA2VYS, of South Salem, N. Y., joined the BPL last year. An excellent c.w. operator and fine addition to the traffic system, WA2VYS is now familiar to many on the NLI Net, NYS and 2RN. When not hamming, Ruth likes to keep in touch with her other hobby, bird and nature photography. (Photo courtesy of W8CXM)

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(Below, right) Phyllis Riblet, W5CXM, is one of many 5-land YLs who can be heard daily on 15 meters handing maritime mobile and hospital traffic that the busy seaport city of Houston, Texas receives.

(Above, left) the radiant faces of Lew, K8WTU, Gabe, K8OJI; and Vivian, WA8EMN well portray the happiness amateur radio has given them.

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(Above, right) the Colorado YLs Christmas party was well attended by (front row, l. to r.) WAØBBR, KØUXO, KØRGU, WØHEM, WØUOT. Back row (l. to r.) KØBTV, WAØDAC, KØRXK, WAØBBP, KØYJG, KØEPE and WØHJL.

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What else would you do when your crystal is for a traffic net frequency? Martha Colburn, WA4PDS, ex-DL4IQ and WA2WBA, joined the net and has become another BPL YL. Heard often on NCN, 4RN, EAN and HBN, she not only handles traffic but is building a keyer, makes her own clothes, raises dogs and keeps up with those two lively boys (right).

Last fall she became a member of Detroit's Metropolitan Rag Chewers' Club whose members make it a special point to help other amateurs. At that time, Vivian was chirping merrily on 15 meters and a group from the club were dispatched to the nursing home to correct this problem. Gabriel Wellett, K8OJI, was one who helped greatly. In the course of several subsequent visits to assist with beam problems, it soon became evident that more than amateur radio prompted the frequency of Gabe's calls. When their engagement was announced a few weeks later, Vivian and Gabe took much good-natured teasing.

On December 27, 1963 Vivian and Gabe were married. Their wedding, which took place at the Dorvin Convalescent Home in Livonia, Mich., was attended by many members of the radio club. Lew Von Trott, K8WTU, and chaplain of the club, officiated at the ceremony and the photographer was W8QGE. They now make their home in St. Clair Shores, Mich. A very wonderful answer to the question: "Who, me?"

YL Club News

YLRL Treasurer Barbara Houston, K5YIB, reports her new address is P. O. Box 88, Richardson, Texas.

At the Buckeye Belle's annual meeting newly elected officers were announced as follows: president, Toni Chapman, K8PXX; vice-pres., Helen Smith, K8QBU; secy., Mary Gambill, K8CEN; treas., Ruth Williamson, WA8CJP. Lillian Richardson, W8HWX, 3709 Starr Ave., Oregon, Ohio, is the new certificate custodian. Applications should be certified with log information and 25¢ to cover postage and handling.

The Gaylarks announce the following new officers: president, Harriet Woehst, K5BJU; vice-pres., Audrey Beyer, K5PFF; secy.-treas., Margaret Pearre, K5MXO; and historian, Sue Hutton, WA5FVH.

The Floridoras announce a new club call, WA4RXP, of which W4UF is trustee. A contact with this station will count as 2 points toward the Floridora certificate.

Silent Key

With deep regret we record the passing of Mary Schultz. K6OWQ, of Temple City, California and wife of Carl (Bud) Schultz, W6CG, of injuries sustained in an automobile accident in West Covina, California on March 18, 1964. A member of YLRL and LAYLRC and the first place winner of the c.w. portion of YLAP in 1959, Mary was very well known on the amateur bands and will be greatly missed. QST

Important Notice—Changes of Address

Important changes in handling second-class mail matter are now in effect. Please advise us *direct* of any changes in address. When notifying, please give old as well as new address. Thanks.

CONDUCTED BY SAM HARRIS,* W1FZJ

Contesting

IT MAY SEEM A LITTLE EARLY to be talking about the June V.H.F. Contest, but you wouldn't think so if you were on the receiving end of the local grapevine news channel. All the top New England groups have been working for the past two months readying their equipment for the coming Donnybrook. What does a top club do to get ready for a v.h.f. contest? Generally the first few months of preparation are sandwiched in between finishing up the low-frequency DX contests, the last of which occur in the end of March. Having expended much energy discussing the problems to be encountered, the usual procedure is to divide the activities into several categories. One group is generally put in charge of supplying, designing, building, scrounging, or otherwise coming up with transmitters for all the bands which are going to be used. In the case of the June V.H.F. Contest this means transmitters for all bands from 50 through 10,000 Mc., with always hope of one more above that.

Transmitter design must be consistent with operating simultaneously in the same building, or at least on the same mountain top, with all the other transmitter and receiver installations. The power output of each transmitter must be consistent with maintaining the communication desired. As the Regulations point out, minimum power necessary to obtain the desired communication should be run at all times. It is usually necessary, at least on the lower bands, to provide a method of varying the input power consistent with the type of work being accomplished at the given instant. It must of course be noted that in this particular instant the desired communication is always with a station who cannot quite read your signal and the result is that the maxim legal limit is usually in use.

Harmonic output and spurious radiations must be kept to an absolute minimum if all bands are to operate at top efficiency all the time. Transmitters for 50 Mc. and 144 Mc. generally consist of a 250-watt general-use transmitter and the kw. standby transmitter. The 250-watt transmitter is generally used for the majority of the contacts until such time as the local population has either been worked out or gone to bed at which time the higher power is utilized to pick up the more distant sections and to maintain scatter-type schedules. On 220 and 420 Mc. the most you can run is usually the order of the day and generally consists of somewhere between 100 and 500 watts. The transmitter committee is thus burdened with the problem of coming up with four a.m./c.w. transmitters capable of operating continuously with an input of at least 200 watts and two more transmitters capable of continuous operating at the kw. level, plus five more transmitters for the 1215-Mc.-and-up bands, each operating with the most output that is practicable and consistent with reliability and distance to be covered.

The microwave contingent takes care of transmitters from 1215 Mc. up, and in general must not only supply transmitters for the home location but must also supply numerous transmitters to be loaned out during the contest to strategically located stations in order to insure contacts with hard-to-get sections. (Connecticut, for instance).

A second group is delegated to design and come up with antennas for all the various bands. This includes at least two antennas for 50 Mc., two antennas for 144 Mc., both sets independently rotatable and capable of being simultaneously fed, so that band scanning in more than one direction at a time may be accomplished. Antennas for 50 Mc. for example might consist of a pair of stacked five-element arrays plus a sixteen-element rotary array. 144 Mc. would have as a minimum a 64-element rotary plus another, backup, 64-element rotary array. Arrays for the higher frequencies would be consistent in gain with the lower frequencies although not so ambitious in size. The microwave antennas must not only be provided for the portable location but antennas for each of the loanee locations must also be provided. The antenna committee must also plan the layout of the various antenna installations to provide best coverage in all the desired directions without interfering with each other. In fact, one of the most important items to the successful operation of the contest is the antenna and transmitter layout at the proposed location. Much of the desired information must be imperically obtained by "losing a few."

The third group, the Receiver Committee, is generally assigned to provide receiving equipment for all bands. As in the case of antennas and transmitters, a duplication of effort on each band is required. 50 Mc. and 144 Mc. must have a minimum of two completely separate receiving equipments in order to take advantage of the high population density. Not only must the converters themselves be highly resistant to overload, but the receivers must be capable of continuing to listen while your own transmitter is in operation. Furthermore the receivers must be capable of both fine tuning for weak c.w. signals and rapid

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

tuning for fast acquisition of short-calling a.m. stations. Contests are generally won on the ability to log stations more rapidly than the other fellow. Mountaintop stations are seldom at a loss for people to work but are rather plagued by their inability to cover the band rapidly enough to acquire all the calling stations. A reasonable receiving setup would require seven general-coverage receivers in conjunction with eleven separate converters providing at least dual operation on 50 and 144 Mc., single-operator coverage on 220 and 420 Mc., and single-operator coverage from 1296 Mc. up. This would be an absolute minimum for a contest-winning effort and of course would necessarily require augmenting with several spares of each variety of equipment.

Sound like an ambitious program to undertake? Believe me, it's only the beginning of a real hard program and one which veterans like W1MHL and K1OOR, W1IPJ, W2PEZ and W6UW make year after year. One might wonder why they do it. The only answer is it's part of amateur radio and that radio is fun.

144 Mc.—Great Britain

How is two meters doing in Great Britain? Well, here's an inside view from Les Coote, G3AHB. "On the receiving side the 6CW4 with its 3 to 4 db. n.f. is quite popular. Antennas here are mainly yagis, the 6-over-6 slot-fed commercial make being very commonplace, usually at 30 to 50 feet up. Eighty per cent of the fellows use the 'Armstrong' method; a few of us have rotators but cost is about $65.00. Activity is an interesting aspect. In the London area several hundred stations are active, the area being within a 50-mile radius of London. As a result of the high activity with young, up-and-coming two-meter types such as G3SHK, G3SAR and G3SHZ, every night someone is always on and even in poor conditions one can work in some directions about 200 miles. The snag is that in the outlying counties activity is mainly by 'old timers' who aren't able to be on all that often and as they probably have gotten hundreds of QSL cards and need no more, getting remote counties confirmed is not easy. If we had keen, up-and-coming v.h.f. enthusiasts in the remote counties who could be on regularly they would undoubtedly QSL promptly. I feel it is up to us 'older' timers to convey the advantages and the fun of v.h.f. to the newcomers and help them to get at least a simple convertor going. S.s.b. is not very popular as yet on two meters. I personally see no real advantage (ooo-o-o, what you said!). Good full-modulation a.m. of the right frequency response seems to pay dividends for me.

"Parametric amplifiers on two meters — G3CCA is doing wonders on this. He hears stations that can't even hear him! But it is mainly a commercial venture at the moment.

"This is my own personal viewpoint of two meters and I may stress that probably some others agree with my views."

Fine business, Les. Delighted to hear from you and hope you keep the news coming this way.

144 Mc. & Up

It's always good to hear that the v.h.f. hams are actually building gear, and recently they seem to have gone into high gear themselves. At Huntsville, Alabama, K4IQU has recently completed a 4' aluminum dish for 1250 Mc. Dave sez it works fine with approximately 25 to 30 db. gain over a dipole, and has been checked over a five-mile path (APX-6s at both ends) with both ends having the same results, 25 db. over S9. He intends to try RTTY soon. Seems that in the Huntsville area recently 1250 Mc. has been used for local ragchewing and there is some talk of using this frequency for the local c.d. net. Dave, K4IQU, had a successful check with WA4OCY on 144 Mc. RTTY and would like some skeds now on 50 Mc., 144 Mc., or 1250 Mc., via that mode. At Bothell, Washington, W7AGJ sez that: "1220 Mc. is also a well-used band in the area, there being around eight fellows using APX-6s with more building. Antennas range from long Yagis (30 elements), 4-foot helices and corner reflectors to large oil cans (6 db./gallon type). [The v.h.f.ers are the *most* ingenious, sez I. — *Helen*] We all have quite a time on the week ends when one of us goes to some hill around Seattle with his APX-6. There is also quite a bit of fixed station-to-fixed station activity in the area." Dave also sez that one thing the fellows have found out is not to be afraid of using 50 feet of coax with an APX-6 if it means getting the antenna in the clear.

> Word has reached us that a group of amateurs will be working the V.H.F. QSO Party from Mt. LeConte in the Great Smokies again this June. They will use the call W4SKH/4, and the working force will be composed of East Tennessee amateurs. They intend to work the full 32 hours this time, and to have signals on 50, 144, 220, 430 and 1240 Mc. It is going to be a serious effort, with a large group participating. The boys would appreciate contacts and skeds for 144, 220 and 430 Mc. Anyone interested is invited to write to W4SGI for skeds.

In the works at the W7AGJ QTH is gear for 10 kMc. It has been completed and is working but Dave is waiting for the summer sunshine before taking it mountain-topping. "Once a fellow has an APX-6 it is very easy to get on X-band," he sez. "Just add a few pieces of waveguide, use the i.f. strip in the APX and rob power from same. Presto! A two-band portable!" Other than these several projects W7AGJ hasn't been doing too much, other than working on a slow-scan TV monitor for 50 Mc.

K3ADS is also working and building for TV. Larry sez he is making a detailed study, which will extend over a period of several months, on u.h.f. antennas for 450 Mc. as to gain and long-term signal reliability using distant u.h.f. TV stations. He is also installing video switching and pulse distribution systems and a new operating console, and wants to complete all the closed-circuit installation before putting the signal on the air. [Probably a darned good idea.] At the present writing K3KFL and K3ADS have resumed TV tests between their 3-mile non-line-of-sight path and expect to have good results after Joe finishes rebuilding his transmitter.

Building for 432 Mc. are WB2COZ, WA4BBY, K4IXC, WA4GHK, W4MIN, WA4FIJ, W5UGO, WA9HUV and W6CTM. Most of these boys are also building gear for other v.h.f. bands but are concentrating, more or less, on the 420-Mc. band. Howie, WB2COZ, is modifying a 465-Mc. transceiver for 432 Mc.; WA4BBY, Jim, has completed a

John, WA9HUX, operates 50 and 432 Mc. from this neat operating position. His Milwaukee operations give many a new state worked on six.

2C39 432 transmitter and is in the process of testing it, is building converters for 220 and 432 Mc. and a parametric amplifier for 432 Mc.

At Melbourne, Florida, K4IXC is working on 432 and 1296 gear with WA4GHK. Frequency at K4IXC on 432 is 432.015 Mc. and although John is now using low power he is working toward higher power, having obtained approval for a kw. John (K4IXC) and Jim (WA4GHK) have modified a couple of APX-6 cavities for use on 1296 Mc. and are having lots of fun playing around on that band while building bigger and better rigs and antennas for more serious endeavors. Another Floridian, W4MIN, sez he is experimenting with beam antennas for 1215 Mc., and is building gear for 220 Mc., s.s.b. converters for six and two meters, a linear for six and two meters, and 220- and 432-Mc. transmitters and converters. Don sez he is the only v.h.f. ham in De Soto County.

At Panama City WA4FIJ is building a rig for 432 running 150 watts input to a 4X150A. Dick is using a corner reflector at 50' and although he's had no QSO as yet he hopes to soon contact the nearest station, located in Sarasota. Dick's 220 rig should be completed for summer operation and nearest station on that band is W4ZGS in Ft. Walton Beach, only 50 miles away. WA4FIJ also tells us that the two-meter net has been "reactivated and rejuvenated" with about 18 stations now on 144 Mc. in Panama City.

W5UGO sez "I built the 432 converter in the 1962 *Handbook* and found that it is remarkably easy to adjust. No antenna made yet and I haven't even decided on a style, but am planning to use the three-band 4X250B final running 300 watts c.w. and a.m., and will drive it with a Tecraft 200 rig." Larry is planning also to use the same rig with an 11-element Yagi and the 1962 *Handbook* converter for 220-Mc. operation. And on 144, plans include stacking 2-11-element Yagis using the same transmitter but with a 522 drving it — until he gets an s.s.b. generator. "Seems to be very little interest here in Oklahoma above two meters," sez Larry. [C'mon, fellas, make him eat those words!] He intends to flay the two-meter band this season as he missed all the decent openings last year. Iowa, Michigan and Alabama are states still needed by W5UGO and I'll bet he'd like skeds.

A few notes from WA9HUV concerning happenings on 432 Mc. in the Elmhurst, Illinois area: "The band has been very quiet with few contacts except on Monday nights. W8PT in Benton Harbor has not been heard lately but W9OKB says he's moving into his new home. [Check!]

Gary, WØCTM in Minneapolis, wrote that he has about 150 watts output from a 4X150 on 432. Gary is hoping he can work the Chicago area this summer, and so are we. He has a 64-element collinear at 70 feet. W9ELH in Lombard, Illinois has been running tests on s.s.b. on 432 with his exciter. Ed hopes to have his final going before summer. Here at WA9HUV we are working on a final too, and so that little old 2-watter has got to move over." Glad to get the news from your area, Norm, and to know that the boys are go-go-going.

Out in Taylors, South Carolina, W4TLC is ready for skeds on 144.115, 220.200 and 432.345 Mc. Charlie sez "now that warm weather is on its way I wonder if anyone would be interested in taking advantage of morning inversions and set up some skeds between 9:00 and 10:00 A.M. weekdays on 144, 220 and/or 432 Mc. I find this time of day produces good signals on the higher bands at least up to several hundred miles in warm weather. I work mostly at night and there must be someone else that does this (or doesn't work at all), and is open for morning skeds. The bands are pretty dead around here during the day (and nights too, sometimes)." OK, Charlie, we're spreadin' the word and you should soon be loaded with skeds.

220 Mc. news from 7-land is usually quite scarce but this month we have news from W7AGJ at Bothell, Washington, and from K7SJQ at Portland, Oregon. Dave (W7AGJ) sez: "Since early last summer I have been working into Oregon (160 miles) on 220 with 40 watts c.w. to a 10-element Yagi over a rather poor path. At first the receiver was a 416B in a beer-can cavity into a homebrew convertor into a 75A3, but after losing 416Bs to transmitter r.f. I made several changes resulting in a better n.f. and no front-end burnout. However, the acid test will come soon, as I'm building a 4CX250R coax final for this band. The 220 gang around Seattle is quite active, including K7IRR, WA6HIA/7, K7KDU, K7YZZ and W7AGJ. We all have the usual problems with Channel 7 TV local oscillators and radars, but still the receivers are awfully quiet, so any 220 stations within 500 miles of us please write for skeds. If nothing else, there's always aurora — VE7-land please note!" Can't say that Dave isn't trying, can ya?

From Portland, Oregon, K7SJQ sez he's still working on the 220-Mc. rig and it will probably be on the air by the time you read this. Ron also notes that two-meter activity is growing in that area all the time.

K4IXC writes us that he has added another state to his two-meter total, which now stands at 27 states worked, with Delaware being the most recent one: John worked K3OBU during January. He is hopefully looking forward to #28 which might possibly be Tennessee and K4CLE with whom he is keeping skeds. At Durham, North Carolina, WA4BBY notes that two-meter activity progresses with stations in the area now active being W4YBN, W4FDO, WA4BBY, W4RZS, W4BZL, W4LEN, W4VON, W4HJZ and WA4FJM. WB2COZ is active on two-meter m.c.w. on 144.7 Mc. and would like some skeds. From Holmes, New York, WB2FOA tells us that he is building a 2E26 amplifier for Twoer and when that is completed will go on to build a 25-watt exciter for 50, 144 and 220 Mc.

Dave, WN1AFD has recently been testing a triple-stacked halo on two meters in preparation for a trip to Florida. He should be there or on his way at the present time, so hope he's had good luck. At Elmsford, New York, WA2ZPD sez that two meters is quite active in the New York City area with the band in good shape on several days during February. Using low power (1½ watts output) Ray was able to work many stations over 50 miles away and received good reports. He has recently raised his 8-element beam and will soon have more power on 144 Mc. In Balti-

Hans, VE3CRU, mobile on a motor scooter—"Getting ready, getting set, and going."

more K3VGX goes along with a number of the boys all over the country in saying that "two-meter activity is really picking up." K3KPA and W3ZRR in Philadelphia agree that two-meter ground wave has been very good during February, with stations being heard in Virginia, West Virginia, Washington, New York, Connecticut and Massachusetts. K3KPA is presently working on a s.s.b. receiver for 6, 2 and 1¼ meters using the McCoy filter and Eddystone dial. At Lemont, Pennsylvania, K3CFA sez that the two-meter band hasn't been active since the January V.H.F. Contest. The 100-watts-plus stations around Pittsburgh are heard frequently and W8KAY is still in there every night, but that's about it, according to Joel. He also sez that the Sunday evening group on two meters is enjoying increased activity with six stations showing up for the two-hour QSOs.

W4UAR at Anniston, Alabama, mentions that a number of fellows are getting interested in two meters again and within the next month K4CFF, K4KZM and W4UAR should all be occupants of the band. Salisbury, North Carolina, comes through this month via K4MHS and K4YYJ. John, K4MHS, sez that he recently received confirmation of a contact into Connecticut during 1962 and this brings his total of states worked on 144 Mc. up to 19 in five call areas. John calls CQ on 144.062 late each night and would like some skeds, particularly with Kentucky. Jim, K4YYJ, running a kw. to a pair of 4CX250Bs would also like some skeds with Kentucky, Alabama, Mississippi, Illinois and anyone else who would like a sked with North Carolina. He tells us that although there is a lot of complaint about low activity on two meters he found on checking his log that he had approximately 100 contacts on two during February and had been in four c.d. net sessions. Average attendance in the net was 11 stations. At Winston-Salem, Bob, WA4DYN, would like skeds with anyone interested in 144-Mc. DX skeds.

Einard Morterud, W5FPB, reports that during January and February there was a total of six net sessions held on 145.44 Mc. on Monday nights at 1930 MST in the Albuquerque, New Mexico area. Einar sez that twenty-one stations checked in during these net periods with some of them being present for all six nets and a number being present for five.

Out in 6-land W6YKS is working on 144 Mc f.m. gear and sez that K6VID, WA6MDL, W6FBK, WA6PTA, WA6MGG, WB6DGJ and WA6MKC are all on 147.31 with crystal-controlled TX and RX. WA6ROJ/6 notes that 144 Mc. seems to be good in his area (Ukiah, Cal.). Al, K7ICW, sez his log shows regular tropo contacts with K6LZC or W6NLZ (or both) every Sunday morning, and on February 23 W6DNG was putting through a fine c.w. signal 539 into Las Vegas from Long Beach. Al also sez: "The dissemination of information on Oscar III in this area has sparked some interest. Observance of orbital passovers will be attempted by K7ICW and K7RKH. Other stations in the area will be asked not to use 145.875 to 145.925 Mc. while Oscar III is in orbit."

Out in Detroit WA8DZP sez there have been a number of times when two meters was in excellent condition due to the warm weather, but because of very low activity on the band these advantages were lost. Chuck Loomis, W8FZ, at Saginaw, Michigan, sez there seems to be an increase in two-meter activity in his area with as many as eight stations getting on the band on *off-net nights*. It is particularly noticeable that fellows who change equipment or antennas come on and ask for all sorts of checks and reports. "Have noticed improvements in many stations as a result of these checks as we are real frank." Good! WA9HQP at Michigan City, Indiana is among those commenting on good ground-wave conditions into Wisconsin on February 2 and 3.

Two-Meter Motor-Scooter Mobile

Last December we received the following communication from VE3FUX, but decided to hold off on it until springtime when it just might give summertime ideas to some of the v.h.f.ers.

"Recently, Hans, VE3CRU and myself, VE3FUX took a 250-mile trip to Buffalo, New York, with what is probably the 'ultimate' in motor-scooter mobiles. A homebrew 'Bit Wheel' antenna was used along with a Twoer and homebrew transistor power supply working off the 12-volt battery in the scooter's electrical system.

"The trip went off without a hitch except that the darned exhaust pipe kept falling off in the middle of traffic! No band openings were encountered during the trip and contacts were mainly restricted to locals. VE3BVC was worked while near Toronto, a distance of approximately 45 miles. A major problem was receiving undermodulated signals while traveling at high speeds on the open highway. WA2WGL/mobile in Hamburg, New York, heard us as we went over the Garden City Bridge, a good 300 feet in the air, for a 40-mile mobile-to-mobile haul. The only actual difficulty encountered during the trip was being stopped by a self-styled 'G-man' who was 'just checking up on the two-way radio and Canadian license plates.' On being asked if he was an FCC official, he sped away with an air of authority!" Sounds like you boys had a lot of fun, Pete, and hope the stacked Big Wheels idea for this coming summer work out. Let us know.

50 Mc.

K3ARR at Sunbury, Pennsylvania, has recently been making comparison tests between his s.s.b. rig with low power and his a.m. rig with high power. Sez the s.s.b. comes out with a decided advantage. Bill reports that he is also running a 4-400A a.m./c.w. rig with good reports up to 250 miles, and he would like to sked anyone on six-meter c.w., a.m. or s.s.b.

From Decatur, Alabama, W4YRM sez no skip observed during February and best ground wave was only 160 miles. Jack is working on a 50-Mc. cascode preamplifier and hopes to soon be using it on the air. K4SFH in Mobile tells us that W4ZDY has an s.s.b. rig on the air, and word has come through of the forming of the Mid-Atlantic Six Meter s.s.b. Net in 4-land which will meet each Sunday at 2100 EST at 50.112 Mc. The net will be able to handle traffic from Wilmington, North Carolina to Long Island, New York, and welcomes a.m. participation. K4VHV is net control.

At Fortuna, California W6YKS tells us that scatter signals are being heard from Los Angeles, Sacramento and San Francisco, but no openings during February. John sez there are now five stations active on six meters in his area and that K6QJB is working regularly into San Mateo County. Out in Brookings, Oregon, K7UZQ writes that during the coming spring and summer he will be trying to work as many of the fifty states as possible on 50 Mc. using 10 watts or less. He will transmit on or near 50.33 Mc. and listen 10 to 15 kc. either side. Ken hopes to give QSLs from Oregon to a lot who need it. "No activity here at present and only other six-meter station (K7RUD) in all of South west Oregon" sez Ken.

Montana news is scarce but W7CJN tells us that he has completed building a panadapter for use with his six- and two-meter converters, and can constantly scan two megacycles of the band. Orrie figures it should help him catch more openings this summer and he is so right. Revised news of s.s.b. stations in Arizona comes from K7YSE, who tells us that "things have happened." K7JUE in Tempe with 2 kw. p.e.p. into 3E27s with stacked 6/6 beams and K7YSE at Scottsdale with 250 p.e.p. into stacked 5s are presently the only s.s.b.ers in Arizona on 50 Mc. Jim Sebastian at Warren, Ohio sez "six-meter f.m. has been very slow with only three stations in Warren. In order to work out you must have a good antenna and the usual DX on six-meter f.m. is around Cleveland, Ohio. Once in a while we can talk to stations in New Jersey, New York and Indiana." Jim is presently hard at work on the project of converting a taxi radio to 50-Mc. f.m.

XE1OE has recently written to tell us that to date he has 47 states confirmed on 50 Mc. with Idaho, Hawaii and Alaska to go. QST

Strays

The University of California at Berkeley credits several amateurs for outstanding liaison work for their recent *Golden Bear* expedition to the Galapagos. Getting the nod were HC8FN, WB6IWB, WA6HSQ WA6CNW, W6QOR, WA2WUV, WB6HPS, K6MQC, WN6IQW, WN6IWU, WB6JLP, and several nonham students, expedition members.

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K2TGH has been named Honorary Secretary of the North American Section of the Award Hunters Club. He will coordinate AHC activities and issue awards here.

Operating News

F.E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr.

It's the Greatest. The scores and station testing results in the Sweepstakes are presented in this issue. Note those and you have the greatest operating news of the month for those who got it. Just think, our first "SS" (Jan. '30) brought only 117 logs and its evolution (new and interesting exchanges last Nov.!) has made it ever more popular. Today every annual "SS" brings over-2000 logs . . . many more also taking some part for the fun and keen operating. *Bravo* Frankford! Congrats to the section winners and those of 87 club groups. There was no club competition in the first one.

The Versatile Amateur is Top Man in DX or Net Activity. To work different modes and bands well at will is easily the faster path to working more states and countries. By repeating or speeding up the sequence of nets and full interconnections we also can step up our potential and performance to meet emergency requirements. The key men who accomplish the interconnections (between h.f. and v.h.f., 'tween bands or c.w.-voice-RTTY) must be versatile or experienced in the systems they tie together, as they take messages reliably from one 'complex' or coverage area to another. The versatile operator and stations' the thing.

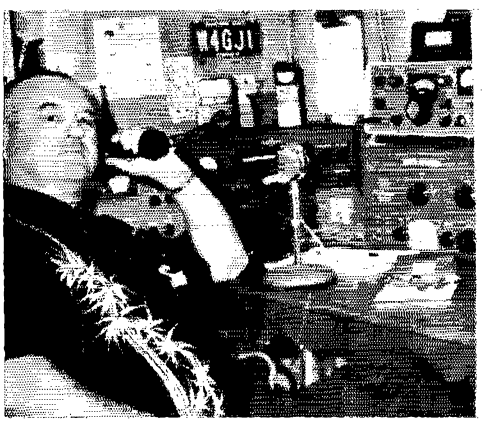
When emergencies develop they constantly demonstrate the need for versatile operators to surmount bottlenecks, to handle other's equipments. Our everyday net operations, c.w. and voice, are extensive. But here, too, ability to reach *all points* depends to a great extent on some operators having a dual membership in nets representing different modes or bands. Net controls often put out the call for that operator who can go to another net or band. Let's each aim to get around and develop more than one kind of amateur radio operating ability. Try a bit of the other fellow's skills. We noted the above in a North Carolina (NCN) Bulletin. WA4FJM puts it very nicely:

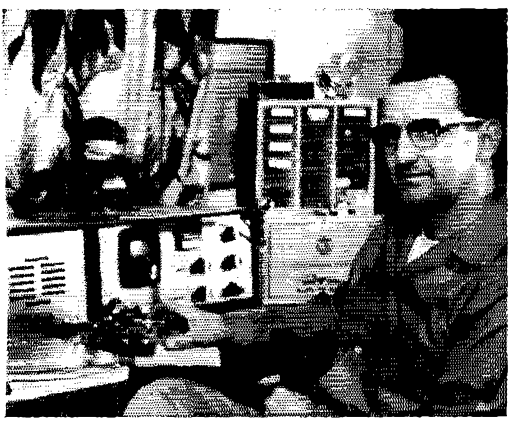
"On both c.w. *and* phone amateur radio needs *a great many people* who are practiced and competent, able to serve as effective members of the Amateur Radio Service when so needed. This means people who are familiar with organized, systematic procedures for distributing third-party traffic — which is a four-bit way of saying we need *nets*. We need good phone nets and we need good c.w. nets. We need experienced net operators and also beginners who will be experienced when the oldtimers retire. Why? Sure, we mean hurricanes and Ash Wednesday storms — they happen. We mean in case of illness, missing children and automobile wrecks — and even the Community Chest drive which netted ham radio a half-page spread in the local paper. These things happen daily.

"Any amateur who could, within the past five years, copy 13 w.p.m. c.w. can with practice get to 15 w.p.m. or better in a few months. It takes

MEET THE SCMs

On the left, East Florida SCM Guernsey Curran, W4GJI, with an interest in amateur radio dating back to 1MA in 1919. This SCM finds time for fraternal and civic organizations as well as hamming and sports like golf and gunning (Captain, Harvard Gun Team '26). On the right, Nebraska SCM Frank Allen, WØGGP, with a wide background in broadcast engineering. Frank is an active EC and in RACES and enjoys hunting, fishing, and camping, although he says "after radio, there's not much time for sports."





only the added familarization with basic procedures that comes from getting in the net to do an effective job in a c.w. net.

"Any amateur who can talk can, by two or three hours a week practice, learn to speak slowly and clearly . . . then do an effective job in a phone net provided he has learned at least the basic procedures. It is not easy to learn to pass traffic on phone. For standard symbols on c.w. the phone man uses pauses and voice inflections. Phonetics must come naturally and without fumbling. Speed must be correct."

Be Proud of both Code and Voice Ability! We're not here going to call the c.w. man who is mike shy or the voice op who is rusty on his c.w. only *half* an amateur — but we've heard something like that going around. We do want to offer the thought that every amateur should be free to operate the mode of his choice. However the all around amateur, though he may favor certain specialties, will be one with a high pride in gaining and holding, in a useful degree, skill and know-how concerning both modes (and use of different bands too) pertinent to our Amateur Service.

A *good* operator should be able to perform at least adequately on *either* of the basic modes, irrespective of personal preferences. This, in turn, means that our *stations* must be equipped accordingly — not just *able* to operate on either mode, but able to do it well! This means push-to-talk on phone, and break-in on c.w., and adequate zero-beating facilities on either. The amateur's greatest usefulness comes in handling third-party messages when other facilities break down, are not available or are inadequate. As in the Alaskan disaster, we can never know in advance what will be required of us.

— F. E. H.

A.R.R.L. ACTIVITIES CALENDAR

May 1: CP Qualifying Run — W6OWP
May 21: CP Qualifying Run — W1AW
June 18: CP Qualifying Run — W6OWP
June 13–14: V.H.F. QSO Party
June 19: CP Qualifying Run — W1AW
June 27–28: Field Day

OTHER ACTIVITIES

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

May 2–3, 16–17: OZ-CCA, EDR (p. 99, this issue)

May 4–5, 17–18: Bermuda AR Contest, RSB (p. 100, this month).

May 9–10: International Telegraphic Contest, USSR Federation of Radio Sports (p. 99, this issue).

May 9–11: Georgia QSO Party, Columbus Amateur Radio Club (p. 154, this issue).

May 10: Tennessee QSO Party, Radio Amateur Transmitting Soc. (p. 118, this issue).

May 23–25: Connecticut QSO Party, Candlewood ARC (p. 134, this issue).

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Details appeared on page 96, March *QST*. Let's hear from *you*.

During March the following additional amateurs were nominated in recognition of their extra skills and courtesies:

W2AYW	WA4IJH
WB2ESH	WB6HQY
K3CAH	WA9AUM
W3EEB	W9PFK
W4CFH	WAØFLL
W4MWH	WØYIIT
VE3BZB	

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for February Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	147	3566	3253	297	7263
K6BPI	63	1550	1466	80	3159
WA4IJH	7	1383	1374	9	2773
WØLGG	197	1207	1150	63	2617
WA4BMC	103	1134	1091	50	2378
WØBDR	107	1135	1086	28	2356
W9JOZ	33	1013	1049	2	2097
W3VR	47	911	882	9	1849
W1PEX	23	812	756	34	1625
W8UPH	21	776	680	93	1570
K9KZB	4	711	686	25	1426
W31VS	21	648	622	26	1317
K9ONK	24	526	487	14	1051
W9IDA	8	524	471	16	1019
W7BA	3	506	483	22	1014
W6RSY	47	459	349	155	1010
WA9AUM	21	453	439	2	915
WA2VYS	22	424	408	11	865
W3EML	26	435	336	12	809
K9DHN	16	398	357	4	775
K9IMR	29	362	223	112	726
WA2UZK	7	353	325	21	706
W9HAS	16	338	312	20	686
W6JXK	4	336	105	231	676
WA2EXP	1	335	310	19	685
W7DZX	16	336	298	5	655
W8DAE	47	298	220	58	623
WA4RSQ	5	309	307	1	622
WA9ECX	10	324	278	9	621
K4PXY	25	280	120	160	585
WA2VLK	33	277	244	30	584
W5CEZ	23	288	255	7	573
K7CTP	36	262	201	67	566
WA9CCP	20	281	232	32	565
K1KSH/4	61	248	220	20	549
W1TXL	81	233	198	17	529
K4AKP/6	16	257	212	44	529
K3GJD	334	107	73	11	525
K1WKK	18	257	231	16	522
K4KDN	38	244	236	0	518
W9DYG	48	252	199	15	514
W2EW	43	230	71	166	510
W9MM	2	253	252	0	507

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6IAB	712	1757	1431	323	4223
W4DUG	2974	0	0	0	2974
W6YDK	2368	221	180	36	2805
W4ZMN	1467	22	0	10	1499
KR6GF	600	47	32	44	723

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

WA9CEQ 200	W2RUF 119	W9NZZ 105
WA4FYV 174	WA2TQT 119	WN4OHO 104
W7APS 149	WA8FIC 119	WA8DGE 104
K6GZ 124	WAØCIE 118	K4SDS 102
WA4GWD 121	WB2HWB 106	K3SMT 101
K8GOU 121	K3PYS 105	

More-Than-One-Operator Stations

KR6MH 260 WA4NZD 150 W4SGH 113

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: WA2UZK, WA2VYS, WA4KBW, K4YSN, K6GJM.

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.

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date of receipt. All totals shown represent submissions credited through February 29, 1964.

W1FH.....308/334
W6CUQ.....308/333
KV4AA.....308/332
W8UAS.....308/329
W8JIN.....308/333
W2AGW.....308/332
W7GUV.....308/331
W1GKK.....308/333
W8POQ.....308/325
W8BRA.....308/331
W9RBI.....308/333
W4DQH.....308/332
4X4DK.....308/326
W3GHD.....308/332
PY2CK.....308/331
CX2CO.....308/329
W7PHO.....307/325
W8KIA.....307/331
W8BF.....307/328
W8MPW.....307/325
W2TQC.....307/326
W2LPE.....307/328
W2JT.....307/326

W4GD.....307/328
W9LNM.....306/329
G2PL.....306/329
W9HUZ.....306/326
W8JBI.....306/325
W2DEC.....306/322
W1BIH.....306/330
W4QCW.....306/323
W8KML.....306/327
W2BXA.....306/330
W9YFV.....306/330
W5MMK.....306/327
W3KT.....306/330
W9NDA.....305/329
W8DMD.....305/327
G4CP.....305/329
W7GBW.....305/329
DJ1BZ.....305/323
W1GLX.....305/328
W6EBG.....305/330
W0QVZ.....305/326
W8LKH.....305/325

G3FKM.....305/322
W6GPB.....305/326
W1JYH.....305/328
DL3LL.....305/321
HB9J.....305/329
W1ME.....304/327
K2GFQ.....304/325
W5ADZ.....304/326
K3UPG.....304/328
W3LMA.....304/326
W0DU.....304/326
CE3AG.....304/328
W2BOK.....304/321
W6AM.....304/329
W2HMJ.....303/323
W5ASG.....303/327

W6YY.....303/323
W8EWS.....303/327
W0A1W.....303/326
W4TM.....303/325
LU6DJX.....303/327
W8DAW.....303/326
W7ENW.....303/327
W4ML.....303/323
OE1ER.....303/325
W0ELA.....303/326
W2LV.....303/322
K2RZT.....303/320
W5KC.....302/325
G8KS.....302/320
W1ZW.....302/319
W0SYK.....302/320
K6ENX.....302/319
W9AMU.....302/319
W0QDF.....302/319
W4AIT.....302/325
W2ZGB.....302/318
W8BKP.....301/323
W2WZ.....301/324

W3ECR.....301/318
W5CKY.....301/320
W2SUG.....301/318
W2OKM.....301/319
W2FXN.....301/315
W0BFB.....301/320
W6GYV.....301/319
W5AFX.....301/326
K4LNM.....301/315
W3GAU.....300/323
W2GUM.....300/322
W7AC.....300/324
W4VPD.....300/317
W8PUD.....300/317
K6EVR.....300/317
W1HZ.....300/318
W5UX.....300/315
G3YF.....299/321
W4LYV.....299/319
W2TVR.....299/317
W1HX.....299/319
W2UVE.....299/317
DJ2BW.....229/316

Radiotelephone

W9RBI.....308/331
W3R1S.....308/333
PY2CK.....308/331
CX2CO.....308/329
W7PHO.....307/325

W8GZ.....307/330
W8BF.....307/328
4X4DK.....307/325
W8POQ.....306/323

W1FH.....305/326
W8KML.....305/326
VQ4ERR.....305/327
W2ZX.....304/323

PY4TK.....304/321
W4DQH.....303/325
W6YY.....302/322
W3JNN.....302/323

W2BXA.....301/323
W9JJF.....300/317
W2JT.....300/314
W0AIW.....299/320
W4QCW.....299/312

From February 1, through February 29, 1964, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

W5BOS.....234
W1WQC.....195
UA9CC.....162
WØFRX.....155
UA3GM.....154
SM5BST.....148
DL1XZ.....137

W5MUG.....131
W2YCW.....130
K6CSC.....130
JAØACX.....129
W3IXJ.....126
ZB1BX.....120
DJ1QP.....114

W1CMH.....110
W1HNI.....110
K3NLC.....110
UT5EW.....110
5B4TX.....106
W1AGF.....104

GI3OLJ.....104
JA8GR.....103
OK1AEV.....103
PA0POC.....102
W2VIR.....101
K3MCO.....101

K6RIA.....101
WA6LBP.....101
W7BCV.....101
W7ZHZ.....101
K9ROR.....101
LA8PF.....101

UA3HP.....101
YV5AWM.....100
WA2YBR.....100
K4MSS.....100
K0GSV.....100
KP4BJU.....100
ZD6OL.....100

Radiotelephone

W2CYX.....205
SP9FR.....195
G3WW.....176

PY2QT.....143
YV5BIG.....132
11TMG.....131

G3LGN.....119
OA4PD.....117
AP2MR.....114
TG9GZ.....108

W2FVV.....103
W6IEG.....102
11SPK.....102
W4MRH.....101

WA6KNE.....101
VE6AAV.....101
WA8AJI.....100

I1ANY.....100
PZ1BE.....100
ST2AR.....100

Endorsements

W9UXO.....311
W6FOZ.....310
DL1IN.....310
W5QK.....305
W2TP.....300
W6ANN.....300
OH2NB.....300
K6LGF.....291
W2RGV.....290
K4JVE.....290
K4RJN.....290
K6VVA.....290
W9DWQ.....290
VE3RE.....290
W4JDR.....282
W6UQQ.....273
K2QHL.....270
W4MS.....270
HB9KU.....270
JA7AD.....265
W3AFM.....264

W4BFR.....261
W2ORX.....260
W6LGZ.....260
I1UE.....259
WØAIH.....257
W6GRX.....254
W9VP.....250
DL1FK.....250
KP4RK.....250
W9KMN.....242
SM5BCE.....242
W9FKH.....241
W9AZP.....231
W5KTW.....230
G5VU.....230
W1BPW.....226
W1QV.....222
K4WHD.....221
W4RVW.....220
W9EGQ.....220
OK1ZL.....220
W7DIS.....213

W1WHQ.....212
VE3ADV.....211
W8KIT.....210
VE3AGC.....210
W3DJZ.....209
W1GKJ.....205
W6PHN.....203
W8BIE.....201
I1BAF.....201
W1UUK.....200
KØMAS.....200
DL1LZ.....200
UA3CT.....200
W9RDI.....192
K1HVV.....191
KV4CI.....191
W5RU.....190
W4HKJ.....183
WA6KNE.....180
K8GHG.....177
W2ASF.....176
W2CZF.....175

K6TWU.....175
W5LLB.....172
K6OWQ.....171
KØUKN.....171
K1IGO.....170
W1EZD.....169
W5FJ.....165
DJ5LA.....163
HP1IE.....162
K8POC.....161
W1YYM.....160
WA2FQG.....160
W7MH.....160
HK3RQ.....160
KL7DTB/6.....158
WA6GFY.....157
W4BWR.....156
W5AJY.....155
W2AAU.....154
W2FVI.....154
W6OMR.....154

W2KHT.....153
CR7CR.....152
G3OZU.....152
VQ8AI.....152
WB2FMK.....151
K6OT.....150
K9YOE.....150
IT1ZDA.....148
VE3RCT.....146
W1BRX.....144
K1NHR.....142
K1KPS.....140
W3QYG.....140
K4RZK.....140
W6UMI.....140
G2AAN.....137
VE2IJ.....136
DJ7CX.....135
W4LSG.....133
WA2BRI.....131

SM5AIO.....131
W1GOG.....130
W4TFL/1.....130
WA4EDY.....130
W2IOT.....130
W6FB.....130
VE3UR.....130
ZS4LX.....129
KP4BJD.....128
G3EIX.....123
WB2CKS.....121
WA2RUB.....120
K6TZX.....120
SM5AM.....117
K7UCH.....111
W2FOO.....110
W3EVY.....110
K4ISV.....110
KØQYD.....110
KH6BIH.....110

Radiotelephone

DL3LL.....312
WØJYW.....301
W2HTI.....301
DL1IN.....301
G3IDO.....301
W5AFX.....300
W4PDL.....295
W2FP.....280
W5MMK.....275
W4TDW.....270
K9LUI.....270
YV5AFF.....265
DJ2BW.....264

W6MBD.....263
K6LGF.....262
I1UE.....258
W1JYH.....251
W2TVR.....251
I1RIF.....251
W1BIH.....250
W3EWD.....245
W2BOK.....242
DL3RK.....241
W6QOG.....239
DL1FK.....237
K2JGG.....233

W9NZM.....233
K2JFV.....230
K6VVA.....221
HB9KU.....221
W3DJZ.....206
W9EGQ.....205
YV5BFT.....204
K6ERV.....203
I1BAF.....201
VK2JZ.....201
W4FPS.....200
KØMAS.....200
W1WQC.....194

E88K.....192
VE2WV.....191
W2SNI.....190
E2MO.....181
W9GMY.....179
WØMRJ.....174
ZS6BBP.....172
KØUKN.....170
VE3BTU.....162
DJ5LA.....162
W5DNL.....161
W4NI.....160

K1UDP.....160
K5DFZ.....155
WA6TGY.....151
W2CZF.....150
W5AJY.....150
WØUIM.....146
W4BFR.....144
W4BWR.....144
W4HKJ.....141
VE2BCT.....140
CX5AF.....138
IT1ZDA.....137

W6PHN.....135
W2KXL.....134
CR7CR.....134
K9ZEQ.....131
K3BNS.....130
ZS4LX.....129
VE7HJ.....128
VE3UR.....121
W1QCO.....120
W4PLL.....120
GW3NWV.....120
WØOBJ.....112
W4UF.....110

W1AW SCHEDULES

(Effective April 26)

Operating-Visiting Hours

Monday through Friday: 7 P.M.-1 A.M. EDST.
Saturday: 7 P.M.-2:30 A.M. EDST.
Sunday: 3 P.M.-10:30 P.M. EDST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent on request. The station will be closed May 29, in observance of Memorial Day.

Operating Frequencies

C.w.: 1805 3555 7080 14,100 21,075 28,080 50,700 145,800
Voice: 1820 3945 7255 14,280 21,330 29,000 50,700 145,800

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:
C.w.: Mon. through Sat., 0000; Tues. through Sun., 0400.
Voice: Mon. through Sat. 0100; Tues. through Sun., 0330.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

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 May 21 at 0130 GMT. Identical tests will be sent simultaneously by transmitters on 1805, 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from W6OWP only will be transmitted May 1 at 0400 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, 0130 GMT May 21 becomes 2130 EDST May 20.

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.

Daily tape-sent code practice transmissions are available on an expanded basis this season. These start at 2330 and 0130 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0130–0220; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0130–0220; 10, 13 and 15 w.p.m. daily from 2330–2400 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0130–0220 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 and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130–0220 GMT practice on those dates:

Date	Subject of Practice Text from March *QST*
May 4:	*It Seems to Us*. . . . , p. 9
May 7:	*Two-Band Sixty-Watter for the Novice*, p. 15
May 12:	*V.H.F. Antenna Facts and Fallacies*, p. 29
May 15:	*Resolve to Build Something*, p. 49
May 19:	*ARRL Amateurs Serve Their Country*, p. 66

Date	Subject of Practice Text from *Understanding Amateur Radio*, First Edition
May 25:	*Magnetic Energy*, p. 19
May 27:	*Electric-Field Storage*, p. 19

SUGGESTED OPERATING FREQUENCIES

RITTY 3620, 7040 14,090 21,090 kc.
WIDE-BAND F.M. 52,525 146.94 Mc.

GMT CONVERSION

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

CODE TEST RESULTS

Interest in the high speed code test sponsored by the Connecticut Wireless Assn., Inc., hit a new high in the March 16 test. A total of 44 copies was received by W1NJM as of the deadline date of March 25, from eight call areas. Eighty meters evidently provided the best reception, with 27 copiers making their copy from W1EIA on 3637 kc. Nine copied K6DYX on 3690, three copied W1EIA on 7120, two W6EOT on 7005, and three did not indicate. As of this writing, copies have not yet been checked.

A volunteer station to send the tests is needed in the midwest. Requirements: a good signal, a tape recorder, and willingness to build a simple gadget to key from a tone signal.

W1AW CONTACT SCHEDULE

Would you like to work W1AW? W1AW welcomes calls from *any* amateur station in accordance with the following schedule:

Time (GMT)	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000–0030[1]	.....	14,280	3555[3]	14,100	14,100	7080[3]	14,100
0030–0100	.....	14,280	3555	14,100	14,100	7080	.....
0100–0130[1]	.....	145.8 Mc.	21,330	145.8 Mc.	50.7 Mc.	21,330	.....
0230–0300	.....	.....	.....	1820	.....	1820	.....
0300–0330	.....	.....	.....	3555	.....	3945	.....
0330–0400[1]	.....	.....	3945	7255*	3945	7255*	3945
0400–0500[1]	.....	.....	3555[3]	.....	3945	7080[3]	.....
1700–1800[2]	.....	21/28 Mc.	21/28 Mc.	21/28 Mc.	21/28 Mc.	21/28 Mc.	.....
1900–2000	.....	7080	14,100	7255	14,100	7080	.....
2000–2100	.....	14,280	7080	14,100	14,280	14,100	.....
2200–2300	.....	14,280	14,280	14,280	14,100	7255	.....
2300–2330	.....	7255*	.....	21,075[3]	.....	14,280	.....

[1] Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin, on c.w. at 0000 and 0400, on phone at 0100 and 0330.
[2] Operation will be on 21,075, 21,330, 28,080 or 29,000, depending on band and other conditions.
[3] W1AW will listen for Novice Class licenses on the Novice portion of this band before looking for other contacts.
* Operation may be on s.s.b. as announced at the beginning of the period.
Station Staff: W1QIS, W1WPR.

Station Activities

•All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: K3MQE. RM: W3EML. PAM: K3CAH. V.H.F. PAMs: W3SAO and W3SGI. The EPA C.W. Net had 417 QNI and a QTC of 347. K3YVG has offered to take over a new net, the Pennsylvania Training and Traffic Net (PTTN). This net will meet nightly on 3610 kc. at 2300 GMT for the purpose of training interested amateurs in the art of traffic-handling. K3KEL has dismantled his station preparatory to entering the military service. The "Magnamatic Paddle" was in service by K3HTZ 5 hours after seeing the info in *QST*. K3SFP operates on 80, 40 and 20 meters with 40 watts and an SX-25. Top scorers in the Delmont ARC QSO Contest were K3RFH, WA3CAD and K3MQR. K3HEC is home after a siege in the hospital. K3OMP received the A-1 Operator certificate. W3RV added a kw. linear to the present gear. K3TYD, K3ZKH and K3UQH are now General Class. W3VAP was voted the Ham of the Year in the Abington ARC. WB2AXW will be active in the Philadelphia area as a student of Drexel Institute. KN3FXV, newly-licensed, is active from Paradise (Pa. that is). K3YQJ, K3OMP and K3JHF, all EPA netters, visited K3KTH. New club officers of the North Penn ARC: K3ISW, pres.; W3EMH, vice-pres.; W3URT, secy.; K3HLN, treas. The Overbrook School for the Blind will be grateful for any donations of excess parts from your "junk boxes." They may be sent to Elisabeth D. Freund, 64th St. and Malvern Ave., Philadelphia. KN3ZOL, an active Novice, is on 40 and 80 meters with an 829-B and 75 watts. K3TZY, 14 years old, just completed WAS. W3LXN, Northumberland County EC, has a new 50-watter on 6 meters. K3DSM is active in Indiana and chief engineer at station WVTI. W3ID was out gazing at his roof, says it's coming close to antenna time. K3ACR was injured badly in a fall while climbing up to take a look at his antennas. A word of caution, the next nice day *you* have off, spend a half hour and inspect those tower guy-wires. Field Day is almost here, are you ready? Traffic: W3CUL 7263, W3VR 1849, W3IVS 1317, W3EML 809, K3MVO 341, K3BHU 205, K3MQE 172, W3RV 122, K3CAH 103, K3OMP 82, W3ZRQ 81, K3YQJ 68, K3KTH 64, W3JKX 51, W3ELI 46, W3QDW 46, K3RUA 34, W3LXN 31, W3VAP 26, K3HNP 25, K3ZDK 18, W3BFF 15, K3KNP 12, W3OY 11, K3SFP 11, K3JHF 10, W3LC 10, W3BUR 8, K3HTZ 7, K3IMR 7, W3ADE 6, W3BKF 6, K3JSX 6, K3AKN 4, K3TEJ 4, W3BNR 2, K3NZD 2, K3YVG 2, W3EEN 1, W3ID 1, K3KEL 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—SEC: W3CVE. RMs: W3QCW, K3JYZ (for MDD Net on 3649 kc. daily at 0000Z). The MEPN meets on 3820 kc. M.W.F. at 2300Z and on Sat. and Sun. at 1800Z. The National Capitol V.H.F. Society will hold its hamfest at Marshall Hall, Md., May 24. The Confederate States Rebel Hamfest will be held at Marshall Hall, Md., June 21. The Anne Arundel Amateur Radio Club will hold its hamfest at Kurtz Beach, near Glen Burnie, June 7. I regret to report the sudden passing of W3EQK, on Feb. 27. He was SCM in 1958. W3CDQ reports 147 attended the QCWA Dinner. W3CQG is busy with traffic on MEPN. W3EOV has his auto tags 73-88. W4EXM/3 renewed his OPS appointment. K3GJD has accepted TCC station "A" appointment. K3JYZ is in California. K3LLR has been appointed AEC for Prince George County. W3MCG has been traveling to VU2-Land and other places. W3MSR has a new 75S-A3 receiver. W3OHI has a kw. linear under construction. K3OSX does not have much time for traffic. The following OESs sent in fine reports: K3DNO, K3PRN, K3LLR, K3VGX. K3PEJ keeps busy with school work. W3QCW is sending out a monthly flier to all MDD check-ins. It gives all the information about the net operations. K3QDD and K3QOO keep busy with school work and traffic. W3SGD and K3RGB reports that the BAAREC held a very successful SET during February. K3YLG is now using a beam. K3YIK is moving back to California. K3TAZ has been appointed AEC in the Baltimore area. K3TAZ has been appointed AEC in the Baltimore area. K3THF is moving traffic on the MDD and MEPN. W3TMZ has been traveling in W6-, KH6- and KL7-Land; W3TN is enjoying the relaxation from traffic. W3TUJ lost his antenna in the wind storm. K3URZ used a kite to fly a long wire for a transmitting antenna. K3VGX reports that 2-meter activity is picking up. KN3YOF is operating on 2 meters. K3YKQ is updating his station by going s.s.b. on 75-20-15 meters. Harvey is adding a stacked array for the 6-meter band. K3YBK is assembling parts for a 2-meter receiver. W3ZNW is going s.sb. with a GSB-100. The Foundation for Amateur Radio is planning a big hamfest in October. Each member club will have an active part in this hamfest. W3RE is chairman for this affair. Traffic: (Feb.) K3GJD 525, K3SMT 180, W3QCW 96, W3AHQ 84, K3JYZ 63, K3OSX 57, K3GZK 55, W3ZNW 43, W3OHI 41, K3QOO 38, W3MCG 28, K3LLV 27, W3OEV 17, K3URZ 17, K3CXX 16, W3PQ 16, K3QDD 16, K3THF 16, W3CQG 8, K3LLR 8, K3RGB 8, K3YBK 3. (Jan.) K3GJD 322, K3GZK 27.

DELAWARE—SCM, M. F. Nelson, K3GKF—PAM: K3LEC. RM: W3EEB. DEPN meets Sat. on 3905 kc. at 1830 local time. DSMN meets Tue. on 50.4 Mc. at 2100 local time. Renewals: K3KAJ and K3PZL as ECs; K3OWS as OPS. A new General Class operator, K3ZMI. At its annual luncheon, Kent ARC named K3LGC as its "Outstanding Amateur of the Year." This award will be an annual affair of the club. Delaware ARC saw a film on "Semiconductor Physics" by Brattain of Bell Labs. The Hawaii SCM sent a very nice letter citing the activities of First Stater K3DIO in the 50th state. Bob is PAM and also editor of the newsletter The *Tapa Beater*. K3CNI has finished his 6-meter transmitter and says the transistor modulator works nicely. Traffic: (Feb.) W3EEB 146, K3OWS 90, K3AXW 8, K3AZH 2. (Jan.) K3OWS 103. (Dec.) K3AXW 100, W3HKS 11.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RMs: WA2BLV and WA2VAT. K2RXB, Margate, is increasing his traffic-handling. N.J. Phone and Traffic Net totals for Jan.: 29 sessions, QNI 542, traffic 244. W2ZI, net mgr., enjoyed a month's trip to Florida visiting many old timers. WA2QPX, in the shore area, is heard on 160 regularly. The Salem County Radio Club has a 6-meter net every Wed. (except meeting night). K2LVN, past-pres. of the club, recently underwent surgery. WB2FJF, Mt. Holly, receives most of his traffic from WB2DAH, who lives next door—he gets it on 20. WA2AOX, Wildwood, supplies the following information: W2ODX ex-W3BJB, passed away several months ago. K3PPQ/2, Cape May, and WA2AVU, Wildwood, are in the Coast Guard. WA2IVZ received the Gloucester Co. ARC hamshack inspection award. The Award is based on safety, neatness and FCC compliance. WA2TSD is recovering from an infection. GCARC Club paper *Crosstalk* is edited by Gloucester County EC K2JKA and published by WA2KGD. W2REB was top SJRA scorer in the Jan. V.H.F. SS, with WA2EMB runner-up. W2JAV, Hammonton, is hospitalized. W2TBD recently was confined to the Wills Eye Hospital in Philadelphia. The Rancocas Valley Amateur Radio Assn. meets the 1st Tue. in Riverside. WB2CRT is pres.; WB2JIV, secy. W2WUP continues this year as pres. of the Burlington County RC. Meetings are held in Moorestown the 2nd Mon. Club news is solicited, especially from those not sending regular monthly reports. Support your County EC and help him with his emergency planning. Look for Burlington County Net 29.580 at 1100 Sun. W2ZVW is NCS. TRAffic: WA2BLV 241, WB2FJF 126, W2RG 123, K2RXB 58, W2XVW 50, WA2WLN 34, W2MMD 30, W2ZI 28, K2SHE 11, WA2KAP 2.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ICZ. RMs: W2RUF, W2EZB and W2FEB. PAM: W2PVI. NYS C.W. meets on 3670 kc. at 1900. ESS on 3590 kc. at 1800. NYSPTEN on 3925 kc. at 1800, NYS C.D. on 3610.5 and 3993 kc. (s.s.b.) at

(Continued on page 114)

NATIONAL's decision to produce the new NCL-2000 maximum kilowatt was prompted by the total absence in the amateur market of linear amplifiers which satisfied four important requirements:

1. 80 through 10 meter operation at a comfortable 2000 watts SSB PEP, and 1000 watt CW, AM, and RTTY operation.
2. Design to commercial standards for this power level, including sufficient plate dissipation to assure conservative ratings, high efficiency, excellent linearity, proper metering, and sensible interlock, overload, and safety devices for protection of both the operator and the equipment.
3. Compact desk-top packaging, with built-in power supply.
4. Price comparable to 500 watt (KW peak) amplifiers.

WE THINK we've succeeded in meeting these requirements rather well. The new NCL-2000 uses a pair of output tubes (RCA 8122) designed specifically for high power linear service, with *800 watts* of available plate dissipation. The power reserve of the output tubes and other components in the NCL-2000 allows us to regularly test it under I. C. A. S. ratings at 2000 watts *single-tone* input! Needless to say, operation at 2000 watts peak SSB or 1000 watts AM, CW or RTTY is comfortable. Efficiency is high. Peak SSB output is 1300 watts on all bands, CW output for 1 KW input is 600 watts. This latter efficiency, by the way, is accomplished by changing the plate voltage and current parameters for CW operation with a front panel switch — a feature usually neglected in SSB-only amplifiers. The National NCL-2000 is properly metered — two precision D'Arsonval rear-illuminated meters allow simultaneous monitoring of plate voltage and plate current, if desired, and the multi-meter switch also allows measurement of screen current, grid current, and exciter relative output. Control, overload and safety devices are complete. The NCL-2000 incorporates a time delay relay to prevent application of plate power to the 8122 output tubes before their cathodes reach operating temperature. One minute after application of filament power, the relay is activated and the "ready" light glows, indicating that the plate power switch will now operate. In the meantime, the internal antenna change-over relay is arranged so that the exciter (transceiver or transmitter-receiver) may be used "barefoot". The switch from exciter-only to high power operation is made automatically as soon as the plate switch is depressed. A plate current overload relay is also incorporated to prevent tube damage, and two precautions are taken to prevent operator damage — a feed-through interlock shuts off plate power when the hinged lid is raised, and at the same time a mechanical shorting bar connects B+ to ground to discharge the filter capacitors in case of bleeder failure or to activate the overload plate cut-out relay in case of interlock failure.

THE NCL-2000, complete with self-contained power supply, is housed in a desk-top cabinet measuring 7⅝" H x 16¼" W x 12¾" D. The fourth requirement . . . price . . . is met as well. The new NCL-2000 sells for little more than the price of a 500 watt (average) amplifier. Our ad on the inside rear cover of QST this month gives more details and full price and delivery information.

MIKE FERBER, W1GKX

National Radio Company, Inc.

0900 Sun. and 7102.5 kc. at 1930 Wed., TCPN 2nd call area on 3970 kc. at 1900, IPN on 3980 kc. at 1600, 2RN on 3690 kc. at 0045 and 2345 GMT. W2RUF made the BPL in February. W2RUF reports that 29 counties are represented so far in the new C.D. County Net. Sessions are held Mon. at 2000 on 3580 and Sun. at 1000 on 3510 kc. Endorsements: W2IDM as St. Lawrence EC and OES, W2RQF as OO, WA2IYB/WA2TFV as OPS, W2WUX as OBS. W2ZRC and WA2LKW as ORSs. Don't torget the 1964 WNY Hamfest May 23 at Vinces' 50 Acres which is on Rte 15 four miles south of thruway exit 46. W2ICE is program chmn. of the RARA-sponsored event. Sorry to report that W2PTN has joined Silent Keys. The Walton Radio Assn. elected K2TMG, pres.; W2FMW, vice-pres.; K2OSL, secy.; K2STS, treas. WA2MQX is mobile on 6 meters with a Shawnee. W2PVI reports that K2JVE has a new kw. on 80 meter s.s.b. WA2HIN and WB2EDW are converting 470-Mc. commercial gear to 432 and are looking for others with similar interests. The Syracuse V.H.F. Club is starting a 2-meter net on 145.080 Mc. After reading this month's fine crop of club bulletins it suddenly became apparent that more than half of the active clubs have purchased property on top of a hill which includes a building to house the club station, etc. It's not too early to think about Field Day. Are your plans made? W2SRP has a new Drake TR-3. K2YXW and WB2KCI have completed the HW-32s. Niagara frontier f.m. operators are now publishing a news letter, edited by W3EUP and K2GUG. About 25 hams are netted on the national calling frequency of 146.94 Mc. and about half are mobile. Mobiles have their choice of relaying via two strategically located repeaters which rebroadcast at high-power. Effective mobile range using this setup is good up to 75 miles. The net is growing day by day and more channels are being considered. Traffic: (Feb.) WA2KQC 493, W2GVH 349, W2EZB 313, W2RUF 283, W2HYM 221, WA2HSB 186, W2FCG 115, W2FEB 113, WB2JCE 84, K2KTK 59, WB2DPR 53, K2OFV 52, WA2RLV 38, WB2DMU 31, K2AYQ 30, W2RQF 27, W2TAB 24, WA2ANE 23, K2QDT 23, K2JBX 22, K2RYH 21, K2HOH 19, K2IMI 17, WA2GLA 16, WA2TUI 12, WA2CFI 12, WB2GAL 11, W2EMW 1, WA2VZA 1. (Jan.) K2KTK 99, K2QDT 32, K2RYH 7.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: W3LIV. RMs: W3KUN, K3OOU and W3NUG. PAM: W3TOC. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets at 2330 GMT Mon. through Fri. on 3585 kc. K3NZB and K3PYS received their Extra Class licenses. The Cumberland Valley ARC installed the following officers at its annual banquet: K3BZQ, pres.; K3BGH, vice-pres.; W3ESV, secy-treas.; W3RIH and K3QCS, act. mgrs.; John Boyd, editor of *Valley QRM*. The Etna RC reports via *Oscillator*: K3FRN is on 160-meter c.w.; W3LKZ had a slight heart attack; K3OQR lost his antennas in a recent storm. The Coke Center RC reports: W3QZV is chief engineer at WCVI; new officers are K3PLW, pres., and K3PPZ, vice-pres.; K3NOU and K3BTF were reelected as treas. and secy. K3YBI has a new jr. operator. The Radio Assn. of Erie's *Newsletter* reports: K3BLY moved to 4-Land; K3KKF now is in Okinawa; W3FVH is going on 6 meters; K3HHD is now a member of the Millereek Police force; K3GAO has a new NC-303. W3SMV has a home-brew kilowatt on the air. New officers of the Nittany ARC are K3AHY, pres.; W3ZZO, vice-pres.; K3OOU, secy; W3KJM, treas. W3ZUH lost his beam in a recent storm. K3CJH has an HT-37. The Horseshoe RC reports via *Hamateur News*: W3BTX and K3BMG are joining the Air Corps; K3TCZ has a Drake S.S.B. rig; W3KFD is on 2 meters with a home-brew rig. Our thanks to W3ISZ, retiring EC of Blair County for a job well done. Up Erie way: W3YWL and K3ZGQ are working 6-meter phone; K3JFB is attending the Univ. of Mich.; K3KPJ was named chairman of the board of Amateur Radio Editors Association (AREA). The New EC for Blair County is K3IML. K3AKR is working on 432 Mc. The Uniontown ARC reports via *Magpie*: K3RLB and K3SAA are new-comers on 2; W3RUW is recovering from recent surgery; K3OQP is on 6 with a transceiver. Traffic: (Feb.) K3PIE 351, K3DKH 306, K3NZB 255, K3PYS 215, W3MFB 130, W3KUN 111, W3JHG 53, W3LOS 47, W3SMV 43, K3ZMH 38, W3UHN 35, W3KWO 30, K3TEZ 24, W3IYI 13, K3SDT 12, K3SMB 12, W3TOC 8, K3COT 4, W3LOD 2, W3OEO 2. (Jan.) K3OOU 2.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9RYU. RM: W9USR. PAM: W9VWJ. EC of Cook County: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. K9PFJ is hospitalized and is progressing satisfactorily. WA9AFC has a new Gonset G-50. WA9AWP has a second license, WA9GIW, and also received his 2nd-class phone and telegraph licenses. W9FKC gave a talk on "DX in General" at a recent North Shore Amateur Radio Club meeting. K9EIV is working good DX with a new Mosley TA-32 Jr. WA9AZO is FB on 432 Mc. WA9BRT has a kilowatt on 6 meters. WA9JXS, WA9DLI, WA9DCI, WN9HVW and WA9JYG are the new officers of the Proviso East High School Amateur Radio Club. The club also is issuing certificates for those who work four members of the club. The 9RN traffic count for this month was 928. W9OLJ's new QTH is Madison, N.J. W9OKI has been bringing in the hard ones with a new Collins 75-A4. W9RQS moved to Glenn Ellyn and has big ideas with a new antenna farm. The Starved Rock Radio Club sponsored its Annual S.S.B. Dinner in LaSalle and the attendance and program surpassed last year's get-together. WA9CWG and WA9GWF (both of Canton) joined the ranks of Silent Keys. Our sympathy to their families and friends. WA9CWZ/Ø is looking for someone to work on the $\frac{3}{4}$-meter band. K9DRS is experimenting with amateur TV. W9HBI's (formerly WØOKO) new QTH is Hinsdale. K9YRA received his Extra Class license. K9UOV made WAC. W9PWL and his WYL are vacationing in Florida. WA9HSZ, NCS of the Norridge C.D. Net, invites all to check in on Thurs. at 9 P.M. on 50.2 Mc. The Sangamon County AREC, under EC W9-YJF, cooperated with the local Medical Association on Operation Sugar Drop, which included Oral Polio Immunization. The Central Illinois Radio Club of Bloomington is sponsoring a homebrew all semi-conductor 2-meter or 6-meter portable battery receiver contest for the membership. New officers of the RAMS (Radio Amateur Megacycle Society) are K9OBB, W9GFF, K9-VJA and WA9KHR. WA9HQK spent a few days in the hospital for observation. WA9KBJ and WA9FVD have finished building sync generators for cameras on 432 Mc. New appointments include WA9IPX and WN9IVR as OESs. The North Central Phone Net handled a traffic count of 753 and the count for the ILN for this month was 42 messages. BPL certificate recipients for February include K9KZB, W9IDA, W9HAS and WA9-CCP. Traffic: (Feb.) K9KZB 1426, W9IDA 1019, W9-HAS 686, WA9CCP 565, K9UOV 141, W9AKV 138, W9-USR 115, K9BTE 75, W9OKI 47, WA9AJF 43, WA9DXA 24, W9HBI/9 21, W9SMD 18, W9GFF 16, K9CYZ 14, W9PRN 14, W9SKR 13, K9RAS 8, K9FNB 6, WA9FVD 6, W9LNQ 4, WA9HSZ 3, WA9APT 2, WA9BQQ 2 (Jan.)W9AKU 118, K9DRS 32, W9OKI 15, WA9APT 4. (Dec.) K9DRS 55.

INDIANA—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET. PAMs: K9CRS, K9GLL, K9IVG. RMs: W9DGA, K9DHN, W9JOZ, W9TT. Net skeds in GMT: IFN, 1400 and 2300 Mon. through Fri., 1400 Sat., and 1330 Sun. on 3910 kc. ISN, 0030 daily on 3920 kc. QIN, daily at 0000 and RFN, at 1200 Sun. on 3656 kc. New appointment: WA9-BWY as OPS. Congrats and wedding bells for W9-DOK on Valentines Day. W9QLW, RM/9RN, reports WA9AVT as Can representative on Sat. nights. K9TFJ reports 2-meter activity up again in central Indiana. K9IDZK, WA9DMP and W9GWC are on 6-meter s.s.b. Those making BPL: W9JOZ, WA9AUM, K9DHN, W9-MM, W9NZZ, WA9ECX. QUIN honor roll: K9VHY, K9DHN, K9UXX, WA9AUM, WA9AVT, WA9ECX, W9FJR/9, W9QLW, W9ZYK. *Amateur radio exists because of the service it renders.* Feb. net reports: ISN 1021, QIN 274, IFN 265, Hoosier V.H.F. 89, 9RN 928 with Indiana represented 100 per cent. Traffic: (Feb.) W9JOZ 2097, WA9AUM 915, K9DHN 775, WA9ECX 621, W9MM 507, W9VAY 445, WA9BWY 292, K9IVG 262, W9RUQ 225, W9NZZ 166, W9QLW 139, WA9EED 103, K9GEL 100, K9ZLA 84, W9YYX 80, K9ZLB 76, W9ZYK 53, K9CRS 52, K9VHF 49, W9CC 42, WA9RLY 42, K9SGZ 39, K9LVK 31, W9FJR 24, K9SWL 24, K9UXX 24, K9VHY 20, W9DGA 19, K9MWC 19, K9RWQ 19, WA9BGI 18, W9BTZ 18, W9FWH 17, K9KTL 17, W9-RTH 17, W9FJI 16, W9QYQ 16, W9FZW 15, K9HYV 15, K9FHQ 14, K9WET 12, WA9CJR 11, K9ILK 11, W9-DZC 10, W9BDP 8, K9FPA 7, K9UEO 7, K9DHJ 6, K9GHN 6, W9DOK 4, W9URQ 5, WN9HRG 4, W9MIO 4, K9BSL 3, WA9DVJ 3, W9GGW 3, W9JSV 3, K9UHQ 2, W9ZZR 1. (Jan.) K9ZLA 150.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9BCC. RMs: W9KQB and WA9AKE. PAMs: K9IMR, W9NGT and W9NRP. Nets: WIN, on 3535 kc. at 0045Z daily; BEN, on 3950 kc. at 2230Z daily; WSBN, on 3985 kc. at 2215Z daily; WTN, on 3710 kc.

(Continued on page 116)

(Continued from page 114)

Tue. through Sat. at 0130Z SWRN, on 50.4 Mc. at 0100Z Mon. through Sat. WSBN net certificates were sent to WA9AZW and W9MOX. New WNA officers: K9IMR, chairman; WA9AQT, secy.; W9NRP, treas. The WNA Picnic will be held at Woodlawn Park in Hartford, Wis., this year. All are invited to attend this fine get-together. W9GGY is on 75 meters with his new Drake TR-3. K9WVM has a new tower and a TA-33 beam. K9DKU is a 9RN CAN representative. Wisconsin had 100 per cent representation in 9RN for Feb. K9LGU is poet laureate for the Stevens Point Club. WA9EDZ has an antenna up for 10 meters. Feb. net reports received; WSBN, 1303 stations cleared 643 of 746 offered; BEN, 736 stations cleared 115 of 153 offered. K9HBT is working on a 50-Mc. s.s.b. exciter. W9FNT has a 10-meter mobile rig. W9DOO operated portable from Kansas City and St. Louis during Feb. W9CXY is trying to work DX on 20 meters. WA9CEQ and WA9HJN handled traffic for the Scout-A-Ramas in Stoughton and Madison. WA9FNS is working with microwave on 2300 Mc. K9-IMR, W9DYG and WA9CEQ made the RPL in February. Traffic: (Feb.) K9IMR 726, W9DYG 514, W9CXY 354, WA9CEQ 206, WA9AKE 149, W9SAA 135, K9DKU 90, WA9BWD 64, W9AOW 58, W9NRP 53, W9QJW 53, W9CBE 49, W9DOO 39, K9GDF 35, K9GSC 27, W9HPC 23, K9WVM 17, W9YT 17, K9DBR 15, K9QKU 14, W9-FNT 12, W9UEB 12, WA9EDZ 11, W9OTL 10, K9WIE 8, W9APB 6, W9FXA 6, K9UUT 5, K9FPM 4, K9LGU 1. (Jan.) W9CXY 283, WA9FOM 20, K9UUT 7, W9FNT 5, W9FXA 1.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, WØHVA—SEC: WØCAQ. PAM: KØTYY. WØVCQ has accepted employment with the Collins Radio Company and no longer will be OBS for North Dakota. We wish you good luck in your new position and will be looking for you on the tubes. The North Dakota RACES Net, operating on 3996.5 kc., reports the following for the month of Feb.: 22 sessions with a total of 783 check-ins and a total of 64 messages handled. Traffic: KØITP 106, WØCAQ 4.

SOUTH DAKOTA— SCM, J. W. Sikorski, WØRRN—SEC: WØSCT. RM: KØGSY. An ORS appointment has been issued to WAØAOY. KØZTV renewed his ORS appointment. WØDSK, WØCUC, KØSZJ and KØWPC participated in the FMT. WØOOL, formerly of Sioux Falls, is teaching in Ashby, Minn., high school. KØQYB is back in Hill City after being stationed in Germany. WØZLS is operating mobile with an HW-12. KØBQS swapped for a new TR-3. WØCUC is operating 50-Mc., c.w. and s.s.b. on 50.4 Mc. and WØPHR is trying 160 meters for the first time. KØZTV reports a new Apache in the shack. KØGSY received a CAN certificate. Traffic: (Feb.) WØZWL 427, WAØAOY 222, KØGSY 216, WØSCT 180, KØBMQ 32, WAØCWX 29, KØYGZ 22, KØAIE 20, WØCUC 16, KØCXL 15, KØYNR 12, WØRWX 10, WØDIY 9, KØKOY 8, KØQYB 7, KØYJF 6, KØBSW 5, WØCQN 4, KØFQH 4, WØOFP 4, WAØ-CKH 2, WØFJZ 2, KØZBJ 2, WAØBMG 1, KØZTV 1. (Jan.) WAØDEM 70.

MINNESOTA—SCM, Mrs. Helen Mejdrich, WØOPX—Asst. SCM: Emerson Mejdrich. WØRIQ. SEC: KØ-KKQ. RM: KØZRD. PAMs: WØYHR, KØVPJ. MSSB: WØHEN. The MSSB Net meets M-F on 3812 kc. at 0045Z and 3805 at 1730Z. MJN (slow-speed c.w.) M-Sat., 3595 kc. at 0010Z. MSN (c.w.) M-S, 3595 kc. at 0030Z. MSPN (noon) 1805Z on 3820 kc. MSPN (evening) at 2330Z on 3820 kc. Appointments issued are WAØDHN as OES, WØFIT as OBS, WB6CDQ/Ø as Ramsey Co. EC; WØLIG as Carlton Co. EC: KØSXP as Beltrami Co. EC; WAØDGW as Steele Co. EC. Endorsements: KØMEQ as Rice and Le Sueur Co. EC. WAØEWK and WAØEWN are reporting good results with newly-erected 6-meter beam antennas. KØMGI has installed a two-element 20-meter beam and KØYEF a four-element 20-meter quad to be used in their private DX contest. Currently KØYEF is ahead (103/86) of WØMGI (97/83). OPS/ORS WAØARA is happy with his Pacemaker S.S.B. exciter and the improved band conditions. SEC KØKKQ is pleased with his new U.S. mail carrier job, St. Louis Co. EC, WØAIK, has installed a 40-and 80-meter doublet. Al uses an Apache and an NC-303. OO WØWAS is pleased with Jan. *QST* home-brew amplifier addition to his KWM-2. MSN NCS WAØFCJ is working the bugs out of his home-brew receiver. Friends and net members wish to express their sympathy to bereaved PAM WØYHR and WØDZZ, whose XYLs recently passed away. Traffic: WAØARA 216, WØOSJ 109, WØGRW 103, WØOPX 96, WØHEN 63, WØRIQ 60, KØZIW 50, KØVPJ 40, WØATO 36, KØZRD 33, WAØDSH 32, WØMXC 28, WØKYG 26, WØYHR 26, WAØEPX 25, WØUMX 24, KØJOA 22, WØLIG 22, KØFLT 21, WØEQO 18, KØJYJ 17, WAØDGW 16, KØFWC 16, WAØDXV 15, WAØFNS 14, WAØBZG 13, KØSRK 11, WAØEDN 10, KØZKK 9, WØALW 7, KØBAD 7, KØEPT 7, KØLWK 7, KØMIA 7, KØUBA 7, WAØASV 5, WØKJZ 5, WAØFIK 4, KØIJU 4, WØ-RQJ 3, WØRA 2.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: W9PHR/5. PAM: K5SGG. RM: K5TYW. The Central Arkansas Radio Emergency Net is prospering now by serving the American Red Cross and the local Sheriff's office. CAREN and NLRARC are jointly sponsoring a Razorback Hamfest to be held Labor Day week end. Now is the time to complete plans for Field Day, 1964. Each FD group is encouraged to send a message to your SCM, who will be guarding 3790 and 3885 kc. during the contest. It is with deep regret that we record the passing of K5JEU/NØSIJ of Hot Springs. Word has been received that the Eureka Springs Hamfest will be held on the week end of May 4, but this is unofficial. K5TWY has returned to the air. K5GKQ reports that the Faulkner County Radio Club helped the Heart Fund Drive with communications. WA5-BHW, EC, had a nice writeup in his local paper in his EC activities. W5LSR, of Searcy, has been designated an Official Mobile Unit. Don't forget your ECs and SEC—they need your help because a chain is only as strong as its weakest link! Traffic: W9PHR/5 399, W5DTR 93, WA5AVO 60, WA5BBS 55, W5YM 33, WA5-CAG 6.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—Your present SCM's term of office expires May 31, 1964 and it is hoped that the new SCM will receive the same kind of help that has been offered to me during the past ten years. We have a fine communications setup in Louisiana, with a good section C.W. Net under RM W5CEZ. W5CEW has been doing a fine job as PAM. W5MXQ, our SEC, who is not as active as he would like to be because of two major operations, has a fine emergency setup going in the state. We have 14 ECs, 4 OBSs, 5 OESs, 7 OOs, 26 OPSs and 12 ORSs. I would like to take this opportunity to thank those who cooperated and helped me during my five terms of SCM and also those who supported me in the Director election earlier this year. It is out of college and into the army for K5LZA. W5IQH is working hard on his new EC duties. The Louisiana C.W. Net now meets daily 2330 GMT (5:30 P.M. CST) on 3615 kc. WA5FNB is Net Manager. W5MXQ is active again handling traffic. W5-JFB has been reappointed OES. W5EA is broken down again. The Catahoula Hamfest will be held at Jonesville Aug. 23. K5OVR has 5 prospective hams ready to take the exam at Alexandria. The Ceda Radio Club has been meeting at MARS station at Enland AFB. W5CEW, a hard core a.m. man, is now going strong on s.s.b. W5ADE is now mobile with his NCX-3. The students amateur traffic net meets M-F on 3868 kc. at 1600 CST. K5QNK is experimenting with antennas. Traffic: (Feb.) W5CEZ 573, K5LZA 196, WA5FNB 133, W5MXQ 73, WA5BLO 48, W5IQH 42, K5OKR 42, W5EA 26, K5FYI 6, K5WOD 6, K5MOJ 2. (Jan.) WA5BLO 53, WA5GLF 18.

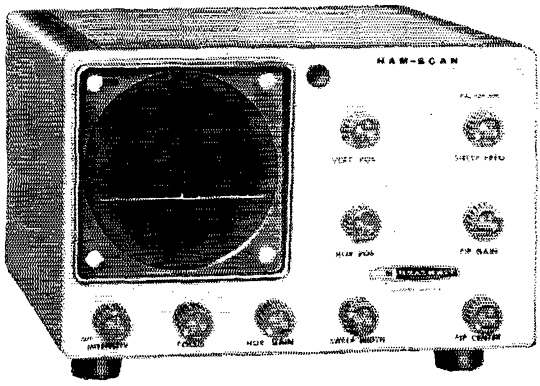
MISSISSIPPI—SCM, S. H. Hairston, W5EMM—The new c.w. traffic net for Novices in Mississippi will meet Mon. through Fri. at 5:30 P.M. CST on 3745 kc. with the net call "N Miss." NCS WA5BMC invites all stations to check in. In cooperation with this net W5JDF, RM, will conduct code practice sessions Tue. and Thurs. at 10 w.p.m. with practice funs to follow. WA5FII is off to a good start on s.s.b. K5MDX is to be one of the operators on SKYTOP II. K5RUO now has 142 countries confirmed. WA5CAC is working lots of DX in addition to his excellent work on c.w. with his HT-44 and SX-117. We have another new v.h.f. net starting in North Miss. with W5AMZ, W5EHX, W5GRV and K5IKB on 144.500 Mc. nightly at 2000 CST. W5IZS, K5SZS, W5ZSU, WA5HEB and K5RFW have done a fine job in getting the Miss. Civil Defense Net back in shape. W5BWW has been a stalwart of the nets. K5YGT is active again in Meridian. Traffic: W5JDF 198, WA5CAC 59, W5WZ 47, WA5FII 20, K5GAD 6.

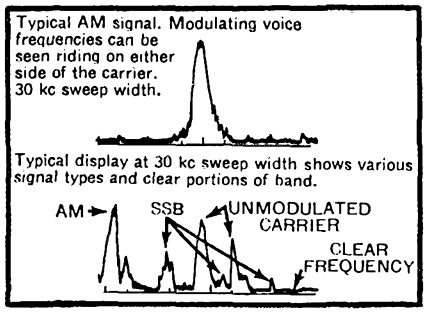
TENNESSEE—SCM, David C. Coggio, W4OGG—

Net	*Freq.*	*Time*	*Days*
TN	3635	1900C	M-Sat.
ETPN	3980	0640E	M-Fri.
TPN	3980	0645C	Daily
TSSN	3980	1830C	M-Sat.

(Continued on page 118)

WATCH IT!... WITH THE





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The SCM reports that Tennessee mourns the loss of three outstanding amateurs who are listed in this month's Silent Keys: WA4EPY was a past FCC inspector and was known all over the country for his v.h.f. experimental and DX work; K4EQK was voted Outstanding Amateur in Shelby County for '63 out of 1000 hams, a real asset to amateur radio; W4SZI was a faithful member of the Tennessee Phone Net doing public service work.

TENNESSEE QSO PARTY

May 10, 1964

All amateurs are invited to participate in the Tennessee QSO Party, sponsored by the Radio Amateur Transmitting Society. Tennessee stations are urged to work as many out of state stations as possible to permit others to earn credit for the "King Cotton" "Chattanooga Choo Choo" "Metro Nashville" and "USA-CA" awards.

Rules: 1) Contacts may be made during the 24 hour period starting at 0000 GMT and ending 2400 GMT May 10. 2) No power or time limitations. 3) The same station may be worked on different bands and modes. 4) The general call is CQ Tenn. C. W. and phone will be considered seperate contests, requiring separate logs. 5) Exchange QSO number, report and county (Tennessee stations) or state, province or country (non-Tennessee stations). 6) Tennessee stations count one point for each complete contact, multiplied by the number of states countries and Tennessee counties for final score. Out of state stations multiply QSO points by the number of different Tennessee counties worked. 7) Certificate awards for the first three places outside Tennessee, for the first five places within Tennessee. All amateurs contacting 10 separate Tennessee stations during the contest will be awarded a "Certificate of Achievement." 8) Suggested frequencies: 3530 3900 7030 7250 14070 14275 21050 21325 28300 28900. 9) Any station disrupting a working Tennessee traffic net for the purpose of contest contacts will be automatically disqualified for any award. Logs showing date, times, stations contacted, bands, modes, locations and computed final scores must be received no later than June 30, 1964. Send logs to the club station WA4NZE, 612 Hogan Road, Nashville 4, Tennessee.

GREAT LAKES DIVISION

KENTUCKY—*SCM*, Mrs. Patricia C. Schaffer, K4QIO—PAMs: W4BEJ, W4SZB, W4USE. RM: WA4LCH. V.H.F. PAM: K4KJQ.

Net	*Freq.*	*Time*	*Days*	*Sessions*	*QTC*	*QNI*	*Average*
EMKPN	3960	0630 EST	M-F	20	45	222	11
MKPN	3960	0830 EST	M-F	31	75	482	15
KPN	3960	1930 EST	M-F	15	69	425	28
MKPN	3960	0900 EST	Sat. & Sun.				
KYN	3600	0900 EST	Sat. & Sun.				
KYN	3600	1900 EST	M-F				

WA4LCH, RM for KYN, is recuperating in Veterans Hospital in Lexington from a heart attack. WA4ELK is acting RM until Doc is back on his feet. K4KEN Hopkinsville, is home from the hospital after a heart attack. K4EI, Bowling Green, is home from the hospital after surgery. The Civil Defense bus in Louisville, W4ABK, was at the Home Show recently and with the help of W4RCC, Red Cross station, took and relayed messages. W4JHU and W4KJP are on s.s.b. with an HW-12. W4TYP still is building his. The Mammoth Cave Amateur Radio Club's 1964 president is K4TSX. The Kentuckiana Radio Club elected K4FJK as president. This club is setting up a station for its Novice members which consists of a Knight T-50 and an HQ-129X. WA4EMM, formerly of Florida, is now living in Louisville. K4DMU has a new HT-32. K4EIH is pushing 2 meters in Danville. W4PFQ is mobile with an HW-22. W4BAZ worked the Antarctic on 80 meters. WA4LCH was top QNI on 9RN in Feb. and met 13 sessions. Kentucky was represented 82.7%. Traffic: (Feb.) WA4LCH 246. W4BAZ 154, WA4AGH 52, WA4ELK 39, K4DZM 35, K4QIO 34, WA4BSC 32, K4HOE 32, W4QCD 28, W4USE 27, WA4GMA 22, K4ZQR 20, WA4CQG 19, W4CDA 15, W4BEW 7, K4LOA 7, W4SZB 6, WN4RVP/4 5, W4JUI 4, W4KJP 3, W4PLN 2. (Jan.) K4DZM 12.

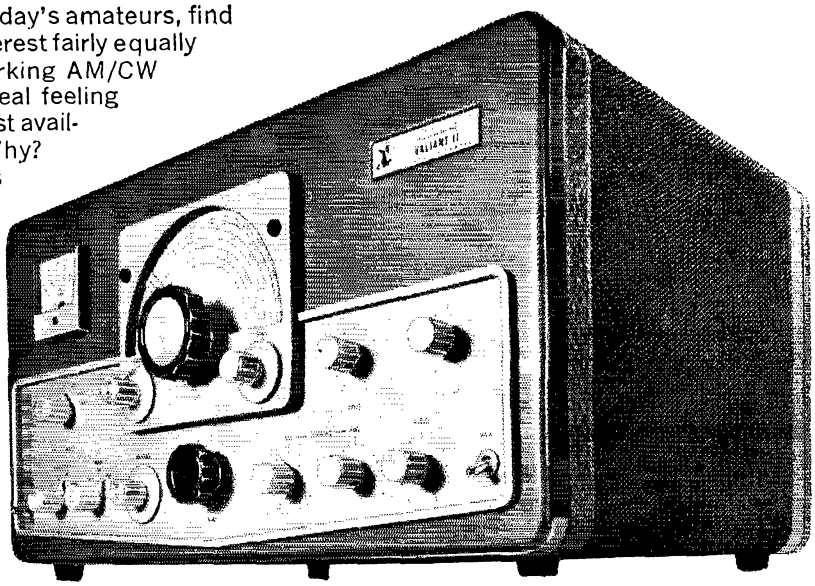
MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: W8LOX. RMs: W8EGI, K8QLL, W8FWQ, K8KMQ. PAMs: W8CQU, K8LQA. V.H.F. PAM: W8PT. Appointments: K8YEK, W8VPC ans OOs; W8DVB, W8SWF as OPSs; W8IUC as EC; W8SWF as OBS; W8QQK as ORS; WA8DZP as OES. Following are recovering or have recovered: W8LOX, stroke; W8SWI, eye operation; K8DPM, same; W8HFU, WA4LCH (ex-W8JTQ), heart attack; K8DHG, unknown operation. We regret to report that Mrs. Dale F. Brock, W8UFZ, formerly Hope Plummer, W2RTZ died, Feb. 28 of recurring trouble she has had for years. The FCC is issuing ham and CB licenses via a Univac Model III computer. The 6-meter band now has steady carrier interference from the receivers of garage door openers. Let's call it GDI, garage door interference. Don't forget OT Nite at Henry Ford Museum, May 30, and the Grand Rapids Hamfest Oct. 17 at the Pantlind Hotel. W8FZL (DL4D) comes home in April for good. W8WBG is now working for Space Teck Lab in California. W8JYJ was given an Honorary Life membership in the Huron Valley ARA. New officers of the Kent RC are W8IWF, pres.: K8CGD, vice-pres.; K8JJC, secy.; W8VV, treas. K8LOY is now DL4CQ, s.s.b. on 14.303 kc. 1200-1400Z. W8DCL has a new HT-44 with his SX-117 and W8IWF has a new SX-117. W8NOH/6 comes "home" to Michigan in 11 months. W8FM, W8ZBH, W8ZCH and W8SJN were on Florida vacations. In the past two months W8IWF has worked 62 DX stations. W8VV improved his home-built s.s.b rig. W8HMS works Europe on his "V" beam. K8NFJ bakes raisin bread! The Metro Rag Chewers Club now meets at the Lighthouse Recreation Center, Oak Park ARC now has the call W8QBC, in memory of Larry Garelik, K8GOU made the BPL again on orig./-del., but K8HLR has more traffic. K8LNE discovers s.s.b.! K3DCB/8 operates an NCX-3 from downtown Detroit YMCA. W8IUD was in Florida and W8RK was at the Mardi Gras. K8RDE got his W.B.E. certificate. The T.R. High School, W8RHF is on c.w., a.m., s.s.b. and RTTY. Traffic: (Feb.) K8HLR 445, K8NJW 287, K8GOU 249, K8KMQ 194, K8LNE 172, WA8DNZ 165, W8GTL 156, W8ELW 119, K8WQV 107, K8QKY 105, W8PGW 82, WA8DJC 78, W8BEZ 70, W8FWQ 65, VE3CYG/W8 59, WA8ASV 57, WA8CPH 55, W8FX 52, W8EU 45, W8RTN 43, K8QLL 36, W8EJR 33, K8JED 30, K8YRO 28, W8AUD 25, W8HKT 25, K8BYX 23, K3DCB/8, 22, K8GKX 22, W8EGI 21, W8QQK 14, W8ZHB 13, VE3EYN/W8 13, K8JJC 11, K8PYW 11, W8ZLK 10, WA8HGE 9, W8HK 9, K8ZZV 9, W8FDO 8, W8RHF 8, W8ILP 7, W8WVL 7, W8DSE 6, K8VDA 5, K8VFR 4, W8DVB 2, K8GJD 2, W8SS 2, K8ZXB 2, WA8JJH 1, W8MPD 1. (Jan.) W8UA 142, W8GTL 95, W8CQU 44, WA8ARK 31, WA8ARI 27, K8PKU 27, K8TWW 25, K8BYX 19, WA8ARJ 18, WA8GCN 9, K8GKX 6, WA8DXW 2, K2PVB/8 1.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickkson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZ, K8BAP and K8UBK. Findlay RC's *The W8FT News* states the club elected K8LEU, pres.; WN8HDY, vice-pres.; K8TMX, 2nd vice-pres.; K8WOV, secy.-treas. and W8OTK, editor; W8DP is starting his 52nd year in ham radio and W8QP is now 91 years young. K8BXT sends this news: K8OQE, WA8GUN and K8RXD received WTO certificates; K8VHM is on 6 meters using a Venus s.s.b. transceiver; W8ZFZ and K8VEL joined the Silent Keys: ex-W8SFG is now W5NCE, in Texas. W8ILC worked WAC on 80 meters. The newly-formed Celina ARC elected WN8HWU, pres.; WN8KSR, vice-pres.; WA8DWL, secy.; and WA8BUV, act. mgr. Meetings are held the 1st Sat. of each month. The Seneca RC heard a talk on use and operation of the oscilloscope by W8POH and tape recording on TVI and meteor scatter. *Smoke Signals*, from the Indian Hills RC, tells us the club had a social evening recently. Columbus ARA's *Carascope* informs us that W8OSL spoke on Guidance and Control, the club's code class has started with W8ETU as instructor. Inter-City RC's IRC *News Bulletin* states the club held an auction then edited a new amateur directory. It is presumed the 1964 officers are K8AKA, pres.; K8QAX, vice-pres.; K8GXH, secy.; K8ZHA, treas.; the club proposed a theory class to get the Advanced Class license to tie in with its Novice Technician and General classes: K8ZHA is on a training cruise with the Navy; K8ZHQ was released from Crile hospital; WN8IZW, WN8LER, WN8IRS and WN8LGY are new Novices in Shelby. Toledo's *Ham*

(*Continued on page 122*)

If you, like many of today's amateurs, find yourself with your interest fairly equally divided between working AM/CW and SSB, there's a real feeling of frustration with most available equipment. Why? Because most AM rigs require extensive modification to operate SSB—and no SSB rig offers high level AM and Class "C" CW—and the end result is compromise in one mode or the other!

Not so with the Viking SSB Adapter/Valiant II combination, for here's the package that gives you 275 watts CW and SSB plus 200 watts high level AM phone! Now, keep your contacts and work old friends no matter what portion of the band they are operating in, and no matter what mode they are using—and do it with maximum punch!



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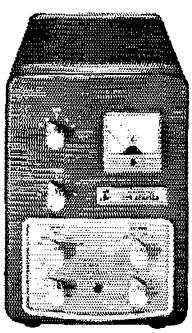

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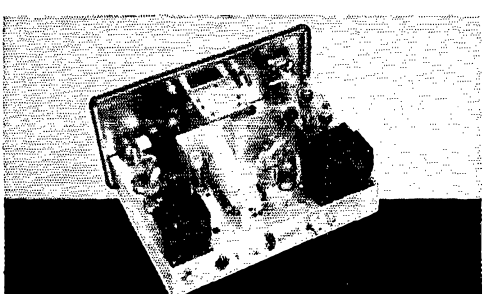

COMPLETE CATALOG

Drop us a card and we will send you Amateur Catalog 962, which gives the full story on the "Viking SSB Adapter" and the "Valiant II", as well as detailed information on our complete line of amateur transmitters and station accessories.

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HERE IT IS! THE SPECTACULAR SSB TRANSCEIVER

Featuring the same unmatched performance, reliability and craftsmanship you have learned to expect from Swan Electronics. These units are now in production.

SWAN-406 MINIATURIZED CONTROL UNIT

Miniature design for mobile mounting in conjunction with the Swan-400. May also be used for fixed station operation if desired.

- Phone Band Coverage as follows: 3.8-4.0, 7.1-7.3, 14.15-14.35, 21.25-21.45, 28.5-28.7, and 28.7-28.9 MC. (These ranges can be easily adjusted to cover other segments, if desired.)
- Direct reading dial scale calibrated in 2 kc increments. Dual tuning knobs provide choice of fast 6:1 ratio or slow 36:1 vernier tuning.
- Transistorized VFO circuit with Zener regulated power supply.
- Temperature Stability: Warm-up drift is virtually eliminated due to separation of the VFO from the transceiver's relatively high temperature, and by the use of transistors. Oscillator circuit is fully compensated for wide excursions in ambient operating temperature.
- Voltage Stability: Zener voltage regulator completely isolates oscillator circuit from power supply variations. Input voltage can change plus or minus 50 per cent with no change in oscillator frequency.
- Mechanical Stability: Extremely rugged construction and precision tuning system establishes new standards in operating smoothness.
- Includes receiver R.F. Gain control; thus the 406 functions as a mobile control head, and makes it possible to install the Swan-400 transceiver in the trunk, if necessary.
- Compact size allows installation on the automobile dashboard within easy reach and visibility of the operator. Supplied with mounting brackets and hardware. Only 3 in. high, 4¾ in. wide, 5 in. deep, 3 lbs. weight.

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SWAN-400 5 BAND 400 WATT

- Operates with the Swan-406 or 420 Frequency Control Unit, and the Swan-117B, 117AC, or 512 DC Power Supply.
- Covers the 10, 15, 20, 40 and 80 meter amateur bands.
- Transmitter Power: 400 watts SSB, P.E.P. input, dist. prod. down 30db. 320 watts CW input, 125 watts AM input. P.A. efficiency: 60 per cent.
- Two 6HF5 P.A. tubes, 6GK6 Driver Stage, 7360 bal. mod. 17 tubes, total.
- Output Circuit: Wide range Pi Coupler, Coarse and Fine Adjustment.
- Panel Controls: Function Switch, Sideband Selector, Phone-CW Transmit Selector, Rec. A.F. Gain, Headphone Jack, Mic. Jack, Mic. Gain, Carrier Bal., P.A. Tune, P.A. Grid, P.A. Load Fine-Coarse, Band Selector.
- Grid Block CW Keying. Key jack on chassis rear.
- Trans. Metering: 0-800 ma. P.A. Cath., and Grid Current position for over-modulation indicator.
- Provision for Plug-In VOX Accessory.
- High Frequency Crystal Lattice Filter. Common to transmit and receive circuits. 3 kc bandwidth. Unwanted sideband more than 40 db down. Carrier down over 50 db.
- Overall audio bandpass: essentially flat from 300 to 3300 cycles, transmitting and receiving.

JUST THREE YEARS AGO Swan Engineering introduced the now famous SW-120/140/175 single band SSB transceiver. Our company began as a one-man operation with Herb Johnson, then W7GRA, now W6QKI. In three short years we have grown to include a talented management team of 13 licensed hams, and a top-quality production department. Our success would have been impossible without the tremendously enthusiastic support of Swan owners. We will continue our policy of providing the finest quality control and reliability, top dollar value, and customer service second to none. And now the latest development from the Swan laboratories. We think you'll agree that the Swan-400 is the most versatile, feature-packed transceiver on the market, regardless of price.

WB6AWJ WA6EDJ K6HON WA6IVC WB6JBL W6KNV
W6OFT WA6OQY K6OUK W6QKI WA6YKZ WA6ZAC K6ZIK

NEW SWAN-400

5 BANDS - 400 WATTS

Separate frequency control heads for maximum stability and versatility, in fixed, portable or mobile operation. Read the following specifications, and we think you'll agree. — The new Swan-400 is for you.

SINGLE SIDEBAND TRANSCEIVER

- Single Conversion Design. Spurious emission and image response down more than 80 db.
- Receiver Sensitivity: better than .5 uv for 10 db signal-plus-noise to noise ratio.
- Wide range AGC system. S-meter functions automatically when receiving.
- 100 KC Crystal Calibrator.
- Built-In Speaker. Also provision for external speaker.
- 5½ in. high, 13 in. wide, 11 in. deep. 15 lbs. weight.

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ACCESSORIES

- AC Power Supply, Model 117B.....$75
- 500 Watt Mobile Power Supply, Model 512.....$145
- Plug-In VOX Unit, Model VX-1 .....$25

SWAN-420 FULL COVERAGE FREQUENCY CONTROL UNIT

Designed for fixed station operation in conjunction with the Swan-400 SSB Transceiver. May be installed for mobile operation if full frequency coverage is desired.

- Full frequency coverage of 10, 15, 20, 40, and 80 meter amateur bands in 20 ranges of 200 kc each, including WWV range as follows: 3.4-3.6, 3.6-3.8, 3.8-4.0, 7.0-7.2, 7.2-7.4, 14.0-14.2, 14.2-14.4, 14.8-15.0, 21.0-21.2, 21.2-21.4, 21.4-21.6, 28.0-28.2, 28.2-28.4, 28.4-28.6, 28.6-28.8, 28.8-29.0, 29.0-29.2, 29.2-29.4, 29.4-29.6, 29.6-29.8.
- Direct reading dial scale calibrated in 2 kc increments. Dual tuning knobs provide choice of fast 6:1 ratio or slow 36:1 vernier tuning.
- Transistorized VFO circuit with Zener regulated power supply.
- Temperature Stability: Warm-up drift is virtually eliminated due to separation of the VFO from the transceiver's relatively high temperature, and by the use of transistors. Oscillator circuit is fully compensated for wide excursions in ambient operating temperature.
- Voltage Stability: Zener voltage regulator completely isolates oscillator circuit from power supply variations. Input voltage can change plus or minus 50 per cent with no change in oscillator frequency.
- Mechanical Stability: Extremely rugged construction and precision tuning system establishes new standards in operating smoothness.
- Matches the Swan-400 in height, depth, and styling. Plugs directly into the 400. 5½ in. high, 6½ in. wide, 11 in. deep, 9 lbs. weight.
- Supplied with mounting base which joins the 400 and 420 in a neat tilt-up arrangement for desk top operating. (As illustrated above.)

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Shack Gossip named K8TVW as its Ham of the Month; WA8AOH, WA8LMA and WA8UNY received their Technician Class licenses. W8JTB and K8YWW received their General Class licenses; the Toledo Mobile RA held an auction; W8CLY is the proud daddy of a new baby girl; the stork brought K8SEX a new baby girl; the 1964 officers of the St. Lawrence Seaway Two-Meter Net are WA8FSL, net mgr.; K8TVX, assist. net mgr.; W8WDZ sec.cy.; and W8QZK is in Arizona. The South East ARC's *Ham-Fax* states that K8TSI is back from Florida and K8LMY is recuperating from an operation. Massillon ARC's *MARC Newsheet* tells us W8OJW talked on conversion of G.E. Lm. gear to 2 meters. K8VWN reports that W8WYS/K7YUN joined the Silent Keys. Appointments made in February were W8PKU and W8WUO as OOs, K8WVZ as OBS, WA8EEW as OPS. Tusco RC's *Beam* states the club printed a Tuscarawas County Amateur Directory for its membership. W8DAE and W8UPH made BPL during February. K8MZT, W8AL, W8HWX, K8PSE, W8EFB, W8WRN, W8IQB, W8LGY, K8RWG, W8UOJ, K8QAD, W8IEC, K8EUX, K8STF, K8CEN, W2QHH, W8IBX, W8BQV, W8FKU, K8TKG, KØGIC, K8VMY, K8QLT, K8RUD, K4RNS, W8UMR, W8BPY, WA8AOK, WA8DSF, K8ZEV, W9AXY, W8CKZ, W8EPM, K8YYK, W8BTW, K8ZSY, K8PXX, K8RZN, WA8EEP, K5RWR, W8IJW, K8CKO, K8TUP, K8SQO, WA8IJW and K8RSH received the Worked Ohio Ladies Award (WOLA). Six Meter Nomads's *The Amateur Extra* informs us that WA8GFV spoke to the club on Tech. Talk. Greater Cincinnati ARA's *The Mike and Key* tells us the club heard W8IHQ speak on Basic Principles of Transistor, Power Supplies and Converters. K8WVJ is home after an operation. The following received the Professional Football Hall of Fame Award issued by the Canton ARC: K8QLT, K8TKG, W8NAL, W8NBK, WA8BZC, W8QMH, WA8DRT, WA8GMY, K8YVZ, WA8HZO, WA8FLD, W8AL, K8ECK, WA8FKJ, WA8GCE, W8LJW, WA8EMW, K8DRS, W8QAZ, WA8FAA, WA8ETX, WA8BXS, K8IZN, WA8GAJ, W8RNL, W8AKU, WA8GHV, K8YDR, K8RUD, WA8ACK. Traffic: (Feb.) W8UPH 1570, W8DAE 623, K8DIU 236, W8RZX 198, K8LGA 196, W8IJH 163, WA8CXY 158, WA8AJZ 103, K8URK 102, K8LUP 97, W8MGA 92, K8LBU 89, WA8BXN 76, WA8AJD 72, W8QCU 72, K8BAB 67, W8LT 61, W8TV 61, K8ONQ 51, K8LGB 42, K8HVT/2, 36, K8YDR 35, K8BAP 30, W8GRG 30, W8DDG 28, K8VWN 28, K8BNL 24, W8LZE 23, K8WSR 22, WA8EEW 20, K8RXD 19, W8DHG 18, W8IEP 12, WA8CFJ 11, K8ZES 10, K8PJH 8, W8ILC 6, WN8IYH 6, WA8FTK 5, W8YGR 5, WA8CXC 4, W8DIH 4, K8RFU 4, W8WEG 3, W8ERD 2, W8PZS 2. (Jan.) W8LT 40, W8DDG 17, K8HVT/2 5.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and K2QJL. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3875 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; NYS County Net on 3510 kc. Sun. at 1500 GMT; Emergency Coordinators on 146,550 kc. Fri. at 0015 GMT. Endorsement: WA2VYS as ORS. Our congrats to two BPL winners for Feb. traffic: WA2VYS and WA2UZK. In Albany, W2APF received the Humanitarian Award from the Variety Club for his "Operation Goodwill" for servicemen overseas each Christmas for many years. We extend our congrats, too, Dave. The Albany Club is reactivating K2CWX at the VA Hospital for traffic-handling and patient rehabilitation activities. Ex-W2-WIK, now in Erie, Pa., would like to be remembered to his old friends in the Capital District. The new NYS County Net listed above has 29 counties represented as a backup for State RACES. Is your county represented? W2IJC has been transferred to Watertown. The Schenectady Club had a demonstration of the latest resuscitation methods and heard reports on activities of four high school radio clubs. A representative from Clegg was the speaker on V.H.F. S.S.B. at the Westchester Club. Those interested in operating K2US at the World's Fair should contact W2ECU or WA2QAE. The president of Ameco was speaker at the New Rochelle Club on new equipment. WB2HYA is a new General in Poughkeepsie handling traffic with an Eico 720 and an HQ-100 to a dipole. We need an EC for Orange County. Let's hear from you ARRL members down that way, please. Traffic: WA2VYS 865, WA2UZK 706, W2THE 414, WB2FZC 147, W2EFU 113, K2SJN 72, WA2PUM 64, WB2FXB 58, WB2HYB 50, W2URP 41, K2QJL 39, K2-MPK 35, WA2VYT 31, WA2FVD 27, WA2JWL 24, WA2-HGB 23, WA2ZPD 22, W2PKY 14, WA2YHA 6, K2DEM 3, K2HNW 3.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2UDB—SEC: K2OVN. RM: W2-WFL. V.H.F. PAM: W2EW. Section nets: NLI, 3630 kc.

(*Continued on page 128*)

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THE GOTHAM VERTICAL ANTENNA IS THE BEST ALL-BAND ANTENNA

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- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
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- Ideal for novices, but will handle a Kw.
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- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

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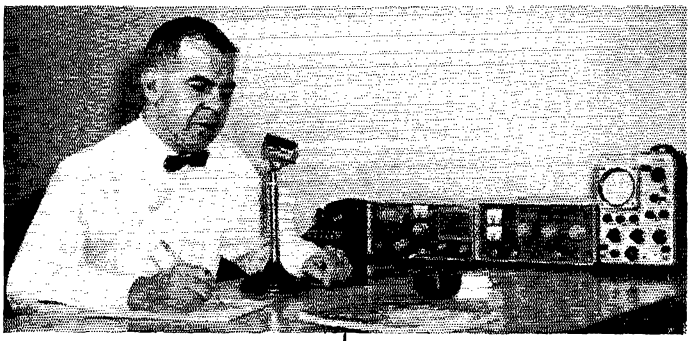
FIELD ENGINEERING WITH A FUTURE



Ed Doherr, WIEEE, a well-known New England call, has been hamming since 1921. Former calls were K6CLC/W3CIR/W8CIR/W8ASB. Ed recently placed the Raytheon SBE33 transceiver and the new Raytheon SBE, 1KW PEP linear amplifier on the air. He claims it talks up a storm and does everything his older SSB gear will do. Ed's other station equipment includes a receiver, exciter, and two 2KW PEP home brew linear amplifiers.

As Manager, Market Development at Raytheon, Ed is responsible for providing executive level liaison with military and industrial customers. In his position, he investigates new areas of business and recommends marketing action on programs offering a potential for the operations services.

Joining Raytheon as a field engineer in 1942, he assisted the Navy in maintaining shipboard radar equipment at North African and European naval bases during WW II. Post war duty included exciting assignments in Hawaii, Japan, and the South Pacific. Ed Doherr has made a number of important decisions in the last 22 years but he considers his decision to join Raytheon as the best he's ever made.

At Raytheon, field engineers are playing an increasingly important role in the installation, maintenance and operation of complex, sophisticated electronic systems. In space, on the ground, under the seas, in every environment probed by electronics, Raytheon engineers are finding and meeting new challenges. The opportunities for qualified people are many and rewarding.

Perhaps you can qualify for a Raytheon field engineering future. Requirements include an E.E. or its equivalent in practical experience in guided missiles, fire control, radar, sonar or communications equipment.

Among Raytheon's benefits: attractive starting salary with regular merit reviews; life and hospitalization insurance; retirement plan; educational and relocation assistance.

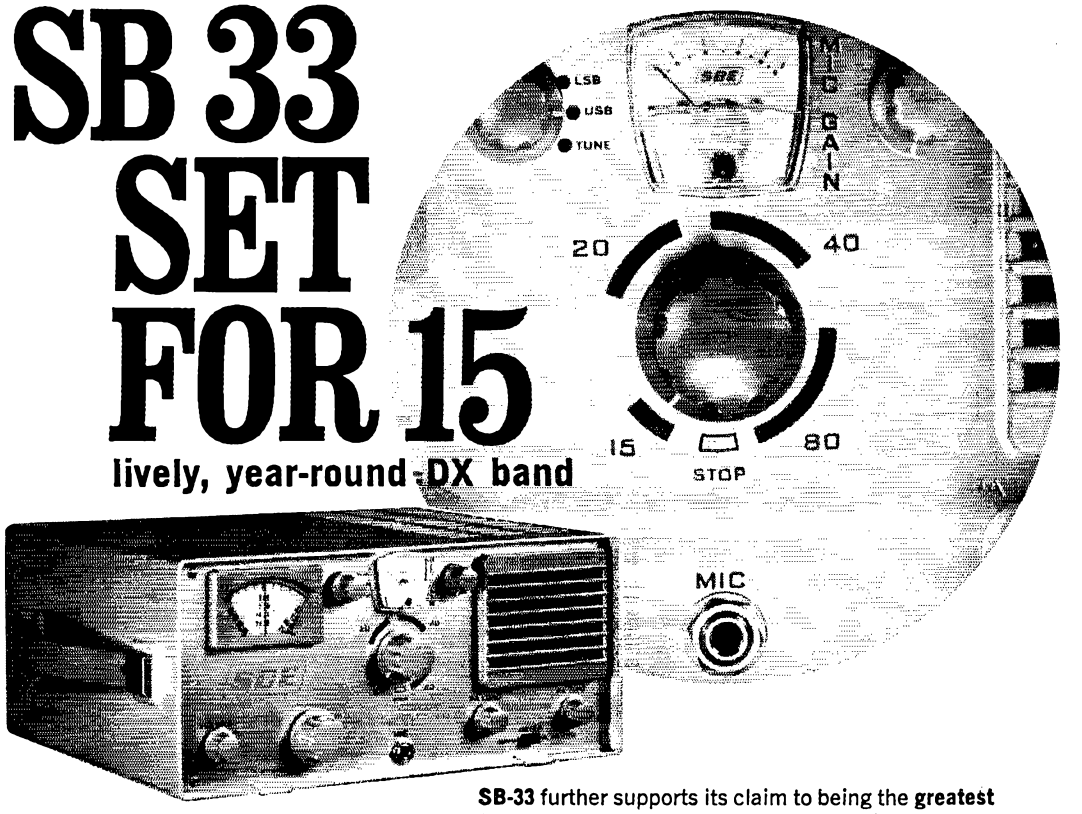
For complete details, write Mr. R. E. Guittarr, Electronic Services Operation, Raytheon Company, Equipment Division, Northwest Industrial Park, Burlington, Massachusetts.

RAYTHEON

an equal opportunity employer

SB 33 SET FOR 15

lively, year-round DX band



SB-33 further supports its claim to being the **greatest SSB transceiver value available** by offering an exciting **fourth band,** 15 meters. Sun spot minimums not withstanding, 15 meters is frequently open for coast-to-coast and DX operation, proved this well during the recent phone DX contest by providing "pipe line" channels to South and Central America . . . to Europe from the East Coast . . . to JA, HL, VS1, VK and ZL from the West Coast. This band is ideal for SSB transceiver operation; the major activity being in the 21.25-21.45 mc U.S. phone band thereby allowing **all** stations—DX and otherwise—to be "zeroed".

Fixed or mobile, **SB-33** plays this band like a hot smash off the distant fences! The all-solid-state receiver performs in a manner that must be heard to be believed. Reminder: **SB-33** is **all-solid-state throughout** except for the RF driver and the husky, double PL-500's in the amplifier.

For those who want the **big** signal at modest cost, the **SB1-LA Linear Amplifier.** Delivers 1 KW P.E.P. on 80-40-20, 750 watts P.E.P. on 15.

VALUE CHECK LIST

Compare **everybody's** transceiver data and prices. **Read all the small print.**

	X	Y	Z	SB-33
Four bands: 80-40-20-15				✓
Built-in AC power supply				✓
Built-in speaker				✓
Panel-switchable sidebands				✓
Price . . complete as above				∧ 389.50

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Please send full information on SB1-LA Linear and SB-33 Transceiver.

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UTICA 650 6 Meter Amateur Transceiver and V. F. O.

- Nominally rated at 22 Watts—input 100% modulated
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- Built-in adjustable BFO
- Built-in TVI filter
- Spot switch for frequency correlation
- 2 crystal sockets on front panel in addition to VFO socket
- Complete push-to-talk operation

Ask any ham why the UTICA 650 is the most wanted transceiver...

"Top features and more of 'em at rock bottom price," That's the answer

The hottest salesman in the world can't sell a ham just any old set. Hams are technical people. They *know* what they want. They *know* features. They *know* value.

Compare this Utica transceiver with anything on the market. Compare quality. Compare performance. Compare features. Compare value.

If you're an experienced ham, *you know* this Utica 650 is *the* buy. If you're just getting into the field, ask any old timer, or mail the coupon below.

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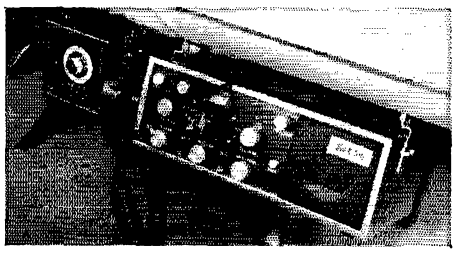
- Transmitter indicator light
- Dual conversion superheterodyne receiver
- Series gated self adjusting noise limiter
- Adjustable squelch control
- Adjustable R.F. gain control
- VFO in separate cabinet

$189.95



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Please rush full details and specifications on
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May QST

at 0015Z nightly; V.H.F. Net, 145.8 Mc. Tue.-Wed.-Thurs. at 0100Z and 146.25 Mc. Fri. through Mon. at 0000Z; and NYCLIPN on 3932 kc. Mon. through Sat. at 2100Z. The N.Y. Ionsphere Busters RC operates the Inter-city Training and Traffic Net on 21.15 Mc. Thurs. at 0100Z. NCS is WB2HMS. C.W. practice also is held on 14.30 Mc. Fri. at 0200Z with WA2CHP sending. BPL certificates went to WA2EXP, WA2VLK, W2EW, WB2-HWB and WA2TQT. W2EW says "Need more Brooklyn and Queens stations in the V.H.F. Traffic Net on 2 Meters!" Hey, Field Day is coming up very soon. WB2HWB was heard by Czech SWL OK1-15180 on 40 meters. W2DBQ is getting equipment ready for 2 meters. How many remember W2DBQ as RM when NLI was formed in 1934? W2ELK did FB with the Nassau AREC Nets while W2FI was in Mexico. The Monday night Queens AREC net is now on 50.52 Mc. at 0100Z. W2PF has designed a new L network for matching 50-ohm transmitters to long-wire antennas on 40 and 80. Look for his *QST* article to come soon. WB2CSS has a new HA-1 electronic keyer and a CP-35 award. New officers of N.Y.C. QRP Chapter No. 1: WA2CFG, pres.; WB2JOU, vice-pres.; WB2CSS, secy.; WB2AYW, treas.; WB2HLH, corr. secy.; WA2HYY, dir. WA2JIS made WAC and WAS. WA2UNH also made WAC. WB2BKS is going on 80 with an Elmac AF68, an HQ-110 and Hy-Gain 14 AVS 90 ft. straight oop! W4TRU/2, retired from the Navy, now is at RCA Institute and operates 75 with an SBE-33. K2YOR moved to Dix (Kilowatt) Hill in Huntington where he works W2CWD, W2TUK and sundry others on light bulb-type antennas. WA2QZZ is sporting a new linear on 20. W2MWK has the all-band antenna ready. WB2EJU, WB2HRH and WA2DEV are fooling around with keyers like they mean to go c.w. K2IDB is mobile on 6 with a Polycom 62. WA2VVV received a net certificate as an Exemplar of the V.H.F. Traffic Net. New appointment: W2BPA as Official Observer. WA2VON made WAS on 20-meter s.s.b. WB2CVK has a new Heathkit Shawnee and a three-element beam. W2SEU is building a new rig for 432 Mc. while keeping busy with RTTY on 6 and 2 meters and 220 Mc. using a.f.s.k. The 44 elements on 220 help. WA2FBB and WA2YXS are now on 220. WA2RAQ is building gear for s.s.b. on 6 meters. WA2SCP is very active on 6-meter c.w. K2KYS is now active on 160 meters. By the time you read this K2US, "Amateur Radio's Voice of the Fair," will be in opration on 80 through 2 meters. The station is located in the Coca-Cola Pavilion and is operated by the member clubs of HARC. Hey, mobileers! It's time to clean up that noise problem, shake the kinks out of the whip (not the Halo, it's made thataway) and brush up on "Safety in motion"! Met a grand bunch of folks at the annual meet of the Queens AREC/RACES, thanks to W2IAG and W2QPQ. Did likewise at the annual meet of the Brooklyn AREC/RACES, thanks to K2OVN, our intrepid SEC. These people are dedicated to public service, but also have fun. Why not join them? WA2WAO is using an HE-35 with push-to-talk and an 8-Mc. rock. How about more OO and OES reports? The Tri-State V.H.F. Assn. holds weekly on-the-air sessions each Thurs. from 7:15 to 7:45 P.M. on 146.7 Mc. conducted by WA2HNC. The Rockaway ARC, W2YBU, holds code practice sessions on 7180 kc. Wed. 2000 EST (0100 GMT Thurs.) and Fri. at 2100 EST (0200 GMT Sat.). Traffic: (Feb.) WA2EXP 665, WA2VLK 584, W2EW 510, W2MTA 448, WB2HWB 182, WA2TQT 120, WA2QJU 114, W2GKZ 75, WB2EUH 49, WA2OOL 49, WA2RMP 25, W2GP 23, WA2PMW 20, W2DBQ 18, W2EC 16, W2ELK 16, WA2-YLL 15, WA2LJS 14, K2KYS 11, WA2WAO 10, WA2EFN 6, K2IDB 6, W2PF 6, W2SEU 6, WA2RAQ 3, WA2VKK 2.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM, Louis J. Amoroso, W2-LQP: NNJ ARPSC Nets:

NJN	3695kc	2300Z Daily	W2QNL-RM
NJ Phone	3900kc	2200Z ExSun. (1300Z Sun)	K2SLG-PAM
NJ 6&2	51150kc	0300Z TTHSn	K2VNL-PAM
NJ 6&2	146700kc	0200Z WSn	K2VNL-PAM
NJNN	3725kc	2320Z TTh (Novice)	WA2SRK-RM
16N	1804kc	2330Z Tue. (160M Aux)	WA2QPX-RM

AREC activity schedules and info are available from the SEC, K2ZFI. New appointments: WA2ZKT as OBS; K2ZFI as ORS; WA2VID as OPS. WA2UOO joined the Morris County Radio Club. WA2TWL has a new Drake 2-B. WA2ZKT has the 80-meter antenna back up. WB2INS has a 2 meter "big wheel." WA2-CCF has a new 75S-3C and Invader 2000. WA2ZRP has been mobiling on 2 meters. WA2QPX is looking for KH6 and Salem County. WB2BCS has 29 members in his AREC unit. WB2KKO received an SWL card from YV for 6 meters. W2NIY has 2 new awards and reports 80-meter DX. WB2JFQ would like to receive SWL reports and is looking for an Asian QSO. WB2CVN re-

(*Continued on page 130*)


IT'S HERE!!!
THE NEWEST - MOST POWERFUL - MOST
COMPACT FULL COVERAGE 80-40-20 METER
300-WATT SSB/CW TRANSCEIVER ANYWHERE!
GALAXY III SSB/CW TRANSCEIVER
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THE GALAXY III IN ITS ACTUAL COMPACT SIZE, 6" x 10¼" x 11¼", IS SMALLER THAN THIS OPEN MAGAZINE. WEIGHS ONLY 14 LBS.
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5. BEST FILTER AVAILABLE. Suppression better than 45db. unwanted SB 55db.
6. NEW 6-SECTION CRYSTAL FILTER. Exceptional - 1.8 to 1 shape factor at 2.1 KC bandwidth.
7. HIGHEST RECEIVER SENSITIVITY. ½ Mv for 10 db S/N.
1. SHIFTED CARRIER CW eliminates dual receiver "Leap Frogging".
2. NEW HYBRID CIRCUITRY transistorized AVC/audio/VOX.
3. DUAL VERNIER TUNING 12:1 fast tune - 72:1 slow tune.
4. HIGHEST STABILITY drift less than 100 CPS in any 15-minute period.
GALAXY III ACCESSORIES
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4. Remote VFO - $59.95
5. Deluxe Accessory Console: speaker, phone patch, SWR Bridge, 24 hr. Clock - $99.95
6. Calibrator - $19.95
VOX - $24.95
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ports 30 QNI in the East Coast RTTY Net. WA2ZOW is building a transistorized 6-meter d.s.b. rig. W2VMX still is trying to find a skyhook to fit his QTH. WA2-MNU is assisting the AREC in plotting mobile communications. WB2EZY is looking for skeds on 6 and 2 with experimenters interested in discussing GaAs Lasers. The Union County RACES assisted in an oral polio vaccine campaign. W2ZI made a trip to Florida and visited many OTs. WB2FXY completed a homebrew 4-band transmitter. K2NP has a new grandson. K2-UKQ moved back to Kendall Park and is using an indoor beam. WA2UDT made 120 QSOs in 8 sections during the Jan. V.H.F. SS. WA2ZCT is the new secy.-treas. of the State Line Radio Club. This club continues its weekly net on 2 meters every Tue. at 2030 local time. We are sorry to hear of the passing of W2-HNA. WB2FZU is experimenting with a "big wheel" and a "Twoer." The Northern New Jersey Radio Assn. conducts a net every Sun. at 1100 local time on 220.18 Mc.; W2DAY is coordinator. Congratulations to WB2-JOO on the receipt of his General Class license. WA2-RIN is conducting a "technical clinic" for inexperienced amateurs. The South Amboy Amateur Radio Assn. conducts a net every Sun. at 2100 local time on 145.65 Mc. The Garden State Amateur Radio Assn. publishes a bulletin called *Scope Showcase*., WB2DXG is editor. Young scientists WB2DDB, WA2ZFG, WA2-VYN and WA2APT took away the honors at a Science Fair. WA2QPX is doing a fine job with the 160-Meter Traffic Net. Let's not forget the Pres-SET exercise May 23. Traffic: (Feb.) WB2ALF 425, K2VNL 315, WA2TEK 241, K2UCY 174, WB2FCT 154, WA2UOO 114, K2SBS 112, WA2MYB 103, WA2VID 88, W2CVW 86, WA2GQZ 86, WA2SRK 82, WA2TWL 55, WA2GQI 53, K2ZFI 31, WB2DEP 29, W2PEV 29, WA2ZKT 29, WA2KVQ 27, WA2WAJ 26, WA2DRV 25, K2JTU 25, WA2UCF 22, WA2-ZFX 17, WA2ZRP 17, W2TFM 16, WA2QPX 15, W2BVE 14, WB2HBC 11, W2ABL 8, WB2COZ 8, WB2BCS 7, K2-MFX 6, W2OXL 5, W2CFB 4, WA2OQP 4, WA2PWI 3, K2SLG 3, K2VVL 3, W2NIY 2, K2REY 2, W2EWZ 1. (Jan.) WA2UOO 65, K2ZFI 14, WA2BNF 8.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Ronald M. Schweppe, KØEXN. SEC: KØVBM. RMs: WØLGG, WØUSL. PAMs: KØBBL, WØLSF. New ECs: WØCQC, Jones Co.; KØHCL, Cedar Co. New Class IV OO, WØHNA. Congratulations to the Iowa AREC, No. 1 in the nation in the 1963 SET. My humble apologies to Story County for failing to get their report in to the SEC. I am sorry. Hats off to WØDIB, who is starting his 41st consecutive year as a member of ARRL. Who can top that? N.E. Iowa is getting under way again with our able Vice-Director, WØGQ at the helm. The Davenport ARC elected KØHSC, pres.; KØFKX, vice-pres.; WAØDLE, secy.; WAØ-FAF, treas., Marshalltown ARC elected WØDGY, pres.; WØDBZ, vice-pres.; WØEFL, secy.-treas. Net reports: Interstate S.S.B., QNI 1177, QTC 385, sessions 29. John Korns, WØUSL, 75 Meter Phone, QNI 1090, QTC 149, sessions 25. Iowa 160 Meter, QNI 1242, QTC 21, sessions 29. Hamilton Co. Emerg. Net, QNI 278, QTC 8, sessions 29. Congratulations to WØNTA on making DXCC. This makes three in our section who have entered the "Magic Circle." I still need a man to organize and lead the Tailcorn Net. Traffic: (Feb.) WØLGG 2617, WØBDR 2356, WØNTB 184, WØUSL 77, KØQKD 37, KØGXP 14, WØJPJ 13, KØBBL 12, WØ-GQ 11, WØPTL 10, WØYDV 9, KØAFI 8, KØBKR 8, KØEVC 8, KØKAQ 8, KØMST 8, KØTDO 8, WØREM 7, WØMMZ 6, WØFDM 5, WØFMZ 5, WØNGS 5, WØ-QVZ 5. (Jan.) KØBRE 20, WØREM 17, WØNWX 7, WØQVZ 6, WØFDM 3. (Dec.) WØSEE 14, KØQKD 7, KØVBM 5, WØDUA 3.

KANSAS—SCM, C. Leland Cheney, WØALA—SEC: WØBXF. PAMs: KØEFL, WØBOR, RMs: WØQQG, WØPFG, V.H.F. PAMs: KØVPH, WØHAJ. New appointments: KØGIB as OES. Net reports for Feb.:

Net.	*Freq.*	*Time*	*Days*	*Sessions*	*QTC*	*QNI*	*Ave.*
KPN	3920	1245Z	M-W-F	15	70	247	16.5
KPN	3920	1400Z	Sun.				
QKS	3610	0030Z	T-T-S-Su				
HBN	7280	1800Z	Daily				

NCSs for the KPN Net for Feb.: WØORB, WØIFR, KØYTA, KØEFL. No reports were received from the QKS or HBN Nets. We are always happy to be able to commend the work of any operator who gives just a little more than is expected of him or her in carrying out the work load of the section. It is with great pleasure that your SCM commends KØEFL and KØBXF for the work they are doing for the section. A few more operators of this caliber and we surely would have the

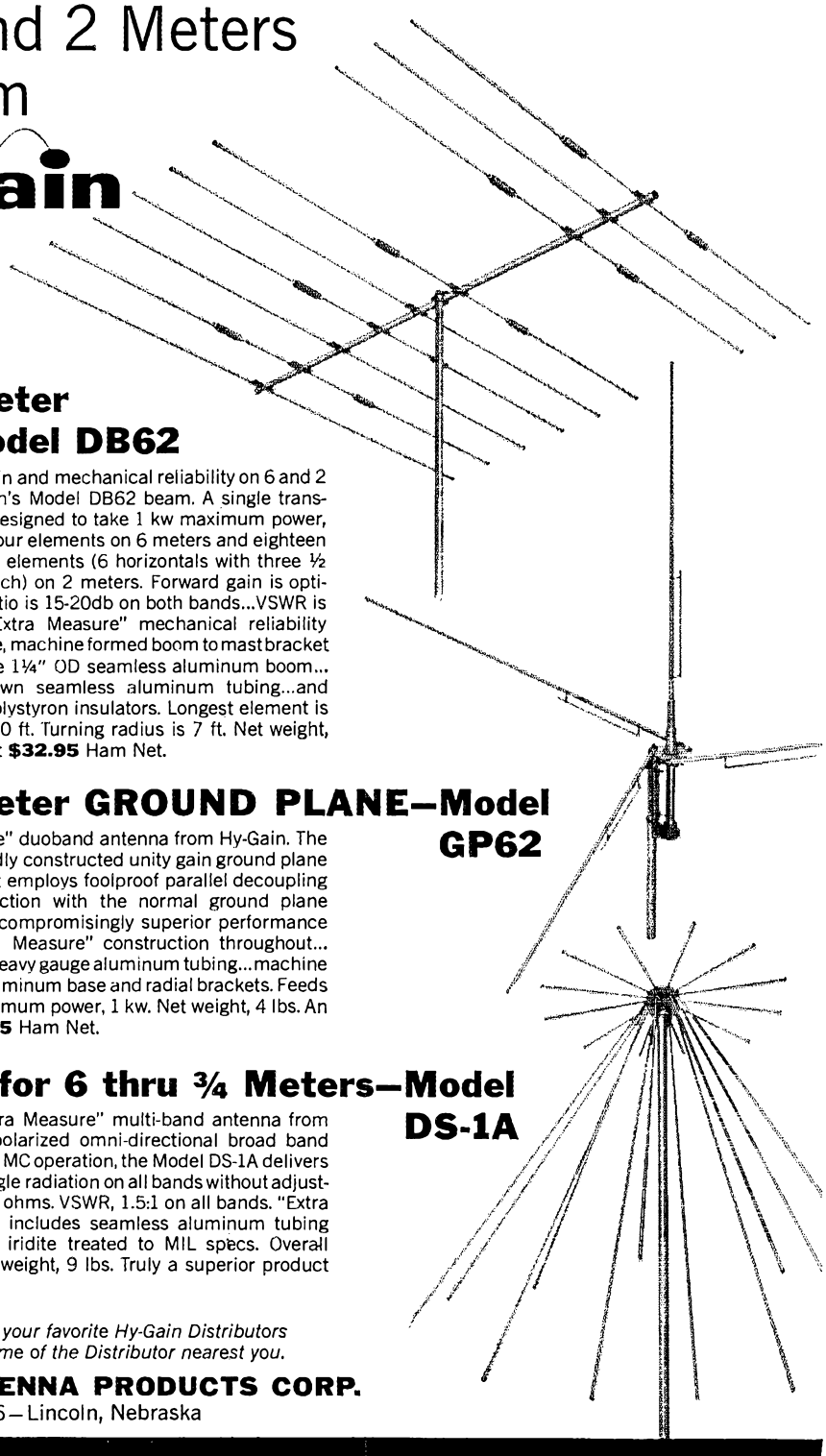
(Continued on page 132)

"Extra-Measure" DUOBANDERS

for 6 and 2 Meters

from

hy-gain



6 and 2 Meter BEAM—Model DB62

For "Extra Measure" gain and mechanical reliability on 6 and 2 meters, specify Hy-Gain's Model DB62 beam. A single transmission line antenna designed to take 1 kw maximum power, the Model DB62 uses four elements on 6 meters and eighteen ½ wavelength colinear elements (6 horizontals with three ½ wavelength sections each) on 2 meters. Forward gain is optimum...Front-to-back ratio is 15-20db on both bands...VSWR is 1.5:1 at resonance. "Extra Measure" mechanical reliability begins with heavy gauge, machine formed boom to mast bracket ...includes heavy gauge 1¼" OD seamless aluminum boom... elements of hard drawn seamless aluminum tubing...and molded high impact polystyron insulators. Longest element is 10 ft. Boom length is 10 ft. Turning radius is 7 ft. Net weight, 6 lbs. A terrific value at **$32.95** Ham Net.

6 and 2 Meter GROUND PLANE—Model GP62

Another "Extra Measure" duoband antenna from Hy-Gain. The Model GP62 is a ruggedly constructed unity gain ground plane for 6 and 2 meters that employs foolproof parallel decoupling stubs used in conjunction with the normal ground plane elements to deliver uncompromisingly superior performance on both bands. "Extra Measure" construction throughout... seamless, hard drawn heavy gauge aluminum tubing...machine formed heavy gauge aluminum base and radial brackets. Feeds with 52 ohm coax. Maximum power, 1 kw. Net weight, 4 lbs. An excellent buy at **$19.95** Ham Net.

DISCONE for 6 thru ¾ Meters—Model DS-1A

A newly designed "Extra Measure" multi-band antenna from Hy-Gain. A vertically polarized omni-directional broad band antenna for 50 thru 500 MC operation, the Model DS-1A delivers "Extra Measure" low angle radiation on all bands without adjustment. Impedance is 50 ohms. VSWR, 1.5:1 on all bands. "Extra Measure" construction includes seamless aluminum tubing with hardware that is iridite treated to MIL specs. Overall height, 63 inches. Net weight, 9 lbs. Truly a superior product at **$39.95** Ham Net.

See them today at your favorite Hy-Gain Distributors or write for the name of the Distributor nearest you.

HY-GAIN ANTENNA PRODUCTS CORP.

8412 N.E. Highway 6—Lincoln, Nebraska

best section in the country. Nuff sed. We still need operators for the QKS C.W. Net. Traffic: (Feb.) KØHGI 149, KØYTA 141, WØBYV 78, WAØEDD 55, KØGII 47, WØIFR 20, WØALA 19, KØLHF 19, WØBMW 14, KØYGR 14, KØEFL 12, KØVQC 10, KØEMB 7, KØTGR 7. (Jan.) KØLHF 12.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. RMs: KØONK, WØOUD. PAMs: WØBUL, WØBVL, WØOAM, KØONK. New ORSs are KØLQH, WØRTO. New OO appointment goes to WØQWS. KØWKC is the new EC for the 5 counties around Fredericktown. WØOGC is the new EC for the 9 counties in the northwest corner of the state. ORS certificate was endorsed for KØRPH. MEN Net certificates went to WØAIM, KØEQY, WAØFKD, WØGQR, KØIHY, KØIOG, KØKUD, WØMMG, KØOGM, WØRTO, KØWKC, KØWNN, WØYHT, WØYSZ. The long skip still plagues the low-frequency nets in the evening. A new c.w. net to help move traffic is the Missouri Noon Net (MNN). It meets at 1900Z (1 P.M. CST) Mon. through Sat. on 3580 kc. WØOUD is NCS. Several v.h.f. schedules have been tried with some success but nets for traffic are still to be set up. Don't forget the Mo. Net Picnic at Jefferson City June 7. GARS and SMARC (Springfield) are planning joint Field Day effort. WØBUL gave a talk on NTS and traffic handling to the Joplin ARC. KØFPC passed the 1st-class phone exam (commercial). WAØEUE has passed the Gen. Class exam. WØGQR has a new home-built a.m. rig, 120 watts. KØIHY has the 6- and 2-meter gear operating. WØKIK built a Heath Twoer. Feb. net reports (Z means GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2345Z	M-W-F	14	246	83	WØBUL
MON	3580	0100Z	Tu-Sun.	25	176	236	WØOUD
MNN	3580	1900Z	M-Sat.	25	74	37	WØOUD
SMN	3580	2200Z	Sun.	4	27	22	WØOUD
MoSSB	3963	2400Z	M-Sat.	25	362	115	KØIHA
PON	3810	2100Z	M-F	20	170	72	KØBWE

Traffic: (Feb.) KØONK 1051, WØWYJ 243, KØZBO 229, WØOUD 160, WØHVJ 126, KØBWE 67, WØKIK 62, KØTGU 62, WØTPK 52, WAØDGT 48, KØLQH 35, WØAIM 18, WAØCWV 17, KØFPC 16, WØBUL 15, WØBVL 15, KØWOP 13, WØRTO 12, WAØEUE 10, KØCWP 4, KØVIQ 4. (Jan.) KØCWP 41.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØTSU. Net reports: Nebr. Morning Phone Net, QNI 384, QTC 17. Western Nebr. Net, QNI 634, QTC 56, 100 per cent check-ins WAØAES, WØFJZ, WØGGP WØNIK, WØRIH, KØBMQ. AREC Net. WØIRZ reports QNI 58. Nebr. Emergency Phone Net, QNI 958, QTC 96. Nebr. Section C.W. Net (NEB) QNI 71, QTC 30. Late reports: Nebr. C.W. Net (Nov.) QNI 56, QTC 16; (Dec.) QNI 33, QTC 33; (Jan.) QNI 80, QTC 33. The Nebr. Storm Net meets at a new time, 0130Z on 3982.5 kc. daily. Two new nets have begun operation in the section. The Nebr. 160-Meter Net meets Mon. through Sat. at 0130Z on 1995 kc. The Junior Operator's Net meets Sun. at 2030Z on 3840 kc. NCSs are WAØCDQ and WAØBBS. It was primarily designed for high school and college operators. Nebr. C.W. Net RM W6JCF/Ø has been transferred to Massachusetts. Wally is to be commended for a fine job as RM. Traffic: WAØCIE 221, WAØDOQ 138, W6JCF/Ø 76, WØLOD 62, WØFIG 60, WAØBID 33, WAØAES 29, KØRRL 26, WØVEA 24, WAØBES 21, WØZHV 21, W4LEE/Ø 18, WØGGP 18, WAØCFB 15, WØBKW 11, WØNIK 11, KØDGW 10, KØJFN 10, WØYFR 10, WØBOQ 9, KØKJP 8, WAØCDQ 7, WØNYU 6, WAØBIE 5, WAØEBX 5, WØRJA 5, WAØFJN 4, WØHOP 4, KØWPG 4, KØYZP 4, KØUWK 3, WØEGQ 2, KØHNW 2, KØJRH 2, WØPQP 2, KØSCN 2, WØWZR 2, KØVTD 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM Robert J. O'Neil, W1FHP—SEC: W1EKJ. RM: K1GGG. H.F. PAM: W1YBH. V.H.F. PAM: Open for new appointment. Traffic Nets: CN, 3640 kc. daily at 1845; CPN, 3880 kc. Mon. through Sat. at 1745, Sun. at 1000; CECN, for emergency coordinators and other AREC members, same frequency as CPN, net starts at 0900. Section Net Certificates for activities on CPN went to WA1ALZ, KIs UYZ, WKK, ZND, GGG. Endorsements went to W1EFW as ORS and OO, K1ONJ is a new OBS and OES; K1UYZ is a new ORS. A BPL card was issued to K1WKK. A new club has been formed at Trumbull H.S. Officers are K1YIX, pres.; K1ZDA, vice-pres.; WA1ALZ, secy.; K1FQT, treas. MARC station officers of WINRG are W1FYG, pres.; K1QAH, vice-pres.; W1WEE, secy.; K1WKH, treas. The club holds an on-the-air net Wed. at 1930 on 146 Mc. W1ICP spoke and projected slides on construction tips and 160-meter DX at the first March meeting of the MARC, Meriden. A May Day parade to be held in Willimantic by the VFW, will see

(Continued on page 134)

AMECO *Leader in Compact, Quality Ham Gear*

Improve your receiver's sensitivity and noise figure with an

ALL BAND NUVISTOR PREAMP

- **All Bands— 6 thru 160 meters**
- **Two Nuvistors in cascode**

only $24.95 wired & tested

The NEW AMECO Model PCL

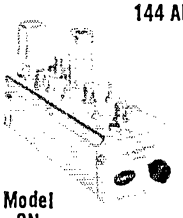
Adding the new Ameco All Band Preamp ahead of your receiver will allow you to really pull the weak signals out of the mud. Model PCL is a tuned RF amplifier covering 6 meters thru 160 meters. It uses two Nuvistors in cascode and gives noise figures of 1.5 to 3.4 db., depending upon the band used. The weak signal performance of all receivers (regardless of price) will be improved. Overall gain of preamp is in excess of 20 db.

The range is covered in four bands, tuned by a variable air capacitor. The preamp can be switched into the circuit or the antenna fed directly to the receiver, without waiting for tubes to warm up, as the power is turned on and off independently.

Model PCL requires 6.3 volts at .27 amp and 100 to 300 volts at 8 ma. from the receiver or converter power supply. **Wired and tested—$24.95.**

Model PCL-P has a 117 volt 60 cycle, AC power supply built in. **Wired and tested $32.95.**

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE

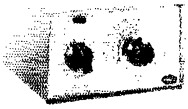


Model CN

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**

2 THRU 160 CONVERTER

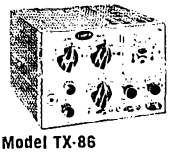
- Transistorized
- Crystal Controlled



CMA, wired and tested, less crystals $64.95
Crystals each 3.50

Model CMA covers all frequencies from 1.7 to 54 Mc. and 108 to 174 Mc. The output can be fed to a standard broadcast set or any communications receiver. The CMA has better than 1 microvolt sensitivity. It can be operated from an internal battery or from the 12 volt car battery. Model CMA has an RF stage, tuned by a panel dial for best image and spurious rejection. Up to 10 crystals can be selected by the bandswitch. Size—3¾" x 6" x 6¾". For more detailed information, write for special "Converter Information Sheet."

COMPACT 6 THRU 80 METER TRANSMITTER



Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5" x 7" 7 7" — ideal mobile or fixed. Can take crystal or VFO. **Model TX-86 Kit $89.95 — Wired Model TX-86W $119.95. Model PS-3 Wired $44.95. Model W612A Mobile Supply wired $54.95.**

CB-6

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. $19.95
CB 6W — wired & tested ... $27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp/mix. 6J6 osc. $23.95
CB-2W — wired and tested. ... $33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. **PS-1K — Kit ... $10 50**
PS-1W — Wired $11.50

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Amateur License Guide ..... **.50**
Radio Operators' Lic. Guide, EL 1-2 ..... **.75**
EL 3 ..... **1.75** EL 4 ..... **1.25**
Amateur Log Book ..... **.50**
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Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

Write for details on code courses and other ham gear. **Dept. Q-5** **Ameco equipment at all leading ham distributors.**

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plenty of AREC portable and mobile units. W1EOR is heading part of the committee for communications. Traffic nets are reported as follows: CPN met 28 times with 171 messages and an average of 18 stations per session. High QNIs were K1AQE, W1LUH, K1s DGK, LFW, NTR, OJZ, EIC, SRF, BTD, W1YBH and W1MPW. Fair band conditions were reported. CN reports the net met 29 times with 370 messages and an average of 12 stations per meeting. High QNI goes to K1WXN, K1GGG, W1CTI and W1RFJ. Very few reports were received from Official Observers and Official Experimental stations this month. Traffic: K1WKK 522, W1EFW 237, W1AW 195, K1WKJ 151, WA1ALZ 124, W1CTI 98, K1ZND 85, W1RZG 79, W1BDI 66, K1UYZ 64, K1GGG 57, W1LUH 55, K1WKN 54, W1RFJ 47, W1YBH 42, W1MPW 40, K1JAD 36, K1EIR 35, W1ECH 32, W1FHP 28, K1AQE 20, K1NTR 17, W1QV 15, K1OJZ 14, K1SRF 13, W1BNB/1 6, W1CUH 4, K1WLA 2, W1CHR 1.

CONNECTICUT QSO PARTY

May 23-25

The Candlewood Amateur Radio Club invites hams throughout the world to take part in the 2nd Connecticut QSO Party.
Rules: 1) The contest begins at 2300 GMT May 23 and ends at 0400 GMT May 25. 2) Phone and CW are considered the same contest, but a station may work another station twice, once on phone and once on CW. 3) Call "CQ Conn" on c.w., "CQ the Connecticut QSO Party" on phone. Connecticut stations sign "de Cn . . . . ." on c.w., "this is Connecticut calling" on phone. 4) All bands may be used. Areas suggested for working the contest are: 3540 3840 7040 7240 14040 21100 kc., 50 and 144 Mc. 5) *Exchanges:* outside Connecticut stations give QSO number, RST, and their state, province, or country. Connecticut stations send QSO number, RST, and their county. (SEE RULE 6) 6) *Scoring:* Each complete contact counts 5 points; outside Connecticut stations multiply their total contact points times the number of Connecticut counties worked; Connecticut stations multiply their contact total times the number of states, provinces, or countries worked. There are 8 counties in Connecticut. Connecticut stations may work other Connecticut stations, but it only counts as a contact with the state of Connecticut, that is, among Connecticut stations, the counties do not count and are not given. 7) *Awards:* 1) A certificate to the highest scorer in each state, province, or country, excluding Connecticut. 2) Certificates to the *two* highest stations in each Connecticut county, excluding C.A.R.A. members. 3) A certificate to the highest scoring Novice in Connecticut and a certificate to the highest scoring Novice outside Connecticut. The same goes for Technicians. 8) *Logs:* Logs must show dates, times, band, mode, numbers, RS(T), and QTH. Tell the class of your license, your address and do your score figuring somewhere on the log. Send all logs before June 28 to: Connecticut QSO Party, Candlewood Amateur Radio Assn., Tom O'Hara, W1DDJ, 7 West Wooster Street, Danbury, Connecticut.

MAINE—SCM, Arthur J. Brymer, W1AHM—SEC: K1DYG, PAM: K1ADY, RM: K1MZB. Traffic Nets: Phone—Seagull Net, 3940 kc. 1700-1800 EST daily except Sun. Maine State C.D. Net meets Sun. at 1100 EST on 3993 kc. and Wed. on 3530 kc. at 1900 EST with W1BYK as NCS. The AREC Net meets Sun. at 0900 EST; K1DYG as NCS. C.W—. The Pine Tree Net meets at 1900 Mon. through Fri. on 3596 kc. The First Regional Net meets at 1815-1930 daily on 3605 kc. The PTN is always looking for more men to check in. K1YSK has a new HQ-170 and says he likes it FB. He has worked Germany, Finland and the Netherlands. K1SZC is on the air now with a new SR-160. K1UXZ reports the 2-Meter Net is getting along nicely every Thurs. evening with mostly Bangor and Waterville stations. Your SCM has tried 20-meter c.w. and has had a lot of fun. K1VEQ has his 2-meter rig hooked up and has worked southern New Hampshire. He is now working on a 420-Mc. rig. New hams in the state are K1EIV, WA1AJU and WN1BIJ. Your New England Division Director would like to hear from the hams in this state. Traffic: K4BSS/1 82, K1MZB 57, K1IMI 48, K1NAN 18, K1YSK 11, K1TEV 2.

(*Continued on page 136*)

There is just no better way of getting started in VHF than with the newest of the new in the Clegg line — the 22'er two meter transceiver. This ready-to-go station combines many of the fine features that have made the Clegg name famous in VHF ham circles for years plus refinements to make 2 meter AM phone operation more interesting and challenging. It is realistically priced — your distributor will have complete information.

Features

1. Triple conversion receiver with NUVISTOR RF stage provides
   a) Better than .25 μv for 10 db s+n/n
   b) 8 KC selectivity with steep skirts
   c) Image rejection better than 50 db
2. Exclusive new receiver tuning system provides extremely good frequency stability
3. Smooth Slide Rule Tuning Dial
4. Illuminated Panel Meter doubles as calibrated S meter on receive and "relative output" meter for transmitter tune up
5. Effective Automatic Peak Noise Limiter on receiver
6. Built in Speaker
7. High level plate and screen modulation with speech clipping for typical Clegg "high talk power" performance
8. Broad Banded Transmitter Circuits for ease in QSY
9. Push to Talk
10. Transmitter frequency spotting switch
11. Provision for (external) linear amplifier and VFO
12. Conservative 11 watt rating (input)
13. Unit will operate with either 8 or 12 MC crystals
14. Self contained universal power supply for 115 Volts AC and 12 Volts DC
15. Tube line-up

V1	6CW4	Rcvr RF
V2	6DJ8	Mixer/VLO Tripler
V3	6DJ8	VLO/Cathode Follower
V4	6AU6	2nd Mixer
V5	6BA7	3rd Mixer
V6	6BA6	IF Amplifier
V7	6AL5	Diode detector/Noise Limiter
V8	12AX7	AF Amplifier/AF Amplifier
V9	6BQ5	Rcvr Audio Output/Xmtr Modulator
V10	6EA8	Xmtr XLO/1st Multiplier
V11	12BY7	Buffer Amplifier
V12	12BY7	Xmtr Driver
V13	2E26	Xmtr Final Amplifier

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EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—SEC: W1AOG. New appointments: K1BIF, RO for Town of Barnstable, as EC. K1s SMT and YKT as ORSs; K1LVV as OBS on RTTY on 3620 kc.; K1OWK as PAM for the 10-Meter Net, which is on 28.95 Mc. at 2000 GMT and for the time being will be on Mon. Wed. and Thurs. only. W1OJM is going to be the liaison between this net and the Central New England Net. All of our nets are lacking traffic. Let's do something about it or they will just fold up. There was a nice write-up in a Boston paper about the fine job that K1GHT has been doing between Ecuador and Boston for doctors. Our EM2MN had 21 sessions, 205 QNIs, 104 traffic. EM1OMN had 10 sessions, 70 QNIs, 6 traffic. The 6 Meter Net had 20 sessions, 456 QNIs, 36 traffic. Central N.E. Net had 25 sessions, 559 QNIs, 0 traffic. W1MFM has been working on the license plate bill. K1AFF had DJ1HP and a group of hams at his QTH. W1AWA, K1s: DGI and CMS are back from Florida. WA1BIK is on all bands. W1KWD worked K7UGA/1 on 2 up in N. H. Silent Keys: W1s HC, MMP, BPF. K1QXJ. The T-9 Radio Club met at W1-KON's. K1BYL was home one week end. K1MCL is moving to Bethesda, Md. K1CTK passed the General Class exam. WA1AWI is on several bands. Jack Lyons is president of the Milton ARC. W1HZR is publicity chairman. K1TWJ is secy.-treas. of the Danvers ARA, which is conducting code practice on 29.56 Mc. Mon., Wed. and Fri. from 8 to 8:30. W1ZMO is supervisor. W1AAR is on 6 most of the time. W1MNL is president of Burlington ARA, which meets the 2nd Fri. at Dodge House. The town has supplied truck, control center and rigs. W1MTS spoke at Middlesex ARC. W1ALP was present. WN1AFD is president of Christian H.S. RC. W1AOG received reports from W1MRQ. K1s IMP and ICJ. K1ESG worked OH5TA/MM on 80. W1SVU's XYL has been very ill. WØPAN/1 is DXing on 14 and 21. W1s LJH and GLF are now s.s.b. W1CQC has a home-built receiver. W1PEX made the BPL. K1VOK is back on sked. WA1AKR, on 6, has a Globe Scout 680 and a Sixer, a five-element beam, an HQ-105TRC with an Ameco converter. K1ZHS is having antenna trouble. K1YFM is on 6. K1SMT has No. 2 QRP400 award. Appointments endorsed: K1AQI Burlington, W1KWD Weymouth, W1PST/ASA Brookline, W1DBY Chelmsford, W1HKG Malden, as ECs; W1NF as OO; W1AAR as OPS; K1MEM as OBS. Heard on 75: W1s PF, TAK, K1s VCO, UNO, QXY, OVA, REX. Heard on 2: W1s-YZC, BS, K1s EGN, ZSA, WN1BIM, KN1FOM. Mr. Roberts, of National Co., spoke at the Framingham Club on the NCX-3. The North Shore RA held an auction. Wellesley ARS had a talk on "Satellite Tracking" by a member of the Air Force Reserve. W1ZOM spoke and demonstrated RTTY at the QRA. W1AOG is back to work after an illness. At a recent meeting the Yankee Radio Club had a period for technical questions along with a film on transistors. K1YKT is helping our Novice Net. K1PNB is putting out a very nice monthly bulletin for this net. Send him your news, fellows. K1YSJ is on 80 with a 50-watt homebrew rig. WN1AIS is on 3725 kc. K1PNB worked the West Coast on 80. EMNN had 12 sessions, 50 QNIs, 30 traffic. Traffic: (Feb.) W1PEX 1625, K1YKT 366, W1EMG 218, K1-PNB 158, K1ESG 100, K1SMT 97, K1ZHS 79, W1LES 68, W1OFK 63, W1DOM 61, K1ZQU 50, W1BJE 39, K1-MEM 34, W1ZSS 32, K1GKA 31, K1VOK 27, W1FJJ 24, W1AOG 21, K1FTQ 20, K1LCQ 15, KN1FJM 13, K1-OWK 8, WA1AKR 6, W4TFL/1 6, WA1ANA 4, W1AUQ 3, K1BGK 2, W1QJR 1. (Jan.) K1PTB 3, W1MRQ 2.

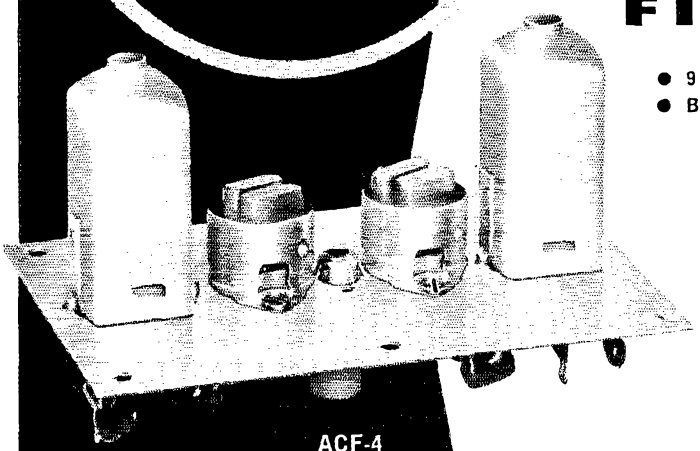
WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. C.W. RM: K1IJV. PAM (75 meters): K1RYT. Unless the various Emergency Coordinators send in monthly reports to our SEC, W1BYH, there will have to be some overhauling in that category. If there is no activity along that line, then so report it, but report anyway. Our latest information here is that the Massachusetts Phone Net just isn't (if I'm wrong, let's hear about it). The old "obsolete" method—c.w.—still is going strong, though! RM K1IJV reports the following active on WMN (3560 kc. 7 P.M. daily except Sun.) arranged in order of activity: W1DWA, K1IJV, W1BVR, W1DVW, K1ZBN, K1ZVJ, W1RWR, K1LBB, W1AMI, K1SSH, W1MNG, K1YMS, K1YST, W1ZPB, W1MND, W1AJX, W1NY. All of the first six listed were in the net 10 or more times during the month so not just fly-by-nighters. In other words, what I'm trying to say is that we have an active net. Why don't some of you phone men dust off your keys and come on in. There is no QRM to speak of, just nice solid copy! (Or maybe you like to battle QRM). W1AZW, W1COI, W1DGT, W1-GTO, K1OOV and W1UUK were active in the ARRL DX C.W. Contest. K1JGW now has 97 countries confirmed. W1VC/W4GS is on s.s.b. with a new Heath transceiver. No bulletins to date have been received from Fitchburg or Springfield. The last few lines above were from *Random Scatter*, of the Berkshire County

(*Continued on page 138*)

NEW FROM INTERNATIONAL

AOC

SINGLE SIDEBAND FILTERS



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ACF-2 Two-crystal filter circuit using low impedance link input and 2K resistive output load. Unwanted sideband rejection greater than 30 db. **$9.95**

ACF-4 Four-crystal filter circuit using nominal 600 ohm input and output. Unwanted sideband rejection greater than 40 db. **$18.95**

ACF-6 Six-crystal filter circuit using nominal 600 ohm input and output. Unwanted sideband rejection greater than 55 db. **$27.95**

MATCHING OSCILLATOR CRYSTALS for the ACF filter series. Recommended for use in OS-4 oscillator.
CY-6-9LO **$4.40**
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OS-4 Crystal Oscillator **$6.95**

SE-6F Mounting Case
Special AOC case for mounting filter plates. **$5.50**

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Amateur Radio Association. Traffic: (Feb.) W1BVR 107, K1IJV 70, W1DWA 66, K1LBB 55, K1ZBN 36, W1AMI 21, W1DVW 11, W1ZPB 2. (Jan.) W1AMI 29.

NEW HAMPSHIRE—SCM, Albert F. Haworth, W1YHI—SEC: W1TNO/W1ALE. PAM: K1APQ. Certificate endorsements: W1TNO/W1ALE as SEC and OBS. Appointments: K1APQ as PAM. *Correction*: The Granite State Phone Net meets on 3842 kc. (alt. 3845 kc.) Mon. through Fri. at 2330Z and on Sun. at 1430Z. It is a pleasure to announce the appointment of K1APQ as PAM and as net manager for GSPN. Let's all get behind Big Ed and bring the GSPN back to full service. It is service to the public that will help us the most when support is needed. The resignation of K1CXP as Hillsboro County EC has been accepted. Bob's new QTH will be Connecticut. Good luck, Bob. The Manchester Radio Club (W1HPM) held its election with the new officers being W1KGZ, pres.; K1ISJ, vice-pres.; W1YHI, treas.; Dough Aiken, secy.; W1KGZ, treas. Good luck to this long-active club. More news of clubs is requested.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. RM: W1BTV. PAM: W1TXL. Endorsements: W1QLT as EC and K1GRC as OES. RISPN reports 29 sessions, 522 QNI, traffic 93. The NCRC Club of Newport showed the film "Memory Devices" by the Bell Telephone Co. at its last meeting. The program was under the direction of Vice-Pres. W1WLG. The Club is working on a 2-meter rig for Field Day. W1JFF is supervising the project. Demonstrations were given to the new members on how to cable and wire a piece of electronic equipment. The W1AQ Club of Rumford reports the rigs are on the air once more after being closed down during alterations to the building. Stations wishing to contact them should look for them on Fri. evenings. New licensees: General—K1FMT and W1WWN. Techs—WA1s BJQ and BJS, K1WER, DML, OWZ and SSI. Traffic: W1TXL 529, K1TPK 117, W1BTV 53, K1VYC 23, K1SXY 12, K1RRK 10.

VERMONT—SCM, E. Reginald Murray, K1MPN—All nets are operating on summer scredule. Green Mt. Net meets on 3855 kc. daily at 2130Z; Vt. Fone Net on 3855 kc. Sun. at 1300Z; VTN on 3520 kc. Tue. and Thurs. at 2300Z; Vt. S.S.B., on 3900 kc. at 2300Z; the Vt. Trading Post on 3855 kc. Sun. at 1900Z. The BARC is planning to hold International Field Day in July around Burlington. The Vermont Fone Net had 123 stations check in during the four sessions in February. The Green Mt. Net had 543 check-ins and handled 74 pieces of traffic. The newly-reactivated VTN has just started and is looking for more operators. In its first few sessions 15 pieces of traffic were handled. The NCS is W1WFZ and all speeds are welcome. Traffic: (Feb.) K1BQB 236, W1WFZ 57, W1CBW 22. K1IJJ 14, K1LLJ 13, W1KJG 6, K1MPN 5. (Jan.) K1BQB 189.

NORTHWESTERN DIVISION

IDAHO—SCM, Raymond V. Evans, K7HLR—RM: W7EMT. W7FGM is a new ORS appointee. EC renewals: W7SLY, K7OAB and K7SJM. Those working with the Ada County C.D. Director are W7s, NRD, UNA, YUX CRE, FTN, SJI. SLY, K7s CXG, OQZ, QQP, REX, UYP, URC, LML, ZCS. These have plans set up for possible flood conditions this spring. W7SLY is QRL with a new home. Glad to see the revival of the *Ham Hills News*. Give them some support, fellows. W7EMT has added a new 400-watt final and faithfully keeps Idaho a part of the National Traffic System. How about a little more support there with Carl and the Gem Net? FARM Net: 20 sessions, 352 QNI and 24 QTC. Gem Net: 18 QTC. Traffic: W7EMT 79, K7CXG 27, K7HLR 21, W7GGV 2.

MONTANA—SCM, Walter R. Marten, W7KUH—Asst. SCM/L.F. PAM: Dr. Marvin Hush, W7YHS. SEC: K7AEZ. V.H.F. PAM: W7TYN. RM: W7FIS. The Mont. S.S.B. Net meets Mon. through Fri. on 3910 kc. at 1800. Endorsement: K7TCI as OBS. K7EWZ made the BPL in Dec. New officers of the Flathead Valley ARC are W7VOS, pres.; W7GBL, vice-pres.; W7NOZ, secy.; W7DWR, treas. Meetings are held the 1st and 3rd Mon. of each month at PP&L Service center, 8 P.M. W7EGN and W7GBL are active on 160 meters. W7VOS, W7POR, W7OIO, K7GVJ and W7CJN are on 6 meters. The Flathead Valley ARC is establishing a 160-meter net on 1985 kc. Sun. at 9:30 P.M. and reactivating the 6-Meter Net on Tue. and Fri. at 8 P.M. on 50.135 kc. K7PWY checks into 4 nets. K7OPJ moved to No. Dakota. W7NPV earned Mont. Territorial Centennial Certificate No. 1. W7CJN has built a panadapter. W7NPV and W7CJN have regular contacts on 50.2-Mc. phone. W7NPV transmits OBs on 50.2 Mc. Annual EC reports have been received from W7LBK, W7EWR

(*Continued on page 140*)

C-P COMMUNICATION ANTENNA SYSTEMS

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BASE STATION COAXIAL ADVANCED DESIGN ANTENNA (2X-Omnidirectional Gain)

CAT. No. 79-509, FREQUENCY RANGE 108-174 MC*

Cat. No. 79-509 2X-Gain Antenna combines the simplicity of a coaxial antenna with the gain of a more complex structure. Though external appearance is that of a standard coaxial antenna, the union of special element lengths and internal matching devices produces 3 db omnidirectional gain.

SPECIFICATIONS

Electrical:

Nominal input impedance	50 ohms
Maximum power input	500 watts
Omnidirectional gain	3 db
Internal feedline	RG-8A/U
Flexible terminal extension	18" of RG-8A/U
Termination	Type N male with Neoprene housing
VSWR	1.5:1
Bandwidth	±1%
Lightning protection	Star gap

Mechanical:

Skirt	2" dia. red brass
Whip rod	6061-T6 aluminum
Support pipe	1-5/16" dia. hot-galvanized steel, 24" minimum length exposed available for mounting
Rated wind velocity	100 MPH at 150 Mc
Lateral thrust at rated wind	19 lbs. at 150 Mc
Bending moment 6" below skirt	55 lbs. at 150 Mc
Weight	30 lbs. at 150 Mc

**Exact frequency must be specified*

SINCE 1933

COMMUNICATION ANTENNA SYSTEMS FOR AMERICAN BUSINESS

Communication Products Company

DIVISION OF

PHELPS DODGE ELECTRONIC PRODUCTS CORPORATION

MARLBORO, NEW JERSEY — Telephone HOpkins 2-1880 (Area Code 201)

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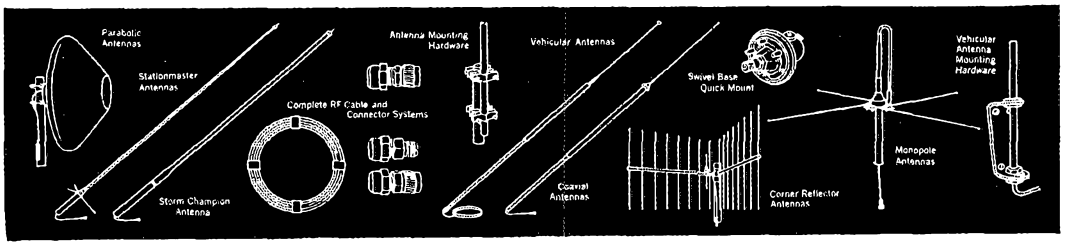
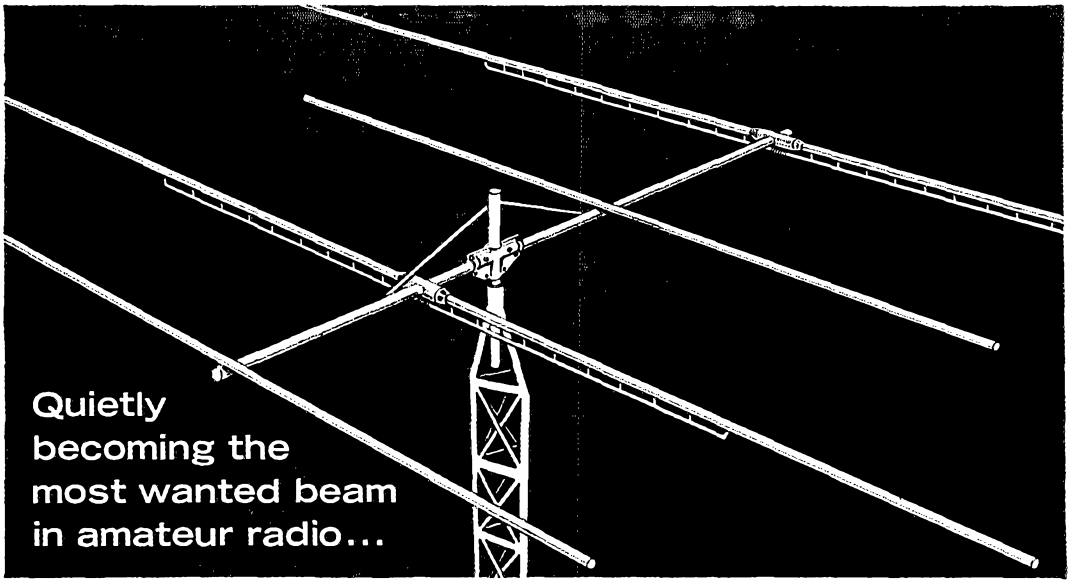


and W7COH. W7COH is doing a fine job with the Missoula Area Emergency Net. The 2-Meter Net K7IMZ as NCS, meets every night at 6:30 P.M. on 144.38 kc. W7FGZ and K7BYB, of Great Falls, attended the Capitol City Radio Banquet. Winner of the Big Sky Radio Club transmitter hunt was K7BBE. K7PCY and K7-MOY erected a 75-meter dipole at 0300 Jan. 1, 1964! W7DXM is teaching in Saco and has regular skeds with her OM W7YUB on 160 meters. Malta will have its Annual Picnic the 3rd Sunday in June. The WIM Hamfest will be at Mac's Inn Aug. 7, 8 and 9. K7DCI and K7DCH are issuing Mont. Centennial Certificates. Mont. hams must work 25 stations in Mont. with one being in Helena. Hams in the Continental U.S. must work 15 Montana stations with none in Helena. DX hams must work 5 Montana stations with none in Helena. Send copy of your log to K7DCI with postage, please. W7YHS went to Helena for a Civil Defense meeting. W7BIS, W7UWY, W7JZW and W7SFK got equipment for the State Emergency Operating Center in Helena. K7BON worked a ZL on 75 meters at 7 A.M. New officers of the Central Montana Radio Club (Lewistown) are W7FUY, pres.; KN7WYR, vice-pres.; W7-BYX, 2nd vice-pres.; W7FTO, secy.-treas. Application for the CMRC has been made with W7WSE as trustee. The CMRC has a new NCX-3 tri-band transceiver located at the hospital for an NCS station and emergency drills are conducted every Sun. at 0800 on 3955 kc. The CMRC meets the 1st Tue. of each month at 7 P.M. in Museum Bldg. W7OIO, Butte EC, advises that the Butte AREC Net meets at 2000 MST on 21300 and 50.200 Mc. the 1st Mon. of the month. W7FSP is making a 2-meter converter to run tests with W7FTD. K7YNX is building an all-band v.f.o. K7MDV is making an electronic t.r. switch. W7CDW is trying to build his code speed to 75 w.p.m. to work with W5GRJ and W4QTA. W7OZY is looking for a new home to put a new vertical. W7QCO had his transmitter fixed. K7-UNW has nearly completed his preselector. K7NDV is putting together an s.s.b. mobile and W7NML just received an SB-300 kit. W7COH conducts code practice every night from 1600 to 1700 on 3525 kc. K7IMZ and his XYL received a BA degree in Square Dancing! K7-UPH was appointed OBS. Other endorsements: K7-GHK and W7EWR as ECs. The Mont. S.S.B. Net had 21 sessions, 612 check-ins and 65 pieces of traffic. Traffic: K7EWZ 233, K7PWY 43, K7UPH 42, W7FIS 1, W7-NPV 1.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7ZFH. Appointment endorsements: W7KTG as OPS. Oregon State Net (OSN) National Traffic System, 3585 kc, 0230 GMT Tue. through Sat., sessions 20, attendance 114, traffic 60, BRAT awards to W7AJN, W7BVH, W7ZFH, K7IWD. Regular monthly meetings of the Multnomah County AREC are held. W7ASG of C.D. at Salem, attended a steering committee meeting and gave a talk on the RACES program. At the AREC members' meeting, a panel discussion on Net Control problem was held, led by K7PHP; also the Red Cross called a meeting with the steering committee attending. K7EZP reports f.m. mobileers traveling through Oregon will find 146.76 being monitored 24 hours a day for emergency traffic. K7DVK has been running a test with W7HGY on 436 Mc. W7HGY is using a scanner and live camera on amateur TV. KN7-YQM has retired his 15-watter in favor of a DX-20. K7TFR saved his receiver and transmitter and his wife's sewing machine from a fire that destroyed their home. Traffic: K7IWD 422, W7ZFH 78, W7MAO 36, W7ZB 28, W7AJN 16, W7DEM 13, W7KTG 10, K7EZP 3.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett E. Young, W7IMQ. RM: W7AIB. PAM: W7LFA. New officers of the Puget Sound Council of Clubs are W7ISC, pres.; W7MEU, vice-pres.; W7ECX, secy.; K7GEX, treas. The council meets the last Fri. of each month in Boeing Employees Club House, Seattle. Plans are rapidly shaping up for a section convention in 1965 to be held centrally in the state. Clubs interested in assisting should contact the president of the council. K1RFX/7 left for a ten-day trip to New York. About eighty were in attendance at the Fairchild MARS Station pot-luck supper held recently. K7YRB and K7YVC are new General Class licensees in the Bremerton area. The NSN had 29 sessions and 357 QNIs with 65 QTCs handled and the Noontime Net (NTN) had 1565 QNIs and 359 QTCs during Feb. The Tacoma Radio Club, W7DK, will handle the communications for the Daffodil Parade Apr. 11. The Annual Banquet of the Tacoma Club was held Feb. 22 at Ingrahms in Puyallup with 35 members attending. The s.s.b. boys in the Walla Walla vicinity are really picking up in their activity. W7GYH is having a ball with converted citizen banders gear on mobile. The hams around the Walla Walla area are enjoying an FB

(*Continued on page 142*)



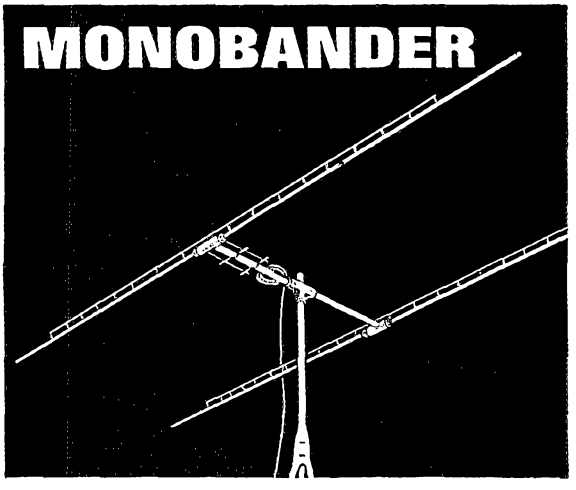
hy-gain's MODEL DB-24 DUOBANDER
DX for 20 and 40 Meters

Most of the Hams who have a Model DB-24 haven't been mouthing it around too much...they aren't too willing to share the wealth of performance they're getting on 20 and 40 meters. However, all you have to do is start looking for a Ham that has one...when you find him, you'll read him but good!

The Model DB-24 delivers full-sized, 3-element performance on 20 meters PLUS unparalleled linear loaded 2-element performance on 40 meters. Three elements on 20 meters deliver optimum forward gain; 20-30db in F/B ratio. The two linear loaded elements on 40 meters deliver maximum obtainable forward gain plus remarkable attenuation of unwanted signals off the sides and back. Unique decoupling technique allows 2-band operation without traps. Constructed of heavy gauge taper-swaged aluminum tubing, the Model 402B feeds with 52 ohm coax and easily handles maximum legal power. Insulators are of high impact, fiberglas impregnated plastic. All steel hardware is iridite treated to MIL specs. Longest element is 43 ft.; shipping weight, 64 lbs. Unquestionably the most outstanding performance antenna available for 20 and 40 meter operation. Priced at **$169.50** Ham Net.

DX on 40 Meters? It's YOURS with Hy-Gain's Model 402B

Hy-Gain's Model 402B delivers the same outstanding performance on 40 meters as the notorious Model DB-24. You can work signals you never knew existed... 24 hours a day...365 days of the year. The key to the superb performance you can get from the Model 402B surrounds Hy-Gain's perfected linear loading technique which employs the use of unique linear loading stubs that run parallel along each element to deliver heretofore unheard of performance gains from a shortened antenna. At the same time, the Model 402B does a remarkable job of attenuating unwanted signals off the sides and back and completely eliminates the need for lossey center loading coils. It feeds with 52 ohm coax. Heavy gauge, taper-swaged aluminum elements are 43 ft. long. Rugged 16 ft., 2 inch OD boom. Insulators are high impact, fiberglas impregnated plastic and all steel hardware is iridite treated to MIL specs. It weighs only 37 lbs. and can be easily stacked with any tri-bander or 20 meter beam with a scant 10 ft. of vertical separation required. Superb performance on a challenging band. Sells for **$99.75** Ham Net.



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HY-GAIN ANTENNA PRODUCTS CORPORATION
8411 N.E. Highway 6—Lincoln, Nebraska

repeater station on 2 meters. W7FPP and W7GVC do a very FB job editing the W7DP news each month. K7-RAM is QRL these days on the MINOW Net. W7GEO is QRL with an addition to his QTH. W7HDL, doing an FB job as OO, had 46 observations during Feb. W7-ZHZ makes DXCC. K7EEC received his first DX QSL. W7YKG, W7DER and W7NLT fixed up the antenna for the Lower Columbia Amateur Radio Assn. The Skagit Club will go to SOL DUC hot springs Apr. 4 and 5 for a ham test. W7VFR received his SW-240 after a factory overhaul. W7IYC is operating portable from Stanton, N.D., with an SW-240. K7GZM has the auto bug and wants to peddle his ham gear. K7RSM has the homespun v.f.o. and exciter perking on 20 meters. K7-CHH is building an i.f. noise silencer for his receiver. W7AMC expects a new press soon. K7PIG is looking for Klickatat, Skagmania and Asotin County skeds. W7NPK is using the new Drake s.s.b. rig. WSN needs more check-ins from the Tacoma area on 3535 kc. A new Novice in the Bellevue area is KN7ZZT. The SCM would like some news from the Spokane area and Columbia Basin along with the Wenatchee and Yakima areas. K7CTP is a director on the NTN and NSN nets and the recorder on the WNS Net. The annual meeting of the Northwest Chapter of the Quarter Century Wireless Assn. will be held July 11 at the Villa Hotel, Burnby B.C. Traffic: W7BA 1014, W7OZX 655, K7CTP 566, W7APS 186, K7JHA 150, K7SRI 38, W7AMC 18, W7OEB 17, K7JRE 15, W7AIB 13, W7BTB 9, K7PIG 9, W7EVW 2, W7JC 2, K7CHH 1.

PACIFIC DIVISION

HAWAII—SCM, Lee R. Wical, KH6BZF—Acting SEC: KH6BZF. RM: KH6EWD. PAM: K3DIO/KH6-NAA. V.H.F. PAM: vacant. ECs: vacant. ORS: KH6-EWD. OOs: KH6BZF, KH6BG, KH6KS. OPSs: KH6-ATS. KH6BG. OBSs: KH6EWD, KH6ATS, KH6DXB, KH6AU. OESs: KH6BAS, K6QXL/KH6. The Hilo ARC elected KH6BEV, chairman; KH6BGF, vice-chairman; KH6AU secy.; KH6DPP, treas. K6-QKL/KH6 filed a nice report on 50- and 144-Mc. activity in the Islands. KH6CMM is working inter-island on 2 meters. K3LHJ/KM6 is putting Midway back on 6 meters. He's looking for 6-meter activity from Johnson, Canton, Wake, Fiji, Christmas and Samoa. K7-GOK/KH6 put his 160-meter rig in mothballs for awhile. Congratulations to KH6DXB and KH6AU, new OBSs, who spread the "Bulletins" within the Islands. KH6EJN, down Hilo way, would like help holding down traffic into Hawaii. KH6ATS launched the Friendly Net daily at 1000 HST on 7290 kc. New check-ins on the 50th State Phone Net were KH6GF, K5-KOL/KH6 and KH6ECU. More OO, V.H.F. PAM, ORS and OBS appointments are available. Write your SCM for details. Traffic: (Feb.) KH6EWD 27, KH6-ATS 5, KH6BZF 1. (Jan.) K3DIO/KH6 3.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU. K7SFN and W4CJD/7 have activated a traffic net on 3660 kc. at 0300 GMT week days as a public service to Nevada. W7BJY and W7TGK are in the Boulder City hospital and will be under medical care for several weeks. C-CATS is a new radio amateur club being formed in Las Vegas. K7RKH and W7HQS are going RTTY. The Las Vegas Radio Amateur Club was host to W6MLZ, who showed movies and talked of his adventures at the North Pole. K7RWN and family have moved into their new QTH. W7YDX has a new rig on 6 meters. K7ADD is on 6-meter n.f.m. W7NDG is active on 40 and 2 meters. K7UDG, of Reno, has a code and theory amateur radio class going with eight students. K7DEF is on the sick list. There is lots of 2-meter activity in Reno (146.16 Mc.) and Las Vegas-Boulder City (145.8 Mc.). K7IVL and K7SFN have activated the MARS station at Stead AFB. Traffic: W4-CJD/7 82, W7PBV 5.

SANTA CLARA VALLEY—SCM, Jean A. Gimelin, W6ZRJ—Asst. SCM, Edward T. Turner, W6NVO. SEC: WA6HVN. The Santa Clara Valley Section Net lost a fine manager when WA6RRH moved to San Francisco. At present the net is in a state of change and will probably reorganize into a Bay Area Combined Section Net on 2 meters. WA6YMX is the Santa Clara County EC. Joe has had experience in emergency communications in Texas and Arkansas and is reorganizing the Santa Clara County Intercity C.D. Net on 2 meters. W6RSY reports that his "ancient" HRO-5 and Viking still are holding up fine. K6GZ and W6DEF report that the conditions on 80 meters have improved and that it is easier to handle traffic than for the three previous months. W6PLS reports having worked in both the QCWA QSO Party and the DX Test. W6AUC is handling regular schedules to Hawaii. WA6UAM, new ORS, is working NCN and has built a modulator for his 75-meter rig. W6ZLO is active again on MTN and MARS. W6QMO is active in this section again as both ORS and OPS and now checks into SCVSN. K6LFZ, San

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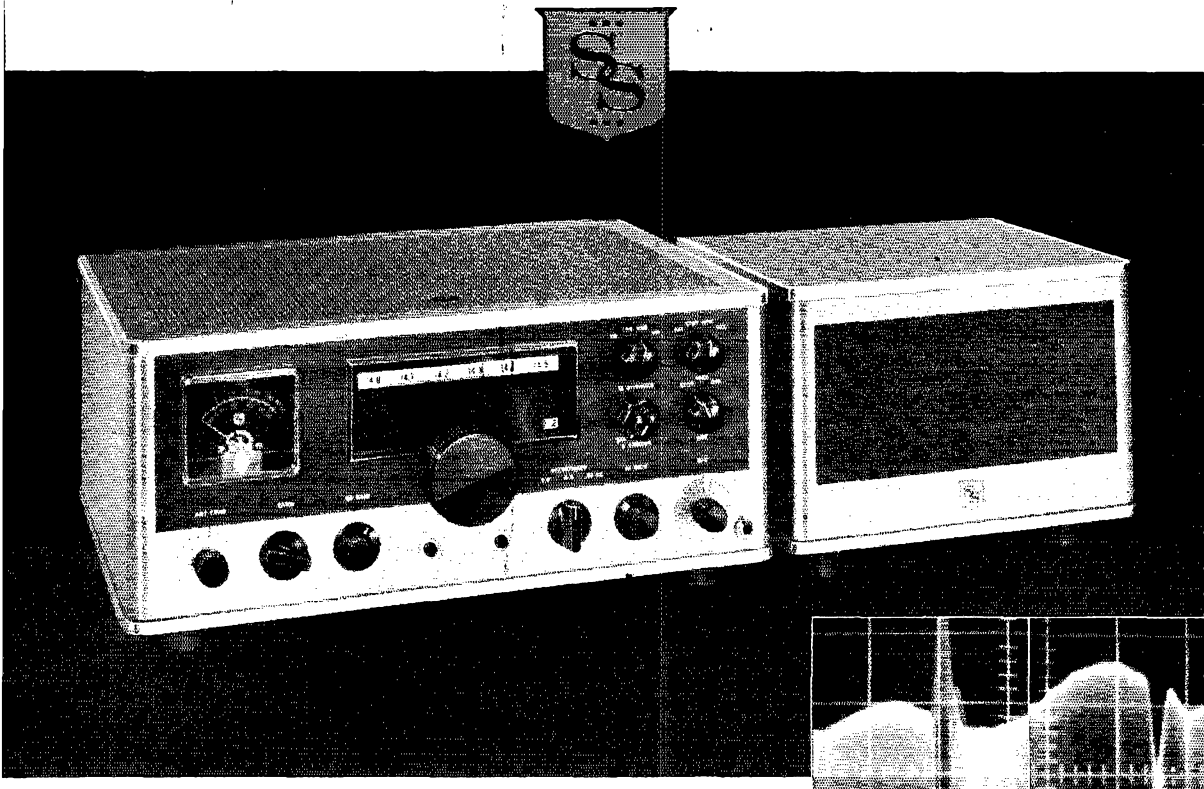

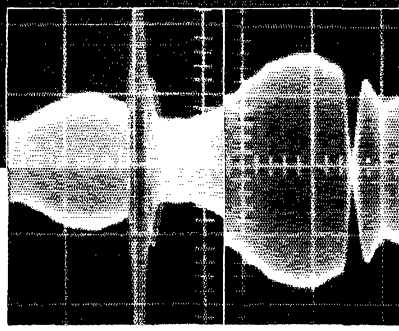

Impulse Noise In—
Readable Signals Out...

The SS-1S Pre-IF Noise Silencer[1] makes possible *solid copy* of barely detectable signals (S2 or less) in the presence of overwhelming (S9 or greater) impulse noise caused by ignition, neon signs, switches, power leaks and similar high peak, short duration disturbances. The truly spectacular performance of this accessory results in part from the exceptional overload and cross modulation characteristics of the unique SS-1R Receiver design[2] as well as from two most important design concepts: a) broad band noise detection (*full receiver front end bandwidth*), and b) gating the receiver (quietly and rapidly with low insertion loss) *before the noise pulse has been lengthened by receiver selectivity.* The oscillograms at right show the net effect of this silencing.

The SS-1R offers other extremely attractive performance characteristics: frequency precision and stability exceeding that of most frequency meters; digital frequency display requiring no mental arithmetic; autocalibration of all amateur bands with WWV; easy and exact sideband tuning (10 kc. per revolution with manual control) plus push button motor tuning fast traverse — to mention just a few. SS-1R is *The New Standard of Performance.* Now available at your favorite dealer.

[1]"A Pre-IF Noise Silencer", W. K. Squires, W2PUL, QST, Oct. 1963. [2]"A New Approach to Front End Design", ibid., Sept. 1963

SPECIFICATION PROFILE

- **Frequency Coverage:** 80 through 10 M (eight 500 kc. segments). Fixed tuned WWV at 10.0 and 15.0 MC; 5.0-5.5 MC auxiliary (WWV 5.0 MC). Two general coverage 500 kc segments
- **Selectivity:** 5 kc./2.5 kc./0.35 kc.
- **Stability:** Less than 500 cps warmup drift (typically in less than 5 min.); less than 100 cps thereafter including low to high line variation
- **Sensitivity:** ½ μv, or better, for 10 db S/N on 10 M with 5 kc. bandwidth
- **I.F. and Image Rejection:** Greater than 60 db
- **Cross Modulation:** Example: Receiving a **10** μv signal with 2.5 kc. selectivity, an unwanted **0.1 volt** signal 20 kc. away produces negligible cross modulation
- ***Internal Spurious:*** None at stated sensitivity
- **AGC:** Attack — 1 ms., **Slow** release — 1.0 sec., **Fast** release — 0.1 sec.
- **ANL:** I.F. type; operates on AM, SSB, and CW
- **Size:** 7¾" H x 16¼" W x 13" D, 25 lb.

For other Squires-Sanders products, see page 135

Squires Sanders, Inc.

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Benito County EC, reports that the Hollister group is active as a c.d. net on 147.475 Mc. at 1930 PST on Wed. and invites check-ins from the area. K6MTX worked the RTTY Sweepstakes. W6PLG works the Transcon Navy MARS Net. W6MMG now has a 300-watt emergency power generator. W6WN1 is active as ORS again. W6AIT reports that his XYL was in the hospital and he was forced to curtail activity. WA6RXM mobiled in the Yosemite area on 2 meters and worked stations in the San Joaquin Valley. Members of the Foothills Amateur Radio Society operate a ragchew 10-meter net on 29 Mc. The Palo Alto Club featured an "all-organization" meeting in Feb. to set up plans for the entire year. W6HEK was the featured speaker at the Feb. SCCARA meeting, presenting the latest information on Oscar. The Feb. meeting of the Santa Cruz County Amateur Radio Club featured a talk on the Oscilloscope by Allen Crowell. Members of the club have been working Fresno via repeater on 2 meters. The Feb. meeting of the South Country Club featured an auction. K6HEP, OES, is looking for contacts on 1215 Mc. Members of the Stanford Amateur Radio Club listened to an Oscar tape at their Feb. meeting. The Society of Radio Officers of the San Mateo Operational Area (RACES) features an organized county drill each month as well as a meeting in one of the member cities. Traffic: W6RSY 1010, W6JXK 676, K6GZ 156, W6YBV 102, W6DEF 79, W6PLS 70, K6DYX 50, W6ZRJ 49, W6AUC 48, WA6UAM 15, W6ZLO 12, W6QMO 8, K6LFZ 6, K6MTX 4, W6PLG 1.

EAST BAY—SCM, Richard Wilson, K6LRN—The new address of the SCM is 107 Cordova Way, Concord. WA6VAT has traded an SX-140 for an HQ-110 and is helping to de-bug a Viking I. WB6JGA/W4FOR is QRL ARPSC with visits to the Hayward RC and the Oakland RC. New ECs are WA6BMT and WA6QLF of the Oakland Club for the Metro Alameda County area; also WA6GRO for So. Alameda County/SACEN-6. WA6ECF says he has the clix in his HX-10 beat and has applied for DXCC. On Feb. 9 WA6FBS was out for a Sunday drive and happened upon an auto accident in Crow Canyon. He quickly QSOed WA6EYG and got aid in 20 minutes. Let's monitor 3.995 Mc. for possible assistance to mobiles whether they are on s.s.b. or a.m. WB6IZE is Field Day chairman for the Oakland Radio Club. K6BLN is now located in Napa. WA6KLL and W6TYM are FD chairmen for the LARK. The LARK had an auction Feb. 6 with proceeds going to the ARRL Building Fund. W6OJW is QRL work but still is issuing the SCM Award. W6KTF is FD chairman for the MDARC with WA6FMZ as assistant. The Early Worms meet on 50.25 Mc. 0500 to 0800. The Six-Meter Net in South Alameda County has hidden transmitter hunts the 3rd Fri. of the month. Starting place and boundaries are announced on SACEN-6. W6SJA, WA6GRU, WA6KLK, WA6YST and K6BYQ participated in an emergency drill at Napa on Jan. 23. Remember, fellows, that amateur radio exists as a hobby because of the public service it renders. This is a two-part obligation—first we must perform the service, then we have to let the public know about it. Let's get together and get back some of the prestige that we have lost because of apathy and bickering in our own ranks. We amateurs must complete and keep tested our own means for effective assistance in handling emergency communication, using our mobiles and fixed stations and our full operator capability to keep going under all circumstances. Only when we can make our plans better and offer them do we have a chance to be fitted in. We have *more* power and capability than others. Let's organize ourselves to perform so we eloquently justify our existence on valuable frequencies. K6DMI, trustee of the Richmond High School Radio Club, reports that the school is on double shifts and the space the club uses is being by classes. Traffic: WB6JGA 120, WA6MIE 26, W6KTF 11, WA6FBS 7, W6UB 7.

SAN FRANCISCO—SCM, C. Arthur Messinco, W6UDL/K6CWP—SEC: W6KZF. Your SCM took his BW Estelle, WA6ALK, to the YL Funfest sponsored by the Camelia Capital Chirps in Sacramento. K6GUQ, formerly of our section up Ukiah way, is now prexy of that club. She and all of her able assistants and club members are to be complimented on putting on a mighty FB program. San Rafael's radio KTIM monitors the Marin Club's mobiles during the rush hours and reports traffic hazards or accidents to its listeners. PICON. WA6IVN's 400 ft. long wire finally had to go —landlord's orders—but he is making up for it by a boost in power from 25 to 275 watts with a new Valiant. W6LTU has moved to San Francisco from Winters and is putting up antennas and working in the shack. WA6VWS is forming a new club in Burney and code and theory classes will be offered. W6DN has received the coveted AJD award from JARL (Japan). He was as-

(Continued on page 146)

sisted in this by JA3BDO. K6ALI continues as a mainstay OO up Santa Rosa way. W6LOU has resigned as EC there and WA6FLX will take over. Keep an open date for the Greater Bay Area Hamfest in Oct. Thunderbird Motel, Burlingame. No. Calif. Chapter QCWA now boasts more than 250 members. Bill, our SEC, says with the tourist season almost on us we should keep a sharp ear out for mobiles in distress. Think PICON! Come on you ECs, let's have some action and get those reports in. The BAYLARC held its Annual YL/OM Dinner with a wonderful turnout. Sonoma Co. RC elected WA6SFB, pres.; and WA6ARE secy.-treas. for the coming year. WA6QXV, one of our most active OPSs, has added 144-Mc. gear in his shack. Eureka RC now holds theory classes. WA6MDL is active from that city. WA6RRH, active as V.H.F. PAM in the Santa Clara section has moved to the S.F. area. The San Francisco Radio Club reports good progress on its code and theory classes, and now is back at its old meeting place at Forest Hill Lodge. Visitors are invited. Traffic: W6YKS 43, WA6IVM 13, W6BIP 4, K6ALI 1, WA6QXV 1.

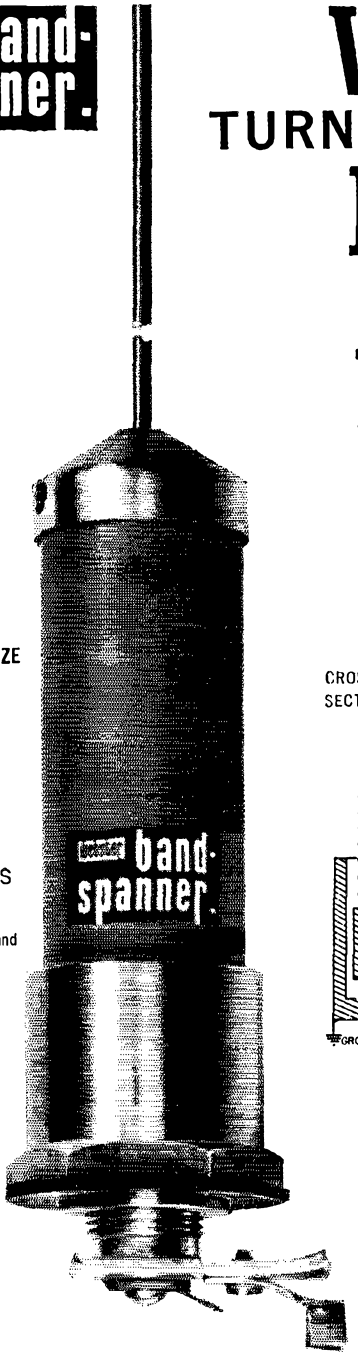
SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—Asst. SCM/SEC: Mary Ann Eastman, WA6-HYU. The McClellan Amateur Radio Society, which meets the 3rd of each month in Sacramento, is host club for the 1964 Pacific Division ARRL Convention. MARS plans a MARSFEST May 1964 embracing Armed Forces Day and Field Day. W6EII chairmaning both events. MARS proudly announces its own Mildred O'Brien, W6HTS, has been appointed a new MARS State Director. MARS also has achieved the singular appointment station-wise, and will be known as "The Gateway Station", gateway to the Far East, with the call AG6EA. K6GUQ, Camellia Capitol Chirps president together with 34 YL's "Chirps" gave news of Sacramento's Camellia Festival to lots of DX countries. The Golden Empire Amateur Radio Club, Chico, featured a "ladies night." Your SCM W6BTY, SEC WA6-HYU and W6CIS, representing the Dept. of Civil Defense, were among the 45 present. K6GLW and K6COO were temporarily out of business because of a "big wind" but are now active on 75. W6INN, momentarily is in Veterans Hospital. W6FJG is lucky working 20-meter m.c.w. Formosa and Siberia. WA6SXG's Ranger is heard on 1920 kc. WB6BYS is combining ham activities with his new position as lab. technician at Sutter General Hospital. WB6DLW devised a forward and reflected power meter which he claims extracts "the last watt output." W6GTG, in an unannounced "alert" Feb. 9, had W6QHP, K6UVE, WA6QGT, W6CXD, WØUMG, WA6UQZ, WA6YZO, WA6IVI and WA6HGH in their assigned locations in less than 23 minutes. W6AK, the Sacramento Amateur Radio Club, is showing a film on Hysteresis and Domains of Ferromagnetics plus discussion. W6GQS contributed his version and interpretation of *QST's* article on a "multivibrator calibrator" complete with schematic and suggestions in the current *Mike and Key*. K6QIF, pres. of the Sacramento Amateur Radio Club, is the newest EC in the area. K6IS answers all CQs he can on 40 meters with his single receiver-342 fed into a Q-5er c.w. They say WA6ZDE is real Q-5 using on 2 meters a Gonset GC-105 transceiver. Now K6QWL, the North Hills Radio Club, dreams of 2-meter net activity. K6EJX plans a speaker and demonstration on Telstar Satellite at the next meeting. K6VPF, chairman of registrations for the 1964 ARRL Convention in Sacramento, says he has the bugs finally removed from his SCR-522 transmitter. El Dorado Radio Club's *Cookie Sheet* indicates they are "in" on 145.5 Mc. Wed. Yolo Amateur Radio Club is Hospitality for the Pacific Division Convention. WA6-MMO and WA6YKR demonstrated amateur radio to 5th graders of the Bryte Elementary School. YOLO can be found Mon. at 2000 on 145.8 Mc., Yolo C.D. at 1900 Tue. on 146.94 Mc., Sacto. C.D. at 1930 Tue. on 147.12 Mc., an A.F. MARS WV118 at 2100 Mon. (local time) 143.95 Mc. Traffic: WA6MMO 2.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—Now is the time for you to send in your reservations for the Fresno Amateur Radio Club's Annual Hamfest, which is to be held in Fresno, May 16, 1964, at the Town and Country Lodge. WA6IGG and WA6-MLQ are new calls heard in Visalia. 4X4LM is attending Cal Poly; so is WA6TZN. W6EPB is running a Galaxy 300. WA6SOV is heard on 75-meter s.s.b. W6-QFR got his Heath transceiver working on 75. K6MIO is crystal-controlled on 432 Mc. W6TZJ has a 17-ft. dish for 1215 Mc. W6JPS is on 15. K6MHH is moving to Chico. W6MVU is heard on 15 meters working DX. W6PBL has a Model 28 RTTY. W6NKZ lost his antenna during a recent windstorm and so did K6PPI. W6ANN was a recent visitor here in Fresno. W6JUK has 32 elements on 2-meters s.s.b., and is horizontally polarized. W6UBK is heard on 75-meter s.s.b. running a pair of 4E27s in the final. WB6ETQ went on a trip

(Continued on page 148)

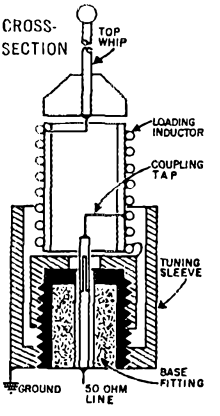
webster band-spanner.

W-600 SERIES TURN-TO-TUNE MOBILE ANTENNAS



ACTUAL SIZE

The **Band-spanner W-600** Series introduces a new base-loaded design which provides an effective antenna substantially shorter than a full-length counterpart. Top, sleeve and interior metallic parts are brass, heavily plated. Top whip is stainless steel. The antenna is ideally mounted on car top since this provides an excellent ground plane. Satisfactory operation can also be obtained by mounting on cowl, rear deck or fender. A single ⅞" mounting hole is required.



These high quality, commercial grade antennas use **electro-static tuning** to establish exact resonance and to achieve lowest VSWR and maximum performance anywhere within the frequency range specified for a particular antenna. The inductor assembly mates with an internal lead screw and can be rotated, micrometer fashion, to move in (or out) of a closely coupled metallic sleeve; this action provides a smooth, small-increment change in coil inductance. Once set, the inductor can be locked securely by Allen-head set screw. **There are no sliding contacts to wear or corrode!** The assembly is weatherproof—durable. Outer jacket is tough, high-impact-strength plastic.

AVAILABLE MODELS

W-600-01	25 to 27 mcs.
W-600-02	27 mc Citizens Band
W-600-03	28-30 mcs. Amateur 10 meter band
W-600-04	30-34 mcs.
W-600-05	32-36 mcs.
W-600-06	36-40 mcs.
W-600-07	39-43 mcs.
W-600-08	42-46 mcs.
W-600-09	46-50 mcs.
W-600-10	50-54 mcs. Amateur 6 meter band
W-600-11	144-148 mcs. Amateur 2 meter band.
W-600-12	145-174 mcs.
W-600-13	450-470 mcs.

Available in three groups: Antennas in the lowest, 25-54 mc group (including 27 mc C-B and amateur 28 and 56 mc bands) are ¼-wave resonant types with 42" whips on all ranges. The two higher groupings (including 144-148 mc) are resonant at ⅝-wave (have physical lengths that average ½-wave) and show gains of about 3 db. VSWR of all antennas is less than 1.5 into 50 ohms.

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to the Orient in March. The following hams helped out in the Telethon for Cerebral Palsey Mar. 7-8 here in Fresno: K6OGX ,WA6DRH, WA6ITF, K6OER, WA6FFJ, WA6JUB, WA6CWT, W6JPS, WA6ZGQ and W6BAN. I'm sure others helped, whose calls I do not have. WA6FFJ is experimenting on 160-meter mobile. K6SEV is the president of the Trowel Radio Club; K6SVM is vice-pres. See you at the hamfest. Traffic: W6ADB 176, W6ARE 16.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RMs: WA4FJM, K4CDZ, WA4ANH. PAM: K4ODX. V.H.F. PAM: K4MHS. Traffic nets: NCNE, 3547 kc. 2330Z daily; NCNL, 3612 kc. 0300Z daily; CCEN, 3907 kc. 0000Z daily; THEN, 3865 kc. 0030Z daily. If you are looking for a new facet of enjoyment of amateur radio, try traffic handling and public service. The SEC and respective managers of the NC nets will welcome your participation. K4QIF has a reactance (parametric) amplifier operating on 144 Mc. K4EOF is the proud owner of a new EAN certificate. WA4BBY has completed a homebrew 2C39 coaxial 432-Mc. transmitter. THEN recently elected WA4EIS, net manager, and K4EO, net secy. K4MHS, K4QIF and K4YYJ recently completed kw. v.h.f. finals and are looking for schedules on 144 Mc. Although troubled by "old man skip" this winter all the section nets have been able to keep operating. NCN has been experimenting with 1.8 Mc. to see if it is usable to beat the skip. W4BAW says that CCEN hasn't missed a session yet but some of them have been rough. WØFPA/4 says that transceiver gear is very popular at Cherry Point. Net Traffic: NCNE 390, CCEN 135, NCNL 110. Traffic: WA4PDS 323, W4LWZ 235, K4CDZ 166, W4IRE 106, W4BAW 104, WA4FJM 87, K8MTI/4 78, WA4QNS 67, K4YYJ 58, W4COJ 46, WA4ANH 45, K4MPE 40, W4FDV 24, W4BNU 22, WA4FFW 16, K4QDO 16, WØFPA/4 12, WA4GEU 9, K4EO 6, W4VSJ 4.

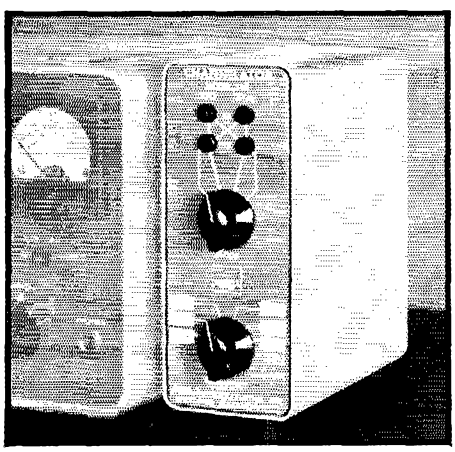
SOUTH CAROLINA—SCM, Lee F. Worthington, K4HDX—SEC: W4BCZ. RM: K4LND, S.S.B. PAM: K4JOQ. Nets: C.W., 0000Z and 0300Z 3795 kc.; A.M., 0000Z, 3930 kc.; S.S.B., 0000Z, 3915 kc. W4NTO outdid himself during February by sending more than 125 Official Observer infraction notices. Congratulations to WA4LPX and WA4ILO on earning SCN Section Net certificates. WA4PFQ is doing a fine job of handling c.w. traffic into the Charleston area, as well as NCS on SCN and 4RN representative. Terry has taken on quite a load and is pulling more than his share. W4JA, one of our best OOs, reports no frequency violations during the recent C.W. DX Contest on 40, 20 or 15 during his monitoring period. W4JA is to be congratulated on his article in Feb. *QST*, "The Black Box," an excellent article for the c.w. gang. W4AWY is the author of the fine RTTY article in Mar. *QST*. Nice job, Ken, how about some more? C.W. Net traffic: 38. Traffic: K4LND 116, WA4LPV 29, W4NTO 29, WA4LPX 21, WA4JHD 14, K4OCU 14, W4JA 10.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM and SEC: H. J. Hopkins, W4SHJ. PAM (S.S.B.) and Mgr. VSBN: W4JMA. RMs: K4MXF, W4ZAU, W4SHJ, W4QDY. Nets: VSN, 2330Z 3680 kc. c.w. VN, 0000Z 3680 kc. c.w. VSBN, 2300Z-0300Z 3935 kc. s.s.b. VFN, 0000Z 3835 kc. a.m. The VSN is a slow-speed training net and the VN is high speed. All nets except VSN meet daily—VSN meets Mon. through Fri. W4QDY, W4SHJ and W4DKP enjoyed a nice dinner and evening with the Richmond Club. Matters discussed included the new VSBN format, the National Traffic System and the SCM's role in the traffic system. The PVRC sponsored an on-the-air club reunion Feb. 29 week end and the mode was c.w. *only!* W4KFC, says that the notice was sent to 145 members and alumni and the response was excellent. WA4QXD reports that his tower is back up to 40 feet. All members of the 4-H Amateur Radio Club of Fairfax Co took part in the Novice Roundup. K4CG operators KN3WUW and WN4PEE passed their Generals. WA4GWD made the BPL on originations. W4JUJ was active with NYC-LI, QCWA and YL-OM Contests and picked up 2 new counties. W6GGR/4 is working on transistorized 10-meter gear. K4BAV reports the loss of transmitter chirps. W4ZMT is VN repping on VSN Wed. W4DLA passed the 100 mark in countries worked on 7 Mc .W4LK enjoyed the QCWA Party. K4SDS reports his son is recovering from cardiac surgery. W4ZM is back from Europe and eyeballs with 4UITU and IIER. W4JXD reports three new AREC members. WA4EPH will be operating from rare Bath Co. from June 17 until Aug. 15—Mode s.s.b. on 75-meters with a new Heath transceiver. QSLs are answered and go to WA4EPH at Camp Nimrod for Boys, Nimrod Hall, Bath Co., Va. Traffic:

(Continued on page 150)

QUICK AS A WINK AND BLINDFOLDED!

Yes, you can select an exact frequency on your KWM2/2A transceiver quick as a wink, and blindfolded — with the Waters Channelator Model 349! Just a flick of the switch finds the frequency you want among six pre-selected channels. You're never in the dark in your ham shack. With your eyes on the road in mobile operation, you'll still hit the precise crystal-controlled frequency you want — and stay there for stable operation! No more "getting a word in edgewise" on a busy channel — just switch over to another frequency, check it out, and move your conversation there without interruption — quick as a wink! The Waters Channelator Model 349 installs *on top of*, or alongside, the Collins KWM2/2A in minutes — with only one cable to solder. □ For Schedule operations, for MARS, for CD nets, for sure DX operation close to the edge of the band, select the Channelator Model 349 by Waters to do your quick as a wink, blindfolded frequency selecting for you. The built-in heterodyne frequency meter and "pullable" crystals permit exact frequency adjustment. The four-position mode switch chooses transmit or receive, crystal controlled or PTO tunable operation. The Waters Channelator Model 349 operates from either a fixed or mobile KWM2/2A power supply. You can *buy* it quick as a wink, and blindfolded! Price: $79.95. Crystals, any frequency, USB or LSB, are $6.00 each. ■■■



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(Feb.) K4PXY 585, W4DLA 323, W4DVT 251, WA4EUL 224, WA4GWD 186, K4KNP 167, W4JMA 154, K4SDS 124, W4SHJ 105, W4RHA 96, K4FSS 81, K4ISM 74, W4DKP 65, W4ZAU 62, K4ITV 53, W4ZMT 53, K4MXF 50, WA4SHD 47, W4LK 45, W4TE 44, WA4HWQ 42, WA4JRY 33, W4MXU 30, W4QDY 28, W4WO 26, W4JUJ 23, W4OKN 23, K4NOV 19, W4NLC 17, W4NVX 17, W4TBX 12, W4BZE 10, K4IIP 10, W4ZM 10, W4MK 9, W4JXD 8, W4OWV 8, W4WBC 6, WA4KVR 4, W6GGR/4 4, WA4QXD 3, W4KFC 2, W4KX 1. (Jan.) WA4SHD 11, WA4KVR 4.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RM: K8HID. PAM: K8EPI. Look for West Virginia stations on 3570, 3890, 3903 and 3905 kc. Congratulations to W8DRU on the *QST* article, Mar. issue, page 49. WVN 3570 kc. C.W. Net reports 172 messages handled and the WVN Phone Net on 3890 kc. had 96 messages. W8SHU represents the Kanawha Radio Club on the West Virginia State Radio Council. Is your club represented? Gratton Radio Club officers are K8ZWN, pres.; K8KRU, vice-pres.; WN8KAN, secy. A new ORS is W8LMF, of Ceredo. W8RKI runs skeds on 144 Mc. into Illinois and Indiana. New members of the WACWV Club are WA8CUZ and W3OIW. W8WHQ made WAC, s.s.b. on 7-Mc. mobile. W8VZO keeps attendance high at KRC Club meetings with well planned activities. The State Radio Council will present an award to the winner of the Field Day competition between state clubs. All club secretaries have copies of the rules. For information on the West Virginia State Radio Convention, Jackson's Mill, July 4 and 5, write Kay Anderson, secy., 209 Childers Court, Huntington, West Va. Traffic: WA8FIC 226, WA8DGE 114, W8CKX 45, K8CHW 9, W8JM 6, W8DUV 2.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—This month's report will be short because of inactivity. But, we did have an increase of fifty per cent on reports, so that is real progress. Our new OD in Pueblo, WØKVX, has been doing a very fine job in helping hams over the country in reporting to them on how their rigs are doing. Net activities are increasing, but conditions on the Columbine Net were real rough, because of the Russian jamming station. The High Noon Net and the Colorado WX Net both are doing a great job, thanks to the managers and the active stations. June 5-6-7, 1964, will be great days in the San Luis Valley here in Colorado. Over at South Fork we will have one of the greatest get-togethers Colorado has ever had for hams and their families. Fishing, picnicking running through the hills and to top it all off Cantakorus Uncle Zeb, WØCUZ the, hermit ham of Creede, Colo., will come out of cave for a personal appearance. Traffic: KØZSQ 259, WØHXB 225, KØFDH 192, KØDCW 135, WØSIN 42, WØENA 23, KØAID 1.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, W7OCX. K7BLR has had to resign as SEC because of pressing work at school. The Utah State Civil Defense had a successful statewide drill Feb. 22. Amateurs were on representing all of the population centers of the state. Officers of the Bountiful Amateur Radio Club for 1964 are W7OSQ, pres.; K7QPE, vice-pres.; W7MAY, secy.-treas.; and W7FSC, act. mgr. The Bountiful has started a net on 2 meters. W7POU has been swamped with requests for skeds and will answer them all as time permits. K7SAS made WAS and took part in the OM/YL Contest. W7LQE is now a liaison from TWN to PAN. W7OCX is back and active after a stay in the hospital for surgery. Beehive Utah Net traffic: 83. Traffic: W7LQE 96, W7OCX 90, W7VTJ 45, W7QWH 28, K7SAS 6, W7ZC 4, K7VRT 3, W7BAJ 1.

NEW MEXICO—SCM, Newell F. Greene, K5IQL—SEC: K5QIN. New Mexico nets return to summer schedules May 1. W5WZK, 10-meter PAM, reports several new nets on 29.6 Mc.: Los Alamos, 1900 MST Sun.; Caravan Club, 1930 Tue.: Roswell RACES, 1930, Sun.; White Sands, on 29.0 at 2000 Tue. After serving as V.H.F. PAM for ten years, W5FPB has resigned. We shall miss his 100 per cent reporting. Those opposed to turning such a good old horse out to pasture say, "nay." White Sands ARC announces Aug. 16 as the date of the Annual Picnic at Cloudcroft. The tall pines make a fine setting for this popular hamfest. W5CRF et al are striving to reorganize the c.w. net. W5ZHN, our RM, will help although burdened with duties while his XYL is ill. On this "second time around" your SCM is aware of the responsibilities which go with the honor of being elected. All cooperation and help will be appreciated. Traffic: W5UBW 51, W5CRF 29, K5RWB 2.

WYOMING—Acting SCM: Wayne M. Moore, W7CQL—Nets: Pony Express, Sun. at 0830 on 3920; YO, Mon., Wed., Fri. at 1830 on 3610. Plan your vacation

(*Continued on page 152*)

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on AM or SSB for CB, Amateur, Mobile or Base Station Use

COMBINES mobile styling with high performance and low cost. Response characteristic carefully calculated to give maximum clarity and intelligibility; minimizes interference in adjacent channels. High Output —50 db. Hi-Z ceramic element has wide temperature tolerance and is immune to humidity. Completely shielded for minimum hum pickup. Reliable DPDT switch gives both signal and relay control. Designed for long life and trouble free performance. Switch can be easily operated using the microphone in either hand. Has rectangular hangup bracket; will not rattle or scratch mounting surface. Attractive light gray high-impact molded Cycolac* case for ruggedness and dependability. Ask your distributor for complete literature or write us today.

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now to attend the Annual Wyoming Hamfest at the Lions' Park in Cheyenne Aug. 22-23. Wyoming now has 5 RTTY stations, the latest as of this writing being W7MUG. K7LBW probably will be next. The Casper Club had a very nice pot-luck in Feb. with 50-60 in attendance. K7SAR has his new s.s.b. rig on the air and it sounds good. The Casper Club saw a movie on eye transplants in March and interest in the Eye Bank and Eye Bank Net is increasing. If interested, see W7-HH, W7HEB or W7TAQ. W7YWE has his beam up 95 feet. Can anyone in Wyoming top that?; Traffic: W7-DXV 38, K7SLM 27, W7HH 22, W7BHH 10, K7IAY 10, K7OVD 10, K7SDK 8, K7VTM 8, K7CSW 4, K7DUT 4, K7TCF 4, W7ABO 2, W7AEC 2, W7BKI 2, W7CQP 2, K7HHW 2, K7LBW 2, W7RPV 2, K7ITH 1, K7JED 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—SEC: W4NML. RM: W4USM. PAMs: K4BTO, K4NSU and K4WHW. We regret to list K4BFT as a Silent Key. If interested in an Alabama RTTY Net, contact W4PXM. The Birmingham Hamfest will be held May 2-3; the Mobile Hamfest May 30-31. WA4MEK now is on 6, K4IQU is on 1296 kc. wishes skeds on 6 or 2 a.s.t.k. after 2130 CST. New equipment: W4YNG is building a receiver, W4NML has a vertical; K4FZQ a Valiant; W4LHW a TR-3; WA4EQF a Thor; W4FXZ and W4-ZIY HE45Bs. We are real proud of our jump to 5th in the '63 SET. W4ZDY now is on s.s.b. The Mobile Club has a new bulletin *Azalia City Q5er*. Feb. net reports (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sessions*	*Ave. Tf.*	*Ave. QNI*
AENB	3575	0100	Daily			
AEND	3725	2200	Daily	20	1.55	5.6
AENM	3965	0030	Daily	29	3	49.4
AENO	50.55	0115	M.W.F.	13	1.2	28
AENP	3955	1230	Daily	27	2	15
AENP	3955	0000	Daily	35	2	23.6
AENR	50.55	0115	Tue./Thurs.	8	.75	27
AENT	3970	2230	Daily	34	1.9	12.41

Traffic: (Feb.) WA4AVM 322, WA4EXA 201, K4WOP 102, K4BSK 80, WA4EXB 74, W4NML 62, K4AOZ 57, K4WHW 34, W4YNG 26, K4FZQ 20, K4GXS 18, K4NSU 14, W4YRM 13, K4DSO 12, WA4MGI 11, K4NUW 10, K4KJD 9, K4BTO 8, K4DJR 7, W4KCQ 7, W4DS 4, WA4CWI 3, K4RIL 3, WA4LDC 2, K4UMD 2, W4DGH 1. (Jan.) W4NML 141, W4KCQ 14.

EASTERN FLORIDA—SCM, Guernsey Curran, W4GJI—SEC: W4IYT. PAM A.M.: W4SDR. S.S.B. PAM: W4OGX. C.W. RM: K4KDN. RTTY RM: W4-RWM. V.H.F. PAM: WA4AZZ. The response to the Dear OM cards has been most gratifying and the files indicate that all those who have an interest in holding a valid certificate have been serviced with only a few cancellations, mostly because of removal from the section. The SAR for February showed fifty stations reporting with a total of 14,232 pieces of traffic, and there were ten BPLs. This is fine, but I feel sure that there are many stations in the section handling traffic who do not bother to report. Please hear this—even if you handled only one message it still counts. If you do not have a Form 1 card just send me a post card and the section and you will get credit. It only takes a moment and remember that handling traffic is an amateur service that we are proud of and this section is one of the most capable of all. V.h.f. activity is increasing daily and it is particularly noted that the 7-11 Two-Meter Net which functioned daily for a long time with only two operators now has a check-in attendance of 74. This net is now called to the south from Lake Worth NCS at 1900 and then at 1930 the beam is turned to the north and then scanned to the west. Last month 98 pieces of traffic was handled and some fine OES work accomplished. For the clubs the ARRL has an excellent list of training aids and films of general interest. We recommended "Ham Wide World" for the refresher and Novice symposium at Orlando and "And a Voice shall be Heard" as general entertainment for all. It is earnestly suggested that club program committees look into these and make good use of their availability. If you get on QO card, think a bit and check before you take offense or resent it. The guy is qualified and trying to help you. Traffic: W4DUG 2974, WA4IJH 2773, WA4BMC 2378, W4ZMN 1499, WA4RSQ 621, K4KDN 518, W4DFU 253, K4NVD 239, W4TRS 219, WA4BAW 203, WA4LBM 187, K4BY 184, WA4FYV 181, W4SGH 179, WA4NZD 150, W4TUB 145, W4VWL 141, WA4GBM 127, WA4IXI 122, K4VNG 122, WN4-CHO 104, W4IEI 104, WA4COR 100, WA4IWO 78, W4-SDR 77, W4MIN 70, W4OGX 70, W4AKB 56, K4COO 41, W4GJI 39, K4IIB 39, W4EHW 38, WA4LHK 36, W4DSH 33, K4LCF 31, WA4RXG 30, K4FQP 26, W4-YJM 25, W4GUJ 22, K4DAX 15, K4ENW 12, W4BKC 11, WA4FGE 11, K4MTP 11, W4FP 8, W4IYT 8, WA4-IYG 7, WA4GDS 6, WA4RBM 5, W4NOK 4.

(*Continued on page 154*)

TRANSMITTER, RECEIVER AND POWER SUPPLY ALL IN ONE HANDY PACKAGE!

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WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. RM: W4BVE. Tallahassee: The Weather Bureau is getting daily reports from Pensacola and Defuniak Springs via Fla. Net Bravo (WFPN). Madison: WA4GHE is looking for a ham-shack in his new home and room to install mobile in the new car. Panama City: WA4FIJ was authorized high power in the 432-Mc. band by the Eglin AFB and FCC. He is looking for schedules. W4ZJB realigned all of C.D. 2-meter equipment and net activity is picking up. Crystals for the 6-meter Section Net, 50.45 Mc., are available from WA4FIJ. Get yours now. K4HNB, prexy of Tyndall MARS Club, has been transferred. K6GII is a new ham at Tyndall. K4CEF has returned to school in Ga. WA4FJF received stickers for YLCC 250. Fort Walton: New officers of the Whipsnappers Mobile Club are W4UXW, pres.; WA4HNI, vice-pres.; WA4OWS, secy.-treas. The club is planning ham activities in connection with the Billy Bowlegs Festival in June. Pensacola: Your SCM had a nice visit with the V.H.F. Radio Club. W4EQR is helping to dispose of the ham gear of the late K4QAC. W4JPD is active on 20 meters with a KWM-2 and kw. linear. K4AH has a tri-band Swan transceiver. WA4IIF runs 40 watts on 40 and 15 meters. WN4NPW and WN4RAZ are new Novices. Traffic: (Feb.) W4BVE 161, W4MLE 118, WA4IMC 114, W4WEB 105, WA4FIJ 91, K4SMB 54. (Jan.) W4MLE 102.

GEORGIA—SCM, James A. Giglio, W4LG—SEC: W4YE. PAMs: W4FYH, K4PKK and W4RZL. RM: W4DDY. GSN meets Mon. through Sun. at 3595 kc. at 1900 EST and 2200 EST. GCEN meets at 1830 EST Tue. and Thurs. and at 0800 EST Sun. on 3995 kc. The Coosa Valley Emergency Net meets each Sun. at 1330 EST on 3950 kc. and the Georgia Cracker Mobile Net meets at 1330 EST on 3995 kc. The Georgia Single Sideband Net meets nightly on 3975 kc. at 2000 EST. K1KSH/4 made BPL again! Congratulations, Sparks, also on making the A-1 Operator Club. He is active on 160 meters. K4QWX handled emergency traffic during the January ice storms. WA4LLI is the new NCS for the Wed. night Middle Atlantic Traffic Net. W4YE and son W4YZC/M4 keep bi-weekly skeds on 40-meter c.w. mobile. WA4PSA earned the QRP 25 award. Anyone interested in the QRP Club, contact him. W4RZL and his XYL are planning to enjoy "old age" (I quote) in a new tri-level QTH. The Georgia QSO Party, 1964 session, will take place from Sat. 2300 GMT May 9 to

(*Continued on page 156*)

GEORGIA QSO PARTY
May 9-11

All amateurs are invited to participate in the 3rd Georgia QSO Party, sponsored by the Columbus Amateur Radio Club.

Rules: (1) *Time:* 2300 GMT Saturday, May 9 to 0500 GMT Monday May 11. Any or all of the 30 hour period may be utilized. (2) All emissions and bands may be used, but a station may be contacted only once per band. C.w.-to-phone is permitted, but crossband contacts are not allowed. (3) *General Call:* "CQ GA" on c.w. and Ga. stations will identify by signing "DE (call) Ga K." (4) *Exchange:* QSO number, RS(T), and county, state, province, or country. (5) *Scoring:* Count two points for each completed contact, one for each report received and sent. For final score, Ga. stations multiply QSO points by the total number of different states, provinces, and countries worked. Ga-to-Ga. contacts count for QSO points and the Ga. multiplier. Outside station multiply QSO points by different Ga. counties. (6) *Awards:* Certificates to the highest scoring station in each state, province, country and Ga. county. 2nd and 3rd place awards will be issued if in the opinion of the contest committee the number of entries warrants it. A certificate will be awarded to the highest scoring Novice and Technician in each district if entries warrant it. (7) *Suggested frequencies:* 1805 3590 3975 7060 7205 14060 14290 21060 21410 kc. Novices try 3735 7175 and 21110. (8) Logs should show dates, times, stations worked, exchanges, frequency, type emission, and a signed statement that all contest rules have been observed. Contest logs postmarked no later than June 15, 1964 should be sent to CARC, c/o C. R. Watson K4ADU, 5224 Morris Avenue, Columbus, Georgia 31904.

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Mon. 0500 GMT May 11, and will be sponsored by the Columbus Amateur Radio Club, c/o K4ADU, 5224 Morris Ave., Columbus, Ga. 31904. For Worked all Georgia Counties Award, contact K4BAI, 3500-14th Ave., Columbus, Ga. 31904. The Atlanta Radio Club Hamfest will be held June 6 and 7 at Lenox Square Shopping Center. Traffic: K1KSH/4 549, W4NSO 263, K4-FRM 44, K4QWX 27, K4MCL 24, W4MLA 19, WA4BVD 8, WA4LLI 8, WA4GPA 6, W4YE 5.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Kenneth P. Cole, W7QZH—Asst. SCM, E. A. "Pete" Marshall, Jr., K7AWI. SEC: K7-NIY. PAM: W7OIF. RM: W7LND. RM: W7FKK. The Copper State Net meets at 1930 MST Mon. through Fri. on 3880 kc.; the Grand Canyon Net Sun. at 0800 MST on 3880; the Tucson AREC Net Wed. at 1900 MST on 2280; the Cochise County AREC Net each Sun. at 1400 MST on 7260; the Tucson 2-Meter Net at 1000 MST on 145.35 Mc.; the Tucson 10-Meter Net every Fri. at 2000 MST on 28.650 Mc. Radio amateurs of Mesa, Ariz., have organized the Mesa Radio Amateur Club. Meetings are held the 1st Thurs. of each month in the auditorium of the Mesa Public Library. All amateurs are cordially invited. For further information contact Frank Maiorana, K7GST, 406 North Drew St., Mesa, Ariz. K7VKE, vice-pres. of the Scottsdale Amateur Radio Club, has moved to Wyoming. K7KCB is now working RTTY. W7YAL completed his home-brew linear. K7NHL, formerly W2SZK, is now permanently located in Tucson and on the air with a powerful 65 watts. He is PAN representative every Thurs. The Old Pueblo Radio Club advises that 2-meter activity in the Tucson area is on the increase. K7WIP, Tucson, is out of the hospital and recuperating at home. The Arizona Amateur Radio Club now publishes a bi-monthly newsletter. For information and advertising contact K7PXJ. Your SCM wishes to thank the amateurs of Arizona and ARRL for the privilege and pleasure of having been allowed to serve them as SCM for past four years. Thanks to the many amateurs of the state whose cooperation made this column possible. My heartiest congratulations to W7FKK, whose term of office began Apr. 15, 1964. K7KYQ, K7-VQI and K7JQJ are running Ham-TV in Tucson. Traffic: W7FKK 40, K7TNW 35, W7KRW 6, K7RUR 4, K7VQI 3.

SAN DIEGO—SCM, Don Stansifer, W6LRU—Director W6MLZ was on hand for the February meeting of the San Diego Council and brought the local gang up to date on many matters. The SOBARS now publishes a bulletin with WA6PDE and WA6TAD as editors. The Newport Club enjoyed a Telephone Co. demonstration for their Feb. second meeting. Feb. guest speakers at the Palomar Club were K6BX and K6UTO. New officers are W6BLL, pres.; WA6IFB, vice-pres.; W6YZV, secy.; W6LKC, treas. The Anaheim Club has six new members, WB6JHZ, K6UYQ, WA6WDW, WA6HKW, WB6GRX and WB6ITH. W6-NFG used the Sun. morning ARPSC Net on 3825 kc. to have police alerted when he saw a break-in. The thief was arrested by police who arrived in record time, and a thanks to amateurs assisting was given by authorities. The San Diego County CD Radio plan is now approved and operating and W6MHY is Radio Officer. Bob, ex-chief-op at W6IAB, is now signing KR6CP, and he wishes to thank K6YVN, K6EPT and K6BPI for their fine cooperation while he operated at W6IAB. W6WRJ, Orange County Club pres., reports working WA6SVG, who was running 8 watts from the radio room of a sunken ship near Catalina Island, 105 feet underwater. Welcome to W2OE/6, ORS from Northville, N.Y., who vacations in San Diego each winter. Traffic: (Feb.) W6IAB 4223, K6BPI 3159, W6YDK 2805, K4AKP/6 529, W6EOT 346, WA6BRG 267, W2OE/6 94, WA6ROF 89, K6GJM 33, W6DGM 14. (Jan.) WA6BRG 441, W6EOT 321, WA6CDD 20.

SANTA BARBARA—SCM, William C. Shelton, K6-AAK—SEC: WA6OKN. RM: W7WST/6. The RM just missed the BPL by a few messages. The LERA of VAFB is a very active club, working on Snow Trips, Oscar III and W6AB Party. The club also had a WAS marathon and logged 42 of the 50 states. The Santa Barbara Club had a program on lasers. The defense fund for the TVI problem in S.B. is getting along well, with contributors from all over the U.S. The Poinsettia and the Ventura County Clubs are having attendance problems. W6KZO has a new QTH with a Hi-tower vertical installed. K6DXW is now with the phone co. WA6OKN had a fire in his home; no damage to his gear, though. The SCM has a new SX-115 receiver. *Please* let me have reports from the gang by the 1st of each month. Traffic: W7WST 464, K6AAK 16.

(Continued on page 158)

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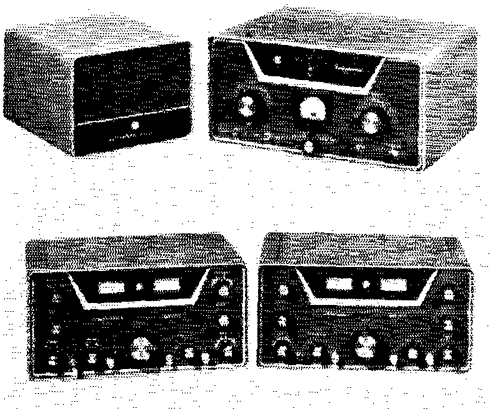

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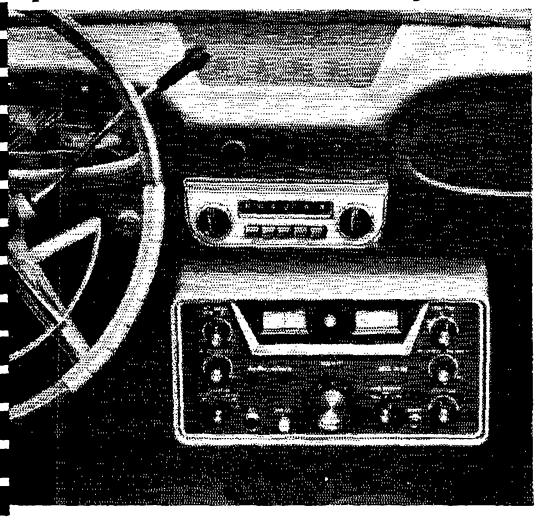

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WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: K5AEX. PAM: W5BOO. RM: W5LR. The Ft. Worth KC Club instruction class has been a great success, according to K5WQH. Eight Novices have passed their test for General. There has been fewer drop-outs from this class than any of the previous classes and more interest in getting the General Class license has been displayed by all students. The Dallas ARC has started a class of instruction for the General Class and is making plans for a class for Amateur Extra. The Red River ARC reports growing interest in its Novice classes. Many Citizen Banders are attending its classes. The Pampa ARC reports 15 members, most of them on S.S.B. The Brownwood ARC is working hard on plans for the coming West Gulf Division Convention and reports everything is shaping up FB. Don't forget the date, June 12 to 14. Don't miss it. W5PYI has been presented a certificate for "Honorable Service" by the Governor of Texas. Cotten has been a member of the Texas House for 7 years. K5ENL is seriously considering s.s.b. W5RV was heard on s.s.b. with a home-brew rig that sounds FB. The Amarillo ARC has set May 2 and 3 as the date for its Annual Hamfest. Traffic: W5DTA 416, W5UTW 375, WA5DQP 57, W5BOO 34, K5ETA 5.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil P. Andrews, W5MFX. SEC: K5DLP. If you are interested in emergency work you can contact Bill or myself and we will be more than happy to sign you up in the AREC. It is part of our obligation as an amateur to assist the public in need, and the Storm Warning Net is about the best I can think of at the time. We had over 100 hams and highway patrolmen out checking on a distress call for help that was received by several Citizen Band operators and some ham operators. They notified the Highway Patrol who at once called out two of its airplanes and tracking devices and along with the use of patrol cars and the *hams* was able to turn up a suspect later identified as an inebriated Citizen Band operator who was out to have a good time. This has been turned over to the FCC. WA5ESV is a new ham in Sapulpa, and already working as a net control on the 7235 Net. I am real proud of the Oklahoma showing in the SET. W5EHC has a new TR-3, W5MRG has a new TR-3 and W5OHH has an HX-500. It looks like Oklahoma City is going mostly s.s.b. We had a real enjoyable meeting with the Bartlesville Club with several Tulsa hams attending. Traffic: W5QMJ 439, K5TEY 222, W5EUL 57, W5MFX 56, W5JXM 52, K5DLP 41, K5KTW 30, K5OCX 21, W5PML 20, K5CAY 14, W5GMJ 13, K5CBA 10, W5EHC 8, K5JOA 8, K5MTC 7, W5FKL 6, W5WDD 5, K5YAQ 5.

SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM—SEC: W5AIR. The new officers of the Corpus Christi Amateur Radio Club are WA5GWT, pres.; W5LVC, vice-pres.; WA5BEY, treas.; W5ARY, secy.; WA5AUB, publicity; W5AQK, activities Director. New directors elected were K5YRN and W5HQR. The Winter Garden Radio Club, WA5IYL, operated from the Crystal City Stock Show and Jamboree. K5LQJ has an ART-13 that he soon will have on the air. K5ANS is teaching two physics courses at Texas A&M University. W5JBV is operating from his dorm room at A&M. W5HQR and W5YCV are the proud grandparents of a fine grandson. The 7290 Traffic Net and the TEX C.W. Net needs more contacts in South Texas to move their traffic. It is Silent Keys for W5NN. He was a member of the Houston Amateur Radio Club and certainly will be missed. This column will have to be short this month, as I didn't receive any news from anyone. Traffic: (Feb.) W5ANV 35, K5LQJ 34, K5LWL 4. (Jan.) K5ANS 85, W5AIR 64, K5LQJ 10.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: A. E. W. Street, VE1EK. New appointments include VE1RY as OBS. Winners in the recent VE1 Contest are as follows: (C.W.) VE1BY with 2448 points, VE1AAQ runner-up with 2352 points. (Phone) VE1GA with 8928 points, followed by VE1MA with 8804. Congratulations, gentlemen. VO1DG has transferred to Cape Breton. Ex-VE1RB now is VE3CBI. New calls include VE1AMG and VE1AMU. Six-meter operators from Cape Breton include VE1s AAK, AKC, ET and NV. VE1AEB has increased power to 150 watts. VE1OM reports that VE1YQ is getting good results with the new NCX-3. VE1WL is recovering after an extended stay in the hospital. VE1NX is active on 6 meters. A severe storm struck Newfoundland's east coast recently and members of SONRA supplied emergency communications in their usual efficient manner. Those assisting included VO1s AE, AO, BJ, BL, BY, CD, CV, DC, DF, DJ, DL, DO, EC, EI, ET, VE1s FR, MN, K1WXP/VO1, K3SWC/VO1, K7GVM/VO1, K8JQO/VO1.

(Continued on page 160)

LEO MEYERSON WØGFQ

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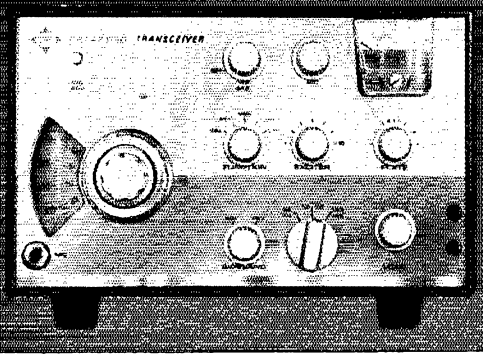

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Congratulations and best wishes to VO1FQ and VO1GE on their recent wedding. Traffic: VE1DB 11, VE1AEB 10, VE1OM 9.

ONTARIO—SCM, Richard W. Roberts, VE3NG—While the ARRL celebrates its fiftieth year, our own Canadian section has been associated with the League for forty-four years. The Scarboro ARC now meets each 2nd and 4th Mon. Newly-licensed are VE3FRD, VE3FRL, VE3FRK and VE3FRW in the York North ARC. The club has its own quarters in King. VE3CUV is now in Fraserdale. From the Lakehead we learn that they, too, in the far west have TVI problems. The club's paper, *High-Q*, is one of the best. This club celebrated its thirtieth anniversary this past Feb. Members of the DX Assn. Ontario have been busy working the schooner *Bluenose* while she was in the Carribean on charter. New OBSs are VE3CLK and VE3BLZ. The latter also is a new PAM for Northern Ontario. VE3TT is a new ORS. Your SCM was a visitor at the Sudbury ARC dinner. The Roblin ARC in Toronto also had the SCM as a visitor recently. VE3AUU has an inverted "V" antenna on 75 meters. VE3FDP now resides in Kingston. The Belleville Two Net is on 144.54 Mc. at 2030 EST Mon. VE3CJJ is back on 75. VE3AHU is on d.s.b. on 75. VE3LY is moving to Florida. VE3AEL is giving up ham radio. VE3EUR is working some DX at last. VE3CFR, at London, advises that the local club is in high gear with planning for the '64 Ontario Division Convention. VE3FQD is a new-comer in Ingersoll. The Ottawa mobile gang had a good time at its social, held at the local Navy Stone frigate, HMCS *Carleton*. The Kitchener ARC has a paper. Your SCM would appreciate a copy when available. It seems that amateurs these days must invite attention of some of the CB group to the fact only DOT-licensed amateurs can truly identify themselves to others as licensed amateur radio operators. Traffic: (Feb.) VE3CYR 133, VE3DPO 129, VE3CFR 122, VE3BZB 121, VE3NG 115, VE3AWE 101, VE3CIL 80, VE3DRF 52, VE3FGV 52, VE3EHL 48, VE3BLZ 42, VE3BTV 37, VE3BUR 32, VE3AKQ 23. VE3CLK 23, VE3DUU 23, VE3AUU 21, VE3BZT 18, VE3EBC 16, VE3WW 16, VE3CFI 12, VE3-DH 12, VE3TT 11, VE3FEH 10, VE3ETM 7. (Jan.) VE3AML 65.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BEZ. A flash 110-m.p.h. wind storm hit Montreal March 5. VE2TA and AUU lost their beams. The Mardi-Gras Carnival, sponsored by the Radio Club de Quebec, was very successful with good representation from outlying districts. A Scout exercise at Hudson, Como and Vaudreuil was ably assisted by 2-meter stations VE2ABV, VE2AT, VE2ALF and VE2ALE as Control. The South Shore Club held its annual dinner-dance at St. Lambert enjoyed by some 125 hams and friends. The BERU and ARRL DX Tests saw considerable activity, especially by the leading VE2 DX lights. VE2AQJ runs classes for Dot at Kenogami. VE2BMS is becoming an active traffic man and VE2JJ also is interested and has good outlets for Newfoundland and Labrador. Glad to welcome back K2VTX from Cornwall. 2-meter net activity plays an important role in St. Maurice Valley with VE2AIM as Control. The AREC Sunday Net at 11 A.M. on 3755 kc. would appreciate hearing from "distant" VE2s. Ve2-AEM, VE2AYA and VE2PT keep regular skeds on 75-meter phone. Récents changements de lettres d'appel: VE2RS maintenant VE2SG, VE2ABT-VE2EK, VE2-AGW—VE2TD, VE2RR and VE2PW déménages chez les VE3. VE2PY tourne présentment un film sur la radioamateur dans le Québec. VE2AGR de retour à Montréal en MARS. Drummondville innove son nouveau radio club, VE2CRD. Des endossements pour le CIM, peuvent être maintenant obtenus pour 25, 50, 75 et 100 QSO, par le CJR. Traffic: VE2DR 129, VE2ALH 103, VE2BMS 56, VE2EC 51, VE2FY 33, VE2BOC 27, VE2-UN 27, VE2OJ 24, VE2SD 22, VE2AIR 20, VE2AAH 11, VE2CP 11, VE2BG 10, VE2HV 8, VE2JJ 7, VE2BRT 6, VE2AYA 2, VE2 QG 2. VE2 ALF 1.

ALBERTA—SCM Harry Harrold, VE6TG—SEC: VE6FS PAM: VE6PV. RM: VE6AEN. ECs: VE6FK, VE6SS, VE6ABS, VE6AJY, VE6AFJ, VE6PZ. OPSs: VE6CA, VE6PV, VE6HM, VE6SS, VE6BA. OOs: VE6-HM, VE6NX, VE6PL. OBSs: VE6HM, VE6AKV. ORS: VE6BR. OESs: VE6DB, VE6HOV, VE6AKV. Our PAM reports that band conditions are improving and he is able to get some good check-ins some nights. SEC reports that the Calgary AREC group is doing very well under the guidance of VE6FK and that VE6-PZ, VE6AJY and VE6AFJ are slow in picking up new members. VE6ABS and VE6SS have very good check-ins. VE6HM and VE6AKV are doing well with ARRL Bulletins. The Northern Alberta Radio Club is now putting out a monthly bulletin entitled *Ham Hum*. Hope you are successful with it, fellows. Your SCM will have a write-up each month in both *Ham Hum* and *Key*

(*Continued on page 162*)

BULLS EYE BUYS AT ARROW

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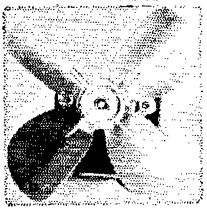

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Mod. 4/104, 4/102 or 4/103 less tubes and xtal, each **$29.95**

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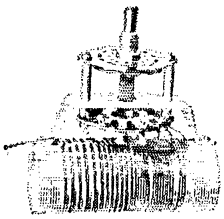

Units have 6 posit. tap switch mounted on ceramic coil form. Mod. 4/111 designed for use with two 807's or 6146's (in parallel). Freq. Range 3.5 to 29.7 mc. Mod. 4/112 is designed for use with single 807 or 6146. Handles up to 60 w. Range: 3.5 to 29.7 mc.

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Model C-855 professional series, dual cone, ceramic-magnet, 12 watt handling capacity. Ideal for remote ham and hi fi use. Shipping weight, 4 lbs.

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Shown approximately actual size

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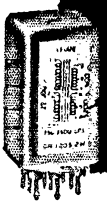
Same as used in W2EWL SSB Rig— March, 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered). The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x 3/4" w. x 3/4" d. New and fully shielded.



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Clicks. The boys in VE8-Land will be listening for the *powerful five-watt station* for the next few months of the Norwegian Arctic Expedition, which will be working c.w. and s.s.b. in the 40-and 20-meter bands. Traffic: (Feb.) VE6HM 186, VE6TG 23, VE6SS 5, VE6AHV 3, VE6CA 2, VE6FK 2, VE6WN 2, VE6AAX 1, VE6ADS 1. (Jan.) VE6AHV 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—The Chilliwack ARC hosted the Bellingham (U.S.A.) ARC and all reported it was a grand evening. The British Columbia Amateur Radio Assn. has decided to cancel its Old Timers Night to support the Quarter Century Wireless Assn. Old Timers Night July 11, 1964. This is not just a gathering of old-timers but of all amateurs and their YLs and XYLs. Tickets are available now from VE7BHH. The cost is $3.50 and the program is good. It is not often that the RI's Office feels sorry for an amateur with a call that is hard on c.w., but VE7BIH was one such amateur. Alec is now VE7GX. The Vancouver ARC is holding a monthly transmitter hunt and the winner is the hidden transmitter station for the following month. All are welcome and prizes have been good tools. VE7BJV, EC, set up his transmitter for open house at his school and the results were very gratifying as shown by the interest of the visitors. VE7BHW took an active part in C.D. Exercise Advance 6 for Oyama district. Our SEC reports that since his last report things are increasing. He still is asking for more Form 7 applications and also is looking for EC for Prince Rupert, Prince George Districts. Traffic: VE7BDJ 241, VE7BHH 19, VE7AKE 8, VE7-BHW 8, VE7KZ 8, VE7DH 3.

MANITOBA—SCM, M. S. Watson, VE4JY—Organization of a Mid-Continent Hamfest to be held in Winnipeg at the Riviera, 1720 Pembina Highway, Sept. 5 and 6 is well underway under the joint chairmanship of VE4HW and VE4CX. Various committees have been set up such as publicity WØKLP/VE4, communications VE4OL, etc. With the advent of call letter license plates in Manitoba there is an upsurge of mobile installations which will add to the efficiency of public service, the plans of the EC and civil defense. VE4EF recently picked up an emergency call from W4IAR/VE3 at Poplar Hill, Ont., where thre is no regular communication with Red Lake, the nearest town. By prompt action Red Lake was informed of an accident to an Indian boy and relief by plane was sent immediately. *VE3EDK and VE3APM*, of Kenora, were assisting relay stations. VE4YW of Brandon having received many prior awards, recently received a 50-MC. Century Club Certificate No. 1, the first in Canada having made 100 contacts on 6 meters. Traffic: VE4JY 6, VE4QD 6, VE4-SW 5, VE4UM 5, VE4IW 4, VE4QJ 4, VE4LQ 3, VE4-ON 3, VE4JA 2.

SASKATCHEWAN—SCM, Mel Mills, VE5QC SEC: VE5CU. PAM: VE5HP. PAM Gordon reports that net operating practices have been generally good but zeroing in on net frequency has to be increased, and breaking before requested are points to remember. Gordon asks "What do you think of an informal noontime net?" Net Control Stations starting with Mon. are VE5AT, VE5HQ, VE5HX, VE5YR, VE5JU, VE5HP and VE5RE. Frequency is 3780 kc. at 1900 Central Standard Time. SEC Bill reports that organization of the AREC is coming along very well but that there still are many positions to fill and members are needed. Drop Bill a line *now!* Hamfest July 3-5 Regina. Plan now for this *must* summer event. The Regina crew has been working on this for months and it looks like a dandy. Don't forget those associate tickets. Traffic: VE5HP 70, VE5LM 56, VE5HQ 7, VE5QC 5, VE5EO 4, VE5IG 2, VE5YR 2, VE5BO 1.

Prescription for Lid-itis

(Continued from page 25)

12) Punctuation. In informal QSOs, the ubiquitous BT and the question mark should be all the punctuation you will ever need. The other marks are seldom used in amateur operating. One BT is sufficient to break the thought — more than one at a time is unnecessary.

13) Acknowledgments. Never send "R" if you did not copy solid; furthermore, do not guess about anything you might have missed. If you copy everthing the other fellow sends, pre-

(Continued on page 164)

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W6UOU
Los Angeles, Calif.

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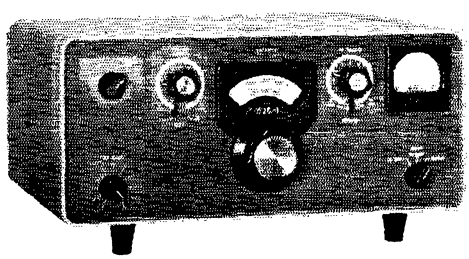
COLLINS

CALL US ABOUT THE 62S-1 VHF CONVERTER



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516F-2 AC Power Supply	115.00
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"World's Largest Distributors of Short Wave Receivers"

face your transmission with one, and only one, "R." Nothing is more irritating than a string of Rs unless it is a string of Rs followed by "Sri OM missed ur name es QTH BT got RST ok." Also, do not repeat what the other fellow sent. It is completely inane to send "OK on ur WX BT OK on ur Blockbuster xmtr BT OK on ur Bandsqueezer rcvr." The guy knows what he said and, if you send "R" he assumes you know, too. You don't have to prove it to him.

How can one acquire the habits of good operating procedure? Here are some suggestions:

1) Study. Get the ARRL Operating Booklet (free) and read and learn every word in it on procedure. Then go back and read it again.

2) *Listen!* Mentally criticize what the other fellow is doing, both right and wrong, then compare his procedures and your criticism with what you do. Then listen some more.

3) Practice — *off* the air. Break yourself of bad habits and get accustomed to the good habits learned by studying and listening. Then practice some more.

4) Do not work any station using poor operating procedure or poor character formation. If no one will work the guy he may get the message and learn proper operating.

5) Make up a set of model QSOs on 3 × 5 cards. Use one card for each type of exchange and have proper prosigns and procedure actually spelled out. Keep the cards handy in the shack and actually use them, verbatim, for transmissions *on the air* until proper operating habits are ingrained. This does *not* mean you should acquire a stereotyped QSO formula, but it helps in the beginning.

6) A Novice should never use a bug. If you feel you must use one, keep it off the air until you have *full* control.

Can the Novice accent be improved with resultant dividends in the amateur bands? Yet, but only when all amateurs recognize the importance of good procedure and give it proper emphasis, not only giving assistance in schooling of pre-Novices, but right in their own shacks. Study, Listen and Practice must be emphasized in all hamdom or we shall be inundated with a flood of mediocrity and afflicted with a Tower of Babel — thousands of transmitters all over the land spewing forth unintelligible garble and garbage — and no one listening. QST

QST ARTICLE CONTEST

As a feature of the ARRL's 50th Anniversary Year, readers are invited to become writers, and submit entries for the monthly Article Contest.

The author of the article selected by *QST*'s staff as the best each month for the remainder of 1964 will receive a $25 U. S. Savings Bond. This month's winning entry, by WA5BEZ, appears on page 24.

Complete rules and some subject ideas appeared on page 49 of *QST* for February.

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VALUES OF THE MONTH

ROTRON WHISPER FAN

The fan that moves 60 cu. ft. of air per minute . . . while running so silently you have to look to see if it's running! Removes heat to save your rig, yet uses only 7 watts. Measures 4½" square by 1½" deep. Has run for years in computers and other commercial equipment without attention — lifetime lubricated. Operates on 110-120V. A.C.

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600 ohm impedance; extra-high sensitivity for weak signals and hard-to-read stations . . . reproduction is crisp, free of distortion . . . unequalled wearing comfort over long use.

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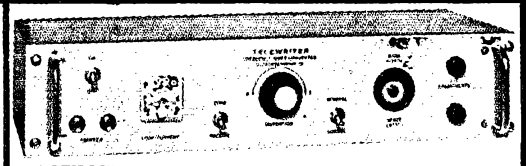

NEW! ALLTRONICS-HOWARD MODEL L TELEWRITER CONVERTER

Converts audio shift tones (2550 cps center frequency) to DC pulses for teleprinter. Distortion control adjusts for unequal pulse lengths. Axis Restorer automatically compensates unequal pulse amplitudes, as during fading, and permits copy on Mark only or Space only, during interference. Available with tuning indicator tube or 1" CR indicator. Built-in DC supply for keying tube and printer magnets. Loop current adjustable from 20 to 60 ma. Standard 850-cycle shift discriminator plug-in unit, unless other requested. Optional plug-in polar relay repeats printer loop signals for external use while providing local printer copy. Write For Literature

Model L for Rack Mounting **$199.00**
Cabinet **14.50**
Polar Relay **24.50**
Model L with CR tube indicator **279.00**

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Powerful 7-tube circuit with integral, heavy-duty 6-in. speaker and built-in antennas for all four bands. Covers 108-130 MC, 200-400 KC, 550-1600 KC, and 1000 KC - 5 MC. High gain with low noise. Plugs into any AC outlet.

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Communicating Through Oscar III

(Continued from page 27)

control the regularity and duration of contacts, as will be illustrated by the following example.

Arcs representing 1000-mile working radii were drawn on a map around San Francisco, Juneau, and Dallas (see Fig. 1). The overlapping area of the San Francisco and Juneau arcs represents the zone of normal contacts between these two cities via the satellite. The dashed line shows a subsatellite track for a north-to-south pass over these two cities. It takes about 90 seconds for the satellite to cross the widest part of this zone. On the other hand, the pattern spreads across more than 25 degrees of longitude, so that at least one, and occasionally two, north-to-south passes each day will pass through this zone.

The San Francisco-Dallas arcs on the same map show the other extreme, a south-to-north pass traveling the length of the overlapping area. This type of pass would last for about 4 minutes, but it can be readily seen that this will be a rare event. The subsatellite track would only have to shift about 5 degrees east or west to completely miss the pattern.

Operating Tactics

Maximum usage of the translator will be achieved when all stations within a few hundred miles of the satellite restrict their operating power to the minimum value necessary to maintain communications. By holding the a.l.c. action down, more stations will be able to use the satellite, and the 2000-mile-plus stations will have a better chance of being heard.

Stations in locations where little or no two-meter activity exists may be able to make some DX contacts by transmitting a signal through the satellite even though no other stations are heard. Again, overdriving the translator is not desirable, because it would limit the translator gain and reduce the sensitivity to possible replies. This is particularly true if full duplex is possible, or if one operator listens while another station is transmitting to the satellite. It will be particularly valuable if African, South American, and mid-Pacific stations can keep the translator active whenever it is passing over their areas.

The Doppler shift of signals entering the input channel may be used to advantage during contacts over north-to-south paths, such as the Juneau-to-San Francisco path shown on the map. During the southbound pass illustrated, the Alaska station can enter the satellite input channel by transmitting on a frequency 2 kc. above the nominal upper band limit, while the California station can respond by transmitting on a frequency 2 kc. below the nominal lower band limit. Throughout the possible contact zone, the satellite is traveling away from the Alaska station, and lowering his transmitting frequency as seen by the translator. As the satellite approaches the California station, it raises his frequency as seen at the translator input. By the time the

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75A4 late	449	S118	69	GSB100	249
75A3	259	S108	79	GC105 2mtrs	189
32V3	279	S107	54	HI 6 MTRS	149
KWM2	775	S95	37	HB 2 MTRS	139
DC SUPPLY	119	SX105	49	IV 6 MTRS	199
CC2 CASE	69	SR150	499	G50	229
PMS ac supply	107	DC SUPPLY	69	SUPER 6 CONV.	22
KWM2 MOUNT	77	AC SUPPLY	69	G66B	72
75S3	499	MOBILE TRAY	22	G77A & 3 way	144
32S1	399	FPM200	1400	CLEGG INTCPR	329
312B4	139	HT32	319	CLEGG 99er	97
AC SUPPLY	89	HT37	299	HEATH GR91	37
DRAKE TR3	479	HT40	49	TX1 Apache	159
AC SUPPLY	69	LOUDENBOOMER	187	DX100B	147
DRAKE 2A	174	INVADER 2000	747	DX60	59
DRAKE 2B	199	VALIANT	267	DX40	47
DRAKE 2BQ	32	VIKING II	99	HX20 ssb xmtr	149
DRAKE XTAL CAL	12	RANGER	149	MR1 rcvr	69
MOSLEY CM1	99	ADVENTURER	37	MT1 xmtr	47
SWAN SW175	169	CHALLENGER	77	X6 6mtr conv	24
SWAN SW240	239	6N2 XMTR	107	HG10 vfo	34
DC SUPPLY	69	8N2 LINEAR	329	VF1 vfo	18
SX101A	249	COURIER AMP	147	AC1 ant. tuner	19
SX111	159	THUNDERBOLDT	329	HEATH sig. trcr	17
SX100	169	TR SWITCH	22	KNIGHT R100	59
SX117	269	HQ100C	97	B&W 5100 xmtr	139
SX117 L.F. tuner	20	HQ105	107	LA 400C linear	147
SX110	99	HQ110	127	P&H 6-150	159
SX43	87	HQ145	157	PALCO 65 xmtr	57
		HQ170C	217	PMR7 rcvr	69
		HQ180C	299	M1070 supply	37
		HX50	289	AMECO 86W	59
		HX500	327	AMECO ac supply	19
		NCX3 ac supply	69	EICO 460 scope	67
		NC183D	177	EICO 315 gen.	27
		HE35 6m tscr	34	EICO 324 GEN.	29
		OLSON RA570	107	WATERMAN S11A	79
		R9a receiver	37	HEATH VTVM V7A	24
		RME4300	99	HEATH 6er	39
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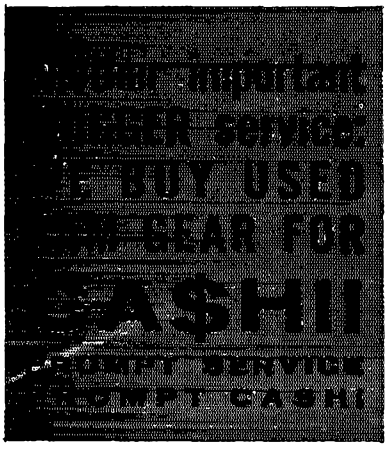

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ADDRESS _____

CITY _____ ZONE ____ STATE _____

*ORDER BLANK TO: (1) trade ur present gear, (2) order above units, (3) sell ur gear for cash.

(ABC1234)

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frequency of the California station drops out of the input band of the translator, the contact would have been terminated by the satellite going out of range of the Alaska station.

Information Reporting

Communication operations may be reported to Project Oscar, P.O. Box 183, Sunnyvale, California, in the form of extracts from the station log, with particular emphasis on precise times of starting and ending contacts, and accurate notations of the transmitting frequency used. All calls made, successful or not, should be recorded so that listener reports may be cross-checked. To supplement the log, a summary of the station equipment — transmitter power, receiver noise figure, antenna gain and polarization — would be appreciated. Also, please give station latitude, longitude, and altitude above sea level, and describe any special site characteristics, such as unusual noise conditions, horizon-masking directions, etc. At all events, *do not* send your original log.

The following articles are suggested review reading for those who wish further information on satellite tracking techniques.

Ciro, "Planning Oscar's Orbit with Ease," *CQ*, June, 1962.

Hilton, "Making Your Own Orbital Predictions," *QST*, March, 1962.

Walters, Wells, and Hillesland, "Project Oscar Measurements and Tracking," *QST*, July, 1961.

QST

Hamfest Calendar

(*Continued from page 19*)

Tennessee — The Mid-South ARA and the Mid-South V.H.F. Club are joining this year to present a hamfest in Memphis. Contact Pat Lane, W4OGQ, for details.

Texas — The STEN Convention will be May 29-31 in Victoria. Contact W5DHK, ANC, for more information.

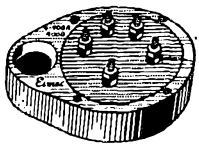
Texas — The first "Swapfiesta" of the El Paso Radio Club will be held May 16-17 at Bassett Center in El Paso. Registration the evening of May 16 at the Falstaff Brewery; the hamfest moves to Bassett Center the next morning. Events scheduled include transmitter hunts, QLF contest (send left-footed with a Texas-size key five feet long), and other events. K5QVH has details.

Virginia — The Roanoke Valley ARC holds its annual hamfest May 23-24 at the Vinton War Memorial in Vinton, Va. An open house Saturday at 7:00 P.M. will be followed by a dance till midnight. Contests, a technical program, and net meetings Sunday, and a chicken buffet at noon. Advance registration a dollar; at the door it's $1.50 or four for $5.00. Buffet ticket $1.25. Write Roanoke Valley ARC, Box 2002, Roanoke, Va.

West Virginia — The Tri-State ARA annual picnic will be held June 7, noon to six P.M., at the Camden Park Amusement Center on Rt. 60, west of Huntington, W. Va. Bring your own picnic or take advantage of the park's refreshment stands. Admission is $1 each, but $1.75 for the entire family. For tickets, info, write Tri-State Amateur Radio Assn., 2933 Auburn Rd., Huntington.

Vantron "300" Linear Power-Amplifier: Grounded-grid circuit. Input and output match 50 to 75 ohm co-ax. Circuit eliminates band-switching on all bands from 10 thru 80. Output loading is switched to match antenna. Complete instructions for use on SSB, CW, AM. Operates from 115 VAC @ 60 CPS. With built-in pwr supply. Orig. factory carton. Sale-priced **$69.00.** (Complete)

Eimac Air-System Socket: For 4-125A, 4-250A, 4-400A, etc. Supplied less screws and Chimney hardware. (Reg. net **$17.50**). Sale price: **$6.95** each (two for **$12.00**). SK-406 Matching Chimney — **$6.50.**



Klixon Circuit Breaker: Operates on 115 VAC. Automatically cuts out at 15 amps. Order PSM Thermal Breaker. **35¢** each (ten for **$3.00**).

Corning Glass Trimmer Capacitor: ½ to 5 Mmf. Micrometer Screw Adjustment for VHF/UHF. With hardware. **$2.50** value for only **20¢** each.

IRC High-Voltage Rectifier: 2000 VDC @ 5 Ma. DC. (4800 Volts PIV/3300 Volts RMS Half-Wave). **85¢** each.

Corning 25 Watt Power Resistor: 50 Ohms/25 Watts/ 1 %. **29¢** each.
Same as above except 400 ohms/25 Watts/5%. 29¢ each.

400 Mfd @ 450 VDC Aerovox Capacitors: $2.50.

Bliley 500 KC Crystal with holder: Only **$3.95.**

G.E. 1N537 Black Top Hat Silicon Diodes: Tested for 600 to 800 PIV @ rated current of 750 Ma. G.E. rates these diodes for 100 PIV. **36¢** each.

FT-243 Crystals w/Holders: 7006 to 7406 KCS **$1.50**; 8006 to 8206 KCS. **$1.50**; 8340 and 8373 KCS **$1.50.** All other frequencies (non-Ham) **$1.00.** (We will ship to closest frequency in stock).

200 Microhenry R.F. Plate Choke for Linear or Class C Amplifier: 600 Ma. maximum. **$1.10.**

10⅜" Long x 1½" Wide steel piano hinge: With five mounting holes on each side of hinge. Ideal for cabinets, doors, test equipment, etc. Very handy. **60¢** each (ten for **$5.00**).

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Hermetically-sealed 2.4 Amp. Choke: 0.33 Hy. Inductance @ 2.4 amps. DC.

DC resistance: 2.26 Ohms. Ceramic insulators. Net wt: 10 lbs. **$2.90.**

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Westinghouse Silicon Top-Hat Type 320-H. 400 PIV @ 1.6 Amps. (ICAS) or — 1 Amp. (CCS) equivalent to 1N1222. Only **45¢** each.

600 PIV/750 Ma. Silicon Rectifier: 36¢ Each. 001 Mfd. Disc Capacitor **10¢** Each.

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MFD	*DC Volts*	*Sale Price*
125	400	**$1.50**
400	450	**2.50**
500	200	**1.00**
500	310	**1.25**
750	200	**1.25**
1200	25	**1.00**
1250	170/180	**1.00**
1500	25	**1.00**
1500	30	**1.00**
1500	80	**1.00**
1500	200	**2.95**
1700	180	**2.25**
2000	15	**1.00**
2000	50	**1.00**
2000	75	**1.50**
3000	150	**2.95**
3500	55	**1.25**
3700	25	**1.00**
3800	108	**2.50**
4500	40	**1.25**
5000	25	**1.25**
6000	40	**2.00**
6500	40	**2.25**
7500	25	**1.25**
8000	55	**2.95**
12000	55	**3.25**

50 Ohm Microminiature Co-ax Cable: Only .068" overall diameter. (Like a piece of #14 GA. wire in thickness). Nom. cap. 27 Mmf/per ft. Made to Navy/AF/Sig. Corps. JAN specs. Wt: 5 lbs. per thousand ft. Brand new. (Reg. price approx. **30¢** per ft.) Special: 25 ft.: **$3.00**; 100 ft.: **$10.00**; 500 ft.: **$45.00.**

COME IN AND BROWSE. MONDAY TO FRIDAY — Thousands of items that we cannot list in an ad. MON. TO FRI. 9 to 6. SATURDAYS 10 to 2 PM. (Free parking on Street Sat.) Mon. to Fri. parking lot 501 Broadway. **WE BUY AND SELL AND SWAP AS WELL. LET'S HEAR FROM YOU! WRITE FOR 1964 GREEN SHEET CATALOG No. 12.** Orders under **$5**, add **50¢** to cover Service Charge.

BARRY ELECTRONICS **DEPT. Q-5**
512 BROADWAY, NEW YORK, N. Y. 10012
WALKER 5-7000 (AREA CODE 212)

☐ Enclosed is money order or check and my order. Prices FOB, NYC. 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.

☐ Send for New 64 page greensheet catalogue No. 12
☐ Send information.....
☐ I have available for trade-in the following.....

.....

Name.....Title

Company.....

Address.....

City.....State.....

Sweepstakes

(Continued from page 92)

W8BFH	7560-	91-28-A-12	
W8BIM	7313-	63-39-A- –	
W8DGQ	4437-	51-29-A- 8	
W8NQR	3432-	104-11-A-33	
W8NAL	3402-	63-18-A- –	
WA8FLO	714-	19-14-A- 7	
WA8AUZ	684-	76- 3-A-16	
W8IJZ	330-	11-10-A- 1	
K8GRO	225-	25- 3-A- –	
K8OKK	224-	15- 8-B- 7	
WA8DSN	204-	34- 2-A-10	
K8BAX	198-	11- 9-B- 3	
W8KZH	78-	7- 4-A- 1	
W8IMF	48-	4- 4-A- 2	
WA8DOM	27-	9- 1-A- –	
W8KCD	27-	3- 3-A- 2	
WN8IJA	26-	9- 1-A-23	
K8UQA (K8UQA, WA8GCR)	88,440-	440-67-A-40	
WA8HCF (WA8s FXT HCF)	23,868-	234-51-B-16	
W8BAA (K8s UIE YTW, W8DRI*)	13,200-	111-40-A-26	
WA8BVZ (WA8s BVZ EZW)	10,764-	71-52-A-13	
K8YNQ (4 oprs.)	1656-	140- 6-B-32	

HUDSON DIVISION

Eastern New York

WA2CLQ	96,428-	500-65-A-40
K2GDP	26,733-	235-57-B- –
W2HYI	4320-	45-32-A-19
K2DEM	1560-	40-20-B- 3
WB2GSK	1224-	68- 6-A-20
K2YXB	870-	29-15-B- –
WB2FXB	252-	21- 4-A- 5
WB2HTL	126-	7- 6-A- –
WB2HBI	90-	6- 5-A- 2

N. Y. C.-L. I.

WA2YMZ	74,277-	400-63-A-31
K2RAR	51,930-	293-60-A-25
K2HQR	25,050-	168-50-A-27
WB2CZI	24,843-	171-49-A-28
W2MGV	21,168-	147-48-A-30
WA2QEB	14,679-	117-43-A-24
WB2DRM	13,572-	118-39-A- 9
WA2TBQ	11,180-	129-29-A-20
WA2EXI	8415-	85-33-A-16
WB2BIJ	5280-	92-20-A-12
W2BMK	4640-	73-32-B- 6
WB2ATS	4244-	62-23-A-12
W2JSL	3795-	55-23-A- 5
W2IVL	3360-	56-30-B-10
W2JB	3225-	43-25-A-12
K2OHK	2900-	50-29-B- –
W2CWD	2673-	50-27-B- 1
W2NNB	2580-	43-20-A-12
W2NRI	2460-	41-20-A- 9
WB2ETF	2448-	48-17-A-11
K2KJX	2398-	55-22-B- 8
W2INT	2160-	40-18-A-20
W2OQI	2074-	61-17-B-10
W2JFU	1968-	41-16-A- 6
WA2HRX	1800-	38-16-A- 5
WB2DZZ	1647-	95- 6-A-37
WA2KHD	1296-	27-16-A- 2
WN2INR*	1125-	75- 5-A-18
WB2FZV	968-	65- 5-A-10
WN2KTX	420-	35- 4-A-16
WB2FCP	420-	35- 4-A-17
K2CMV	405-	15- 9-A- 2
W2ISD	279-	16- 9-B- 3
WN2FCB	270-	31- 3-A- –
WA2DSR	216-	24- 3-A- –
K2RPW	189-	21- 3-A- 5
WA2QJU	144-	12- 4-A- 1
WA2TKL	144-	16- 3-A- 1
WA2KSD	138-	12- 6-B- 1
WA2VDA	66-	22- 1-A- 3
WA2JKT	60-	5- 4-A- 1
W2WDW	54-	18- 1-A- 1
W2DID	48-	16- 1-A- 1
WA2RUJ	42-	14- 1-A- 1
K2AAW	39-	13- 1-A- –
WA2SDI	39-	13- 1-A- 3
W2TUK	36-	4- 3-A- 1
K2JQO	33-	11- 1-A- 1
WB2ERA	30-	10- 1-A- 3
W2ZV	12-	4- 1-A- 1
WA2PJL	3-	1- 1-A- 1
K2JCC (K2JCC, WA2VLK)	27,825-	175-53-A-22
WB2LHY (5 oprs.)	27,405-	219-42-A-37
WA2LQO (5 oprs.)	19,260-	214-45-B-23
WA2IEC (WA2IEC, WB2s DLH ETF)	3718-	72-26-B- –
WA2NZA (WA2s NZA SUG)	306-	27- 4-A- 9

Northern New Jersey

WA2TOA	37,596-	241-52-A-31
WA2PWI	28,050-	170-55-A-21
K2ZSS	20,412-	162-40-A-17
WA2ZNR	7092-	100-24-A-20
WA2JSW	4200-	140-10-A- –
K2YFE	3843-	61-21-A- 1
W2JKH	3744-	50-26-A- 4
WA2UEV	3192-	57-18-A-16
WB2EUI	1584-	18-32-A- 3
WA2KRX	1251-	70- 6-A-13
WB2ARW	1080-	39-10-A-10
WN2KLD*	882-	50- 6-A-24
W2ZAL	500-	19- 9-A- 2
WA2TMT	372-	31- 4-A- 3
K2ZFA	264-	11- 8-A- 4
W2TJD	228-	19- 4-A- 3
WA2MYB	189-	9- 7-A- 2
WN2IIN	186-	31- 2-A-18
WN2KOD	54-	9- 2-A- 4
W2MNW	30-	5- 2-B- –
W2LWO	18-	6- 1-A- –
W2JZS	15-	5- 1-A- 1
K2PGH	6-	2- 1-A- 1
K2YNT (WA2s KZV PTS)	97,043-	571-57-A-37
K2VAC (K2VAC, WA2SLH, WB2FCA)	39,312-	351-56-B-31
WN2KDD (WN2s IKW KDD)	858-	72- 4-A- –
WB2IOM (WB2s ICH IOM, WN2LKX)	432-	54- 4-A-28

MIDWEST DIVISION

Iowa

KØAIMS	112,761-	561-67-A-35
KØASI	75,795-	409-62-A-30
WØLBS	50,292-	384-66-A-28
KØJGH	45,570-	252-62-A-34
WØBVR	28,892-	238-62-B-20
WØSQN	20,562-	149-46-A-12
KØAAR	18,155-	126-49-A-33
KØJFZ	14,084-	115-41-A-20
KØAUU	10,406-	121-43-B-28
WØAXE	5438-	63-29-A- 4
KØEXN	326-	16- 7-A- –

Kansas

WØBAA	97,988-	725-68-B-38
KØRNZ	95,156-	475-73-A-36
WØLA	85,124-	426-67-A-38
KØVQE	16,244-	109-49-A-19
WAØDPA	1397-	25-19-A- 7
WAØDOZ	324-	12- 9-A-12

Missouri

KØUWZ	103,113-	513-67-A-40
KØROD	70,380-	510-69-B-40
WØHAD	44,561-	245-61-A-27
WAØAJV	44,460-	247-60-A-34
KØEVN	14,520-	119-44-A-11
KØETY	3929-	49-27-A-10
KØJPL	1720-	43-20-B- 2
KØRNK	158-	8- 7-A- –
WØEEE (6 oprs.)	72,732-	560-66-B-29
WØCTV/Ø (4 oprs.)	41,958-	264-54-A-39

Nebraska

KØSCM	118,218-	591-68-A-35
KØCVA	112,158-	558-67-A-32
KØVVO	33,852-	211-56-A-26
KØKEK	5481-	63-29-A- 9

NEW ENGLAND DIV.

Connecticut

K1DQV	64,119-	372-58-A-28
K1THQ	34,088-	257-45-A-24
K1TVG	12,792-	106-41-A-22
K1THP	11,766-	106-37-A-19
K1YGS	8640-	82-36-A-12
W1AW[2 3]	7840-	112-35-B- –
K1OJZ	2346-	46-17-A- –
K1PQA	528-	16-11-A- 5
K1HKS	48-	4- 4-A- –

(Continued on page 172)

Here's Steve W9EAN (Manager of our Milwaukee Store) trying out the "Push Button" Tuning feature of the New Squires-Sanders Receiver.

WE CARRY THE COMPLETE LINE

FIGURES TO RIGHT OF PRICE SHOWS YOUR MONTHLY PAYMENT AFTER $5 DOWN

DESCRIPTION	PRICE	
SQUIRES-SANDERS, INC.		
SS-1R 3.5 to 30 MC Receiver	$895.00	$32.13
SS-1HS Speaker	35.00	
SS-1S Noise Silencer	135.00	4.69
CLEGG LABORATORIES DIVISION		
Zeus, 6 & 2 meter Transmitter, Modulator/Power Supply	$745.00	$26.72
Interceptor B, 6 & 2 meter Receiver	495.00	17.69
Interceptor Allbander, HF Frequency Tuner/Speaker	129.95	4.51

DESCRIPTION	PRICE	
99'er, 6 meter Transceiver	179.95	6.31
Thor 6, Transceiver RF	260.00	9.20
Thor 6, model 417 AC Power Supply/Modulator	139.95	4.87
Thor 6, model 418 DC Power Supply/Modulator	159.95	5.59
Venus, 6 meter SSB Transceiver	495.00	17.69
Venus, Model 416 AC Power Supply	110.00	3.79
Lo-Pass Filter, Model 372	14.95	

NOW FINANCE "DEALS" AS LOW AS 5%

Write today for our new Order Blank, which has full Details

AMATEUR ELECTRONIC SUPPLY

Steve W9EAN

MILWAUKEE 8, WIS.
3832 West Lisbon Ave. • Phone We. 3-3262

Hours: Monday and Friday, 9 A.M. to 9 P.M.
Tuesday, Wednesday & Thursday, 9 A.M. to 5:30 P.M.
Saturday, 9 A.M. to 3 P.M.

Doc W9HJS

CHICAGO 31, ILL.
6450 Milwaukee Ave. • Phone: Ro. 3-1030

Hours: Monday, Wednesday & Thurs., 12 P.M. to 9 P.M.
Tuesday & Friday, 12 P.M. to 5:30 P.M.
Saturday, 9 A.M. to 3 P.M.

Phil W9DVM/4

ORLANDO, FLA.
23 Azalea Pk. Shop. Ctr. • Phone 277-8231

Hours: Monday, Tues., Thurs. & Friday, 1 P.M. to 9 P.M.
Wednesday, 1 P.M. to 5:30 P.M.
Saturday, 9 A.M. to 5:00 P.M.

IMPORTANT! **Send all Mail Orders and Inquiries To: Terry, W9DIA at our Milwaukee store, c/o Department (Q)**

Get Our Quote Today, No Obligation

Terry: I want to buy_____

I have to trade_____(what's your deal?)

STAY ON THE AIR PLAN
Not only will I give you a terrific trade-in allowance, but you can keep your equipment until you receive your shipment.

Ship Me: _____

I enclose $_____ and will pay balance

☐ C.O.D. ☐ 1 Year ☐ 2 Years ☐ 3 Years
(10% deposit)

If ordering on terms, please list following information on separate sheet and enclose with this order: Name, address, age, married? children? Employed by? Salary? How long? Own or Rent Home? To whom renting? or buying from? Wife employed? Own car?—who buying from? Three to five credit references. The more information you give, the faster we can approve your credit.

EVEN IF YOU'RE NOT ORDERING TODAY, SEND ABOVE INFORMATION FOR ATTRACTIVE CREDIT CARD

NAME _____

ADDRESS _____

CITY _____ STATE_____

☐ Check for latest reconditioned bulletin.

Maine

W1NJL/1	53,820-	345-52-A-38	
W1GKJ	53,550-	429-63-B-38	

Eastern Massachusetts

W1BU[4]	115,730-	832-71-B-35	
W1FRR	104,040-	725-72-B-35	
K1KTH	84,700-	605-70-B-25	
W1LMZ	54,848-	428-64-B- –	
K1PQO	36,192-	232-52-A-40	
K1PEK	15,086-	200-38-B-16	
K1BRO	4779-	93-27-B- –	
W1PIJ	2184-	42-26-B- 4	
W1CMW	1860-	31-20-A-11	
K1WJQ	1575-	75- 7-A-24	
K1KEC	1512-	85- 6-A- –	
K1CHY	644-	20-11-A- –	
K1VGM	429-	13-11-A- 3	
W1MX[5]	216-	12- 6-A- –	
K1ETH	132-	22- 2-A- 8	
K1RYU[6]	90-	10- 3-A- 8	
K1WJR	60-	20- 1-A-16	
K1YSG	54-	9- 2-A-20	

Western Massachusetts

K1NWF	70,656-	369-64-A-35	
K1RYT	67,947-	319-71-A- –	
W1SBW	4394-	51-29-A-16	
W1BKG	1440-	36-20-B- –	
W1JYH	144-	9- 8-B- 1	

New Hampshire

W1FZ	57,554-	318-61-A-27	
W1EKO/1	40,936-	371-56-B-23	
W1RCC	25,872-	180-49-A- –	
W1QKA	22,308-	169-44-A- –	
K1YBJ	2625-	42-25-A-10	
W1ET (4 oprs.)	61,305-	461-67-B-38	

Rhode Island

W1HQV	49,896-	317-54-A-34	
W1YRC	43,980-	368-60-B-24	
W1HIK	2580-	43-20-A-14	

Vermont

K1PNE	14,760-	189-40-B-13	
K1MVV	5088-	81-32-B-12	
W1SWX/1	6-	2- 1-A- 1	

NORTHWESTERN DIVISION

Alaska

W3AHM/KL7	120-	10- 6-B- 6	
KL7FAR (WA9KEK, KL7FAR)	2156-	51-22-B- 6	

Idaho

W7NGA	19,305-	177-55-B- –	
W7DMP	14,040-	134-39-A-24	
W7DZH	432-	20- 9-A-16	
W7DQU	234-	14- 6-A-13	
K7PGG	12-	2- 2-A- 2	

Montana

K7ASV	68,206-	516-67-B-38	
W7CBY	21,263-	160-45-A-18	
K7YRA	7527-	99-39-B- 9	

Oregon

K7MLO	46,494-	246-63-A-23	

Washington

W7BSW	169,608-	764-74-A-37	
K7QWI	48,732-	404-62-B-30	
W7EYD	28,272-	254-57-B-18	
W7NLB	16,536-	108-52-A-11	
W7FIM	108-	9- 6-B- 3	
K7JRE	8-	3- 1-A- 1	

PACIFIC DIVISION

Hawaii

W7UXP/KH6	35,448-	212-56-A- –	

Nevada

W7KOI	8816-	120-38-B-16	
K7WLX	2394-	39-21-A-10	

Santa Clara Valley

W6VER	64,350-	330-65-A-28	
K6VGW	62,682-	342-62-A-32	
WB6EWU	37,800-	286-45-A-35	
WB6DUB/6	1313-	88- 5-A-35	
W6ISQ	12-	2- 2-A- 1	

East Bay

WA6CVB	9024-	95-48-B-17	
W6TMX	8364-	68-41-A-11	

San Francisco

WA6AUD	41,478-	223-62-A-27	
WA6QVW	17,568-	122-48-A-14	
W5GVP/6	1280-	32-20-B-10	

Sacramento Valley

WA6SLU	64,052-	488-67-B-29	
K6OFO	13,974-	137-51-B-19	
W6SFH	8474-	115-38-B-25	
K1CAU/6	1500-	25-20-A- 5	

San Joaquin Valley

WA6SBG	54,600-	260-70-A-28	
W6TZN	43,745-	337-65-B-22	
W6ZZC	24,881-	150-57-A-17	

ROANOKE DIVISION

North Carolina

K4QVK	67,161-	397-61-A-40	
WA4AAL	40,014-	235-57-A-15	
K4ISE	20,829-	131-53-A- –	

South Carolina

K4WJT	102,720-	535-64-A-40	
W4YSJ	15,105-	124-45-A-28	
W4ULY	13,923-	111-42-A-14	
KØALL/4	6324-	62-34-A-10	
K4YYL	5402-	73-37-B- 6	

Virginia

W4BVV	115,961-	537-73-A-37	
K1IGY/4	35,397-	259-46-A-23	
K8JIM/4	34,839-	236-49-A-17	
W4BGP	11,484-	132-44-B-12	
K4VCY	11,040-	92-40-A-16	
K4KLO	9810-	109-45-B-25	
K4DYW	4950-	75-22-A-10	
K4TSU	4374-	57-27-A-10	
K6MNI/4	2288-	31-25-A- 1	
W4ZZV	144-	8- 6-A- 2	
K4IKF	48-	1- 1-A- 1	
W4PTR	2-	1- 1-B- 1	
WA4BDB (WA4s BDB IVL)	80,988-	397-68-A-37	

West Virginia

K8AKG	26,553-	168-53-A- 1	
K8BIT	6480-	90-36-B- –	
W8LD	5032-	69-37-B- –	
W8NCD	2415-	35-23-A- 4	

ROCKY MOUNTAIN DIVISION

Colorado

KØMIC[7]	115,220-	823-70-B-38	
WØGSP	75,978-	380-67-A-33	
WØREQ	43,092-	229-63-A-33	
KØTIV	28,107-	174-54-A-25	
WAØGUH	25,658-	158-55-A-22	
WAØBXR	11,938-	136-47-B- –	
WØETT	4440-	77-30-B- 4	
WØHTH	3968-	62-32-B- 3	
KØKRL	1148-	23-17-A- 9	
WAØEEG	624-	16-13-A- 3	
KØZBA/Ø	36-	12- 1-A- –	
WØYQ[8]	18-	3- 2-A- 1	
KH6CKJ/Ø	9-	3- 1-A- –	
WØANA (8 oprs.)	97,416-	757-66-B-39	
WØENA (5 oprs.)	36,918-	295-63-B-37	

Utah

K7DKD	54,404-	407-67-B-33	
K7AQB	53,109-	285-63-A-37	
K7NXH	44,378-	251-61-A-29	
K7VRT	18,216-	138-44-A-13	

New Mexico

W5NXF	41,085-	210-66-A-14	
W5RVZ	23,310-	37-21-A- 4	

Wyoming

W7QPV	47,784-	362-66-B-27	
K7TLB	31,590-	206-52-A-23	
K7DUT	3312-	47-24-A-10	

SOUTHEASTERN DIVISION

Alabama

K4WWN	56,639-	310-61-A-29	
WA4FBS	36,783-	201-61-A-31	
W5UNL/4	28,674-	166-59-A- 4	
W4GQL	21,204-	186-57-B-24	
K4KJD	20,520-	171-60-B-14	
K5IQA/4	17,424-	133-44-A-28	
W2KJY/4	12,489-	90-46-A-10	
W4OLO	11,340-	21-18-A-13	
K4WHW	2156-	49-22-B- 4	
W4YFN (K4VJL, W4YFN)	37,107-	200-62-A-31	
WA4EJY (WA4s EJY HSH)	144-	8- 6-A- 3	

Eastern Florida

W4TCY	82,180-	500-70-B-36	
W4HKJ	77,286-	587-66-B-28	
WA4GYA	72,600-	579-66-B-29	
K4FQU	52,200-	300-58-A-16	
W4STA	31,512-	202-52-A-14	
W4MVB	23,780-	206-58-B-13	
WA4KGH	22,490-	161-47-A-21	
WA4IYG	13,098-	129-37-A-12	
W4PJG	11,820-	100-40-A- 7	
W4QVJ	9576-	84-38-A- 5	
K4KZL	7035-	68-35-A-14	
W4RMX (6 oprs.)	41,715-	262-54-A-32	

Western Florida

W4JLW	111,754-	811-71-B- –	
WA4FIJ	84,318-	613-69-B-39	
K4DAD/4	52,470-	304-60-A-27	
W4YJY	22,752-	160-48-A- –	
K4ZJF	13,068-	149-44-B-10	

Georgia

K4KAZ	39,060-	218-60-A-26	
W4SFN/4	23,400-	195-60-B-24	
WA4IWE/4	12,915-	110-42-A-13	
K4SLX	5040-	57-30-A-17	
W8KNP/4	912-	19-16-A- 1	
WA4HHK/4	75-	5- 5-A- 1	

West Indies

KP4AFL	18-	3- 3-B- 1	

Canal Zone

KZ5FD (4 oprs.)	56,280-	432-67-B-30	

SOUTHWESTERN DIVISION

Los Angeles

K6CYG	125,132-	607-69-A-37	
WA6TWA	50,304-	266-64-A-22	
WA6KNE	46,200-	351-66-B-30	
WB6FQO	33,210-	224-54-A-31	
W6CFM	19,980-	111-60-A- –	
WA6JRD	19,338-	131-44-A-10	
WA6IRU	9990-	91-37-A-10	
WA6ZWT	9636-	74-44-A-16	
WA6STJ	9450-	75-42-A-14	
WB6BCK	8280-	94-30-A-13	
K6YFZ	7245-	70-35-A-20	
WA6VMX	1170-	31-13-A- 8	
WA6ZAA	1056-	23-16-A-15	
WB6DHG	3-	1- 1-A- 1	
K6ICQ (K6s ICQ ICS)	252-	11- 8-A- 1	

Arizona

K7VMO	40,743-	276-54-A-28	
K7PXI	35,400-	201-59-A-13	
K7RUR	14,300-	130-55-B-19	

San Diego

W6NAT	47,520-	277-60-A- –	
W6KBJ	37,200-	205-62-A-19	
WA6WPG	26,970-	155-58-A-24	
WB6DQX	10,271-	84-41-A-14	
K6EOX	5365-	75-76-B-29	
K6ICS/6	6-	2- 2-A- 1	

Santa Barbara

WA6SNA	58,212-	299-66-A-34	

WEST GULF DIVISION

Northern Texas

WA5ALB	101,175-	476-71-A-38	
WA5EEM	52,731-	426-63-B-27	
K5PSL	45,888-	240-64-A-25	
K5ODZ	31,350-	215-50-A-30	

Oklahoma

K5HWO	91,154-	457-67-A-27	
WA5EUR	58,011-	323-61-A- –	
WN5HTL	21-	7- 1-A- –	

Southern Texas

K5DEN	76,032-	408-64-A-35	
WA5CNR	35,135-	200-59-A-18	
WA5AOO	810-	23-18-B- 3	
WA5CJC	413-	13-11-A- 1	

CANADIAN DIVISION

Ontario

VE3CRM	31,122-	183-57-A-28	
VE3CAY	14,994-	99-51-A-26	
VE3CBY	14,775-	99-50-A-12	
VE3CKW	3234-	39-28-A- 6	
VE3FHQ	2-	1- 1-B- 3	
VE3EVZ (VE3s EVZ EZM)	13,702-	102-45-A-14	

Alberta

VE6OR	43,560-	242-60-A-21	

[1] K9ELT, opr. [2] Hq. staff, not eligible for award. [3] W1WPR, opr. [4] W1HIV, opr. [5] K4BVD, opr. [6] K1RHT, opr. [7] K6LSG, opr. [8] K6RTI, opr.

ARRL thanks the following amateurs for submitting their logs for checking purposes: C.W.: W4WHK W5ARJ W7HBO KH6ETB VE2IR and VE4DQ. PHONE: W3MDJ W9MWV and VE3AO.

V.F.O for the Mark II

(Continued from page 55)

when you turn it on, without turning up the microphone gain, the secondary winding of T_2 is connected wrong. Just reverse the leads to the secondary of T_2 and the condition will be corrected. When operating on c.w. the modulator should be turned off by means of S_{10}.

It may sound tiresome to read this statement at the end of nearly all construction articles but it bears constant repeating: when working on this transmitter, or any piece of gear where voltages are involved, *always* make sure the power is off before you start poking around in the innards! QST

Happenings of the Month

(Continued from page 37)

last three months or five hours in the last year preceding the application).

Recently, the FCC has amended its rules to remove any flat prohibition against early filing; when it is logical to do so, amateurs may file at any time in their license term for a full five-year renewal. However, the new rules appearing below make it clear that in the absence of any good reason to the contrary, FCC will expect amateurs to file sometime between one and three months prior to expiration. The new rules technically went into effect on March 18.

(Continued on page 176)

§97.13 Renewal or modification of amateur operator license.

* * *

d) Application for renewal and/or modification (change of address, etc.) of an amateur operator license shall be submitted on FCC Form 610 and shall be accompanied by the applicant's license. Application for renewal of unexpired licenses must be made during the license term and should be filed within 90 days but not later than 30 days prior to the end of the license term. In any case in which the licensee has, in accordance with the provisions of this chapter, made timely and sufficient application for renewal of an unexpired license, no license with reference to any activity of a continuing nature shall expire until such application shall have been finally determined.

e) If a license is allowed to expire, application for renewal may be made during a period of grace of one year after the expiration date. During this one year period of grace, an expired license is not valid. A license renewed during the grace period will be dated currently and will not be backdated to the date of its expiration. Application for renewal shall be submitted on FCC Form 610 and shall be accompanied by the applicant's expired license.

* * *

§97.47 Renewal and/or modification of amateur station license.

a) Application for renewal and/or modification (change of address, etc.) of any station license shall be submitted on FCC Form 610. In every case the application shall be accompanied by the applicant's license. Applications for renewal of unexpired licenses must be made during the license term and should be filed within 90 days but not later than 30 days prior to the end of the license term. In any case in which the licensee has, in accordance with the provisions of this chapter, made timely and sufficient application for renewal of an unexpired license, no license with reference to any activity of a continuing nature shall expire until such application shall have been finally determined.

b) If a license is allowed to expire, application for renewal may be made during a period of grace of one year after the expiration date. During this one year period of grace, an expired license is not valid. A license renewed during the grace period will be dated currently and will not be backdated to the date of expiration. Applications shall be submitted on FCC Form 610 and shall be accompanied by the applicant's expired license.

SUSPENSION OF LICENSE

The Amateur Extra Class license of John Douglas Allyn, W7YGN, of Seattle, Washington has been suspended by the FCC for one year. The Commission's Order stated that Mr. Allyn was found to have willfully or maliciously interfered with the signals of other radio stations, transmitted a call not assigned to the station he was operating, damaged or permitted to be damaged the radio apparatus of a licensed station and transmitted unidentified radio communications. Mr. Allyn apparently did not request a hearing, though he did write a letter denying the charges. After the suspension was placed into effect on June 16, 1963, Mr. Allyn filed an informal petition for reconsideration with FCC. Apparently the Commission did not consider this application to have been timely filed, and has taken no action on it. QST

Old Timers' Night

(*Continued from page 57*)

experience any trouble — just simply figured I needed half as much of everything. I reduced the four-wire flattop and eight-wire counterpoise by putting insulators in the middle (not a very pretty sight), and cutting the coils and condensers in half. I had just gotten on 80 when the Radio Inspector paid Denton a visit (prompted by many BCI complaints). He checked everyone with his absorption-type wavemeter. I was the only one on 80; he asked me what wavelength I was on; I told him 77 meters. After checking I asked him 'what do you check it?' He said, '77 meters.' I would still like to know how close we were.

"It was only a matter of days, November 1924, until 5DW in Greenville was the first Five to work New Zealand and Australia, followed closely by 5IN Dallas and 5OX Houston and about two other Fives before I worked them. That was using a single 202 and a two-tube receiver, and just to think I raised that DX the very first call, and today I have to call some little old island that counts as a new country two or three days with a kw. and beam!

"Speaking of nostalgia, I really had a bad case of it a couple of years ago. The XYL and I spent a day in Death Valley, on a cool spring day — any old timer will tell you what Death Valley is famous for, twenty-mule-team borax. Being there and seeing the old mines and wagons that brought the precious cargo out so hams could have CRAC notes carried me back to many pleasant memories as I could visualize those 48 jelly glasses all frosted over. Glancing at the XYL, realizing she couldn't share the memories with me, was a bit sad.

"One of the greatest changes in amateur radio is that the average ham is much older. Most hams seemed to be teenagers then, and I had the idea that most men thought it wasn't dignified and was something for the kids to play with. Another big difference then was that hams were rather scarce. Many towns of considerable size didn't have a single ham. One could almost remember every town he had worked and the call. It wasn't unusual for hams to hitchhike from one town to another to meet a ham he had become acquainted with over the air; I made one such journey as far as Denver, Colorado. Then there was a lot of visiting overnight — one almost felt obliged to look up the hams in every town he was visiting. I still like the idea, but with so many hams in every little hamlet today, you surely couldn't do so much traveling.

"In closing, I want to wish all you old timers many more years in which to reflect on the pleasant memories of the past and to participate in the exciting years ahead for amateur radio. To the newcomer I will say 'when you have had 40 or 50 years of amateur radio behind you, you too can look back and I am sure the comparison will be even greater than the past fifty years.'

"Thank you and 73"

QST

Silent Keys

IT is with deep regret that we record the passing of these amateurs.

W1AYO, Arthur J. Scherber, Buzzards Bay, Mass.
W1IFQ, Alphonse J. Martin, Meriden, Conn.
W1NNI, Eugene L. Prinsen, Sterling Junction, Mass.
K1QXJ, George E. Stevens, South Natick, Mass.
K1RXS, Kenneth R. Brown, Braintree, Mass.
ex-W2AHX, Marvin C. Polhemus, Belmar, N. J.
W2AQP, Walter H. Atkinson, Sr., Pleasantville, N. J.
K2DI, James A. Shiels, Newark, N. J.
W2ODX, Elmer C. Bishop, Wildwood, N. J.
W2RGZ/K2HP, Charles W. Huff, Chenango Bridge, N. Y.
W3EQK, Arthur W. Plummer, Baltimore, Md.
K3KSW, William D. Cooper, Pittsburgh, Pa.
ex-3MX, Thomas H. Barker, Jr., Gladwyne, Pa.
K3NJQ, Robert A. Reitz, Sparks, Md.
W3RI, Harry L. Bear, Tarentum, Pa.
WA4EPY, Joseph Marshall, Ozone, Tenn.
K4EQK, Otto H. Roehrs, Jr., Memphis, Tenn.
WA4KEX, Paul G. Hines, Decatur, Ga.
K4SUT, Eugene E. Cooley, Hampton, Va.
W4WTM, William J. Hopkins, Manassas, Va.
W4YAQ, Walter J. Phillips, Ocala, Fla.
W5IHT, Alvin E. Ware, Menard, Tex.
K5JEU, Alvin G. Patrick, Hot Springs, Ark.
K5OGO, Glynn P. Smith, Santa Fe, N. Mex.
K5OOW, Cad B. Westfall, Fort Worth, Tex.
W5QJJ, Clifton H. Tupper, San Angelo, Tex.
WA6BGS, Eddy F. Quinn, El Cajon, Calif.
K6JDI, Raymond R. Stone, North Hollywood, Calif.
W6JPA, John I. Wright, Beverly Hills, Calif.
WA6KIG, Harry N. Ironside, Sr., Stockton, Calif.
W6LXY, George S. Pearlson, Venice, Calif.
WA6NGB, Thomas J. Prentice, Oakland, Calif.
K6ODA, Heinz G. King, Modesto, Calif.
K6OQJ, Richard A. Le Clert, Tracy, Calif.
K6UAX, John J. Barbeiro, Inglewood, Calif.
W6UDQ, Wesley B. Donnenwirth, Sacramento, Calif.
K6UHP, John C. Walker, Turlock, Calif.
K6VQK, John E. Valentin, Pacific Grove, Calif.
K6ZEB, Ernest H. Dort, Pasadena, Calif.
W7NY, Elmo E. Eshelman, Hayden Lake, Idaho
K7RTP, Alfred M. Henry, Phoenix, Ariz.
K7TYM, Harry W. Bowman, Tucson, Ariz.
W7YLR, Augusta A. Mader, Jerome, Ariz.
K7YUN, Oliver F. Moore, Yuma, Ariz.
K8CNH, Frank J. Lester, Detroit, Mich.
W8DK, Frank J. Kobric, North Olmsted, Ohio
W8GVO, Paul H. Leimbach, Salem, Ohio
K8GZD, Richard E. Arthur, Bryan, Ohio
W8IMM, Charles E. McLaughlin, Toledo, Ohio
W8MGN, Ivan L. Heavey, Cincinnati, Ohio
W8UFZ, Hope P. Brock, Detroit, Mich.
WA9CWG, George W. Rakestraw, Canton, Ill.
WA9GWF, Edward J. Bump, Canton, Ill.
WN9HGT, Nathanyl Johnson, Indianapolis, Ind.
W9KGD, Albert G. Roioff, Roselle, Ill.
KØEFY, Louis P. Kearney, Laporte, Minn.
KØISS, Lawrence M. Cotterman, Minneapolis, Minn.
WØWXE, Ernest E. Swafford, Fort Scott, Kans.
OA4AH, Valmore M. LaPierre, Lima, Peru
VE3AGA, William E. Blennerhassett, Port Arthur, Ont., Canada
VE4TQ, Edward W. Trewella, Carman, Man., Canada
VE5CV, H. A. Hansen, Gull Lake, Sask., Canada
VP6WD, G. McLean, Christchurch, Barbados

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.
(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.
(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.
(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**
(5) Closing date for Ham Ads is the 20th of the second month preceding publication date.
(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.
(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.**
(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

BIG D Hamboree, August 15, 1964. Make your plans now. Write to Dallas Amateur Radio Club, Box 30532, Dallas, Texas 75230.

SRRC Hamfest, June 7th. See May Hamfest Calendar in QST for details, or write: SRRC/W9MKS, George E. Keith, RFD #1, Box 171, Oglesby, Ill.

SAN FERNANDO Valley Radio Club 8th Annual Hamfest-Picnic: June 21, 1964, Sunset Farms, Sylmar. Tickets/info: W6SD Hamfest, Box 3151, Van Nuys, Calif.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

HAMFESTER Radio Club Hamfest August 9, 1964. Write for full details. Hamfester Radio Club, K9LOK, 5434 So. Bishop St., Chicago, Illinois 60609.

MOTOROLA used FM communications equipment bought and sold. W5BCQ. Ralph Hicks, Box 6097, Tulsa, Okla.

WE buy all types of tubes for cash, especially Eimas, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

TOROIDS: Uncased 88 Mhy, like new. Dollar each. Five/$4.00. P. P. DaPaul, 309 South Ashton, Millbrae, Calif.

SOUTHERN California: Transmitter and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. KEllogg 8-0500.

CASH For your gear! We buy, trade and sell. We stock Hammarlund, Hallicrafters, National, Johnson, RME, Hy-Gain, Mosley and many other lines of ham gear. Ask for equipment list. H. & H. Electronic Supply Inc., 506-510 Kishwaukee St., Rockford, Ill.

WANTED: Military or industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel SOrmandy 8-8262.

HAM TV Equipment bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

TOROID RTTY Kit: Mark-Space discriminator and bandpass filters. Includes 4-88 Mry and 1-44 Mhy uncased like new condx, toroids; information sheet, mounting hardware and six mylar capacitors. $5.00 ppd. Toroids: specify 88 or 44, less capactrs. $1.00 each. 5/$4.00, ppd. KCM Products. Box 88, Milwaukee 13, Wis.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

CRYSTALS: Free Bargain List. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

WANTED: Parts, sets, as is GRC-9, BC-610, GRC-27, Autodyne, 236 Park Avenue, Bethpage, L.I., N.Y.

HAM Discount House. Write us for lowest prices on Ham Equipment. Factory sealed cartons. Specify equipment wanted. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn.

QSLS?? WPE?? SWLS?? Personalized made-to-order service!! Samples 25¢. DeLuxe 35¢. Religious 25¢ (refunded). Sakkers, W8DED, Box 218, Holland, Mich.

C. FRITZ QSLS. Bringing hams greater returns over a quarter-century! Samples 25¢ deductible. Box 1684, Scottsdale, Ariz. (formerly Joliet, Ill.).

QSLS. Twenty exclusive designs in 3 colors. Rush $3.85 for 100 or $6.90 for 200 and get surprise of your life. 5 days' service. Satisfaction guaranteed. Constantine Press, Blandensburg, Md.

QSL, SWL cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elm, Hamilton, Ohio.

QSLS: samples 25¢ (refundable). Schuch. W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

QSLS "Brownie" W3CII. 3111 Lehigh, Allentown, Penna. Catalog with samples. 25¢.

QSLS-SMS. Samples 10¢. Malgo. Press, Box 375 M.O., Toledo 1, Ohio 14107.

PICTURE QSL Cards of your shack, etc. Made from your photograph. 1000, $14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Pa., 19140.

DELUXE QLS. Petty, W2HAZ, Box 27, Trenton, N.J. Samples, 10¢.

QLS Specialists. Distinctive Samples 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago 39, Ill. 60639.

QSLS Special. 100 50 Star U.S. Flags on glossy cards, $3.70. Ppd. Other samples 10¢ or 25¢ refunded. Dick, W8VXK, Rt. 4, Gladwin, Mich.

QSLS-SWLS. 100 2-color glossy, $3.00; QSO file cards, $1.00 per 100. Samples, 10¢. Rusprint, Box 7575, Kansas City 16, Mo. 64116.

QSLS. Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

SUPERIOR QSLS. Samples 10¢. Ham specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

ZIP Code rubber stamp, call, name, address, with ink pad, $1.00. K4ISA, E. Perry, Box 8080, Allendale, Fla.

DON'T Buy QSLS until you see my free samples. Bolles, W5OWC. Box 9363, Austin, Texas.

QSLS, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QLS, SWLs, XYL-OMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fantabulous. DX-attracting, prototypal, snazy, unparagoned cards (Wow!). Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

QUALITY QSL's—Custom and Stock. Samples 10¢, 25¢, 50¢. Savory, 172 Roosevelt, Weymouth, Mass.

SUPERIOR QSLs. samples 10¢. Ham, specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLS 300 for $4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS. Samples 25¢. Rubber stamps: name, call and address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLS 3-color glossy, 100, $4.50. Rutgers Vari-Typing Service. Free samples Thomas St., Riegle Ridge, N.J.

QSLS, Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Sample 15¢. Agents for Call-D-Cal decals. K2VOB Press, 62 Midland Blvd., Maplewood, N.J.

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 51Q Jutland, N.J.

QSLS. All kinds, free samples. W7IIZ Press, Box 183, Springfield, Ore.

ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

RUBBER Stamps $1.00. Call and address. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, N.J.

QSLS. Samples 20¢. QSL Press, Box 281, Oak Park, Illinois 60303.

1½" Call QSLS $2.40/100, $2.90 (2 sides). Samples. Garlepy, 2624 Kroemer, Ft. Wayne, Ind.

QSLS: 100 for $3.50. Glossy. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y.

QSLS. Samples free. Blanton's. Box 7064, Akron, Ohio 44306.

RUBBER Stamps for QSL cards. QSL kit includes: 3 stamps, ink, pad, plus 5 year QTH and call change certificate. Write free information. E & R Rubber Stamp, 50 Gerald Rd., Rantoul, Ill.

RUBBER Stamps, 3-line, $1.00. Andrew Travis, 2002 West 8th, Austin, Texas. 78703.

QSLS, SWLS 3-colors 100, $2.00. Samples dime. Bob Garra, Lehighton, Penna.

QSLS. Samples, dime. Printer, Corwith, Iowa.

FREE QSL Samples. 1167 East 23rd, W6OHE Press, San Bernard.no, Calif.

AT Last! Something new in QSL cards! All original designs. Send 10¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

PHOTOSTAMPS of your station with gummed back for your QSLS. 100 $1.50. Samples 10. Morgan, W8NLW, 443 Euclid, Akron, Ohio.

30 New QSL drawings, samples, 10¢. Brigham, Colson St., No. Billerica, Mass.

QSLS-SWLS. Gorgeous 5-6 color rainbows, others. Highest quality! Very reasonable! Samples 10¢ refundable, Joe Harms, WA4FJE, 905 Fernald, Edgewater, Fla.

QSLS: $2.50/100. New catalogue-samples 10¢. Longbrook, Box 393-W. Quakertown, N.J.

FINE QSLS. Dime. Filmcrafters, Box 304, Martins Ferry, Ohio.

QSLS. Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLS-SWLS. Gorgeous rainbows; others. Immediate service. Very reasonable. Samples 10¢, refunded. Joe Harms, WA4FJE, 905 Fernald, Edgewater, Fla.

RUBBER Stamps for QSL cards. Kit available. Free sample impressions. E & R Rubber Stamp, 50 Gerald Rd., Rantoul, Ill.

NEW! Unusual QSLs. Free samples. Thomson, P.O. Box 3554, Austin 4, Texas.

CENTRAL Electronics, 100V, excint condx, $485.00; HQ-170, $249.00; K2JZW, 212-HI-5-8947.

CREAM Puff, matching Hallicrafters station, HT32 ($350); HT33A ($500), SX101A ($260); FV729 mike, LP filter, connecting harness and desk. All for $995 certified check or separately as priced. K2JEI, 1122 Hillside Avenue, Plainfield, N.J.

FOR Sale: Viking Valiant, National NC-109, and Hy-Gain TH-4 Tri-band beam. All in xclnt condx. Doug Swanson, WA2KJP, 1408 Univ. Halls, Cornell U, Ithaca, N.Y.

HAPPY Hams Club. Are you happy with Ham Radio as it is? Do you think more operating restrictions and license requirements are unnecessary? Be Happy with us! Send 25¢ (coin) for handsome inscrolled 8" x 10" Club Membership Certificate suitable for framing. It's a Wow! Brigman, W4IEN, Box 257, Norcross, Georgia 30071.

WOW! Ham Trader, Ham's Hobby Mart now one! Cheapest rates! Buy, sell, trade with other hams. Next 10 issues, $1.00. Free sample. Ham Trader, Box 153A, Franklin Square, N.Y.

RTTY Gear for sale. Write for list. 88 or 44 Mhy Toroids five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

FOR Sale: Plate transformers, 3600-0-3600 VAC at 1000 Ma., with dual 110V and 220V primaries, $35.00. Peter W. Dahl, 5331 Oaklawn Ave., Minneapolis, Minn. 55424.

SELL: SX-101A with speaker, DX-60, homebrew transmatch, microwave micromatch; Johnson key. All in new or in excint condx. Best offer over $300 takes all. Dick Fraser, 616 Chapel St., Ottawa, Illinois.

FACTORY Reconditioned pacemaker, perfect, $189.50. Thunderbolt, $325.00. F.o.b. WØBDG, 421 Groveland Ave., Minneapolis, Minn.

RTTY, MU Western Model M-1 FSK and AFSK converters regular, $11.50; special $89.95 new. Pat's Used Electronics. 1138 16th St., Denver, Colorado 80202.

SALE: HQ-180, Viking Valiant, 3-El Triband beam, rotator, tower, or any part. In mint condx; $550 takes all. N.Y. call TI-2-9500, Ext. 532 (W2DRS).

SELL: Following items in mint condx: KWS-1 with RTTY at $700; model 14 typing reperf at $100. Telrex, Triband beam (needs slight work) at $30. Want: R-278B/GR, R-390A, R-390, R-391 revrs. N. K. Thompson, WILWV, 99 Water St., Millinocket, Me.

304TL tubes wanted. Also other xmtrg and special purpose tubes. We will buy military or commercial transmiters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

ATTENTION! Mobileers Heavy-duty Leece-Neville 6 volt 100 amp. system, $50; 12 volt amp. system, $50; 12 volt 6 amp. system, $60; 12 volt 100 amp. system, $100. Built-in silicon rectifier alternators 12 volt 6 amps, $100; 12 volt 100 amps, $125.00. Guaranteed no ex-police car units. Herbert A. Zimmerman, Jr., K2PAT, 1907 Coney Island Ave., Brooklyn 30, N.Y. Tel. DEwey 6-7388.

HEATH Mobile ham station for sale: Comanche receiver, Cheyenne transmitter, HP-10 power supply, 12-volt, mike, etc. $150. Dick Johnston, 3 Oak Road, Southington, Conn.

WANTED: For personal collection: QSTs March, April, May and August 1916; ARRL Handbook Edition 1. CQ's for 1945 thru 1947. W1CUT, 18 Mohawk Dr., Unionville, Conn.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc., 131 Lawrence St., Brooklyn 1, N.Y. Tel. UL 5-2615.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel: GArfield Area code 201-471-2020.

WANTED: All types of aircraft or ground ratios. 17L 618F or S 388, 390, GRC, PRC, 51J, RVX. Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

COLLINS Owners! Work A.M. Wired kit, $5.00. No soldering, holes, chassis removal! Switch In-Out! (State Model)! KWM-2 independent receive control, $15.00. It's a honey! Kit Kraft, B-763, Harlan, Ky.

TUBES, Diodes, transistors wanted. High cash prices paid. Astral Electronics, Box 636, Elizabeth, N.J. Tel: 354-3141.

SELL, swap or buy ancient radio sets and parts, magazines. Laverty, 118 N. Wycombe, Landsdowne, Penna.

WANTED: 4 or 5 element 20M Telrex beam. Desk cabinet for relay rack 19" x 17" panel space, any condx. W2UGM, 66 Columbus, Closter, N.J. Tel: PO 8-1884.

SELL: Cleaning out! Send for list of power supplies, meters, miscellaneous parts, etc. Molyneaux, 5801 Shadesview Dr., Mobile, Ala. 36608.

MUST Sell: 75A-4-500A. Globe King, Johnnie Brines, K4-GGM, 16 Barbrick St., Concord, North Carolina.

SIDEBAND: Marauder exc., $300; Drake 2B and spkr. and Q-mult., all exc., $200. Also ant. relay and acc. All for $480.00. Stu Personick, WA2KCH, 3230 Cruger Ave., Bronx, N.Y. 212-014-2381.

NCX-3 with AC supply. New, less than 20 hours on the air. In orig. cartons: $350.00. K2TRU, Marty Schiff, call: 212-LO-6-7387. Write: 1684 West 8th St., Brooklyn 23, N.Y.

SELL: KWS-1, $650.00. In excellent condition. Dave De Armond, W6MSD, 3024 Seminary, Oakland, Calif.

HARVEY-WELLS TBS-50C, VFO and pwr. supply; $75.00. R. K. Fetterman, W3FYC, Blue Bell, Penna.

FOR Sale: Duplicate QST and CQ magazine. Send list for quotation. Wanted: Old callbooks, Pacific Radio News, Modern Electics, early wireless gear, catalogs, etc. for private collection. W6YPM.

CASH For callbooks. Old callbooks prior to 1925 or after 1931 wanted. W8EF, 795 Lake Shore, Grosse Pointe, Mich. 48236.

EXCELLENT KWS-1 and 75A-4, three filters, speaker. All for $1100 cash and carry. K4UMC, 107 Chatham Lane, Oak Ridge, Tenn.

JOHNSON Desk kilowatt, new sideband modification kit, Ranger P.T.T. sequence keying, factory-wired, kilowatt Matchbox SWR bridge, new tubes, extra spares, 4-400A's, 810's, 872A's, not surplus. Complete cables, ready to operate, condition like new: $900 cash. Ted Brix, 5573 No. Van Ness Blvd., Fresno 5, Calif.

GLOBE Champion transmitter for sale (early model). Only $75. Sakkers, W8DED, Holland, Mich.

75S3 No. 10190, $550; 2.1 kc filter for 75A4, $45.00; B&W L1001A and matching LPS-1 supply, like new, $250. Coax relay for KWS1, new, $20; H.V. transformer and choke for 30S1, new, $75. Weston Model 372 microfaradmeter, $50; resistance bridge model ZM4B/U, $50; Gonset "Bow Tie" beam for 20M, with coils also for 15M, xclnt, $35.00; 312B1 speaker for KWM1, $20; 351D1 mobile mount for KWM1, new, with all cables and hardware, $35. 4CX250B, new, boxed, sealed, $30. 3B28s, new, $2. 5R4WGA, ruggedized, new, $2. National neutralizing capacitor for high power, new, $3. Transformer, 220/5V at 20A, 10KV, new, oil-filled, $7. Transformer, 115/5V at 15A for 4-400s, new, $5. Transformer, Stancor PT-8313, new, boxed, $15. Panel meters, 3", assorted ratings, mostly Weston, $4 each. Maj. James Craig, 1646-B Sycamore Dr., Blytheville AFB, Ark. 72317.

WANT: 20-A, K8VKC, 790 East 254, Euclid 32, Ohio.

HEATH DX-100, in gud condx, new tubes, one-step loading, $110. R. Landrigan, K1NNW, 215 Willow St., W. Roxbury, Mass.

MUST Sell HQ-180, new February 14, 1964. Will send date of purchase with set. K3RT, Ed Moorhead, 801 Chartiers Ave., McKees Rocks, Penna.

SELL: HQ-180, clock and spkr, best offer over $275. K9WXA.

SALE: DX-60, $72; HG-10 VFO, $28; POO-Keyer, $17; Autronic Key, $14; TA-31 antenna, $16; antenna relay, $8. Excint condx. Package deal: $140. WA2SJQ. Tel TU 1-7185. New York City area only.

SELLING Out: All in gud condx: NCX-3 transceiver and AC supp, $350; Hammarlund HQ-180C revr, $275; Gonset 201 Linear, $180; Gonset G63 Hamband revr, $125; Hammarlund HQ-129X revr, $75; Johnson Viking I, $60; Mobile Elmac AF67-PMR6A and 1070 power supply, $100. Philip Schwebler, W9GCG, 4536 N. 50th St., Milwaukee 18, Wis.

National NC-155 receiver, factory new mint condx: $140. K3LIZ, 239 West 21st St., Chester, Penna.

BOOST Reception; 3.5-30 megacycle SK-20 Preselector kit, $18.98. Boost modulation, AAA1-1 clipper-filter kit, $10.99. Reduce noise, NJ-7 Noiselector, IF, wired, $4.89. Postpaid! Literature free. Holstrom Associates, Box 8640-T, Sacramento, Calif. 95822.

SELLING 2000 watt P.E.P. table-top linear amplifier. From special lot by Hunter Mfg. Co. Uses four UE 572As in grounded grid. Self-contained solid state pwr. supply. Operates 80-40-20 mtrs. Brand new with factory warranty, $325.00. KØCKX, 511 5th Ave., Coralville, Iowa 52241.

WANTED: In like-new condx: HT32B. Also 6-meter 4/5 el. beam. Sell NC-190 general purpose revr, like new, $170. AR-22 rotor, never used, $22. Power xfrmr 5000 v. at 400 mils. No C.T. Make offer. K2ZEX, DE 2-2339.

GOING Cross-Country! Must sell KWM-2 with PM-2 p.s. MM-1 mike and CC-1 carrying case. Used only 10 hours. Perfect condx. Trade for new 650 cc motorcycle or $950 cash. Walter Gezari, 410 Thurston Ave., Ithaca, N.Y.

FOR Sale: 6 walkie-talkie (weighs 4 lbs). WA2TKS. Meyers, 2727 Ocean Parkway, Brooklyn, N.Y. 11235. Contact via mail please.

FIRST Check for $170 buys Heathkit Cheyenne, Comanche, Hp-20 P/S, AK-6, AK-7, "Slimline" mike, all cables. Like new condx, accurately calibrated, in perf. condx. C. Francis, 8311, Ellsworth WMU, Kalamazoo, Mich.

SX-111 Receiver, in mint condx, spkr, manual, $170; DX-20, spotless, manual, $20; 4-1000A deluxe linear kit, write: cleaning out shack. Stamp for bargain list. WØLWZ, 1030 So. Dudley, Denver, Colorado, 80226.

COLLINS Station for sale: 75A-3, and 32V-3. Original cartons. One owner. Spare 4D32. Matching spkr/cabinet, in excint condx. Not scratched or worn. Want best offer over $500. However, make your best offer and get free picture of station. Mac, W4NJE, Box 4192, Lynchburg, Va.

FOR Sale: Lafayette HE-50, 10-meter transceiver. VFO, mike, new antenna, perf. condx: $50. W2LZW.

HUNTER Bandit 2000A linear, like new, factory checked with new set of tubes first $339. Want 51Js or 51J4. Richard E. Mann, WØWHP, 7205 Center Dr., Des Moines, Iowa.

CRYSTALS Airmailed: Kits, MARS, Marine, SSB, Nets, CD, etc. Custom finished etch stabilized FT-243 .01%, any kilocycle 3500 to 8600 $1.75. (Five or more same or mixed frequencies $1.50.) (Ten or more same frequency $1.25.) 1700 to 20,000 Kilocycles $2.25. Overtones above 10,000 Kilocycles. Add 50¢ each for .005%. HC-6/u miniatures above 2000 add 65¢ each. QST Kits, FT-243: "DCS-500", "Three band converter", "Phasing", "IMP" $9.95/set. "SSB Package" Mixer or Filter—$11.95/set. Write regarding specific needs. Airmailing 10¢/crystal, surface 5¢. Crystals since 1933. C-W Crystals. Box 2065-Q, El Monte, California.

HQ-145-X, clock, calibrator, $175 or your best offer. James Cotten, Weatherford, Texas.

DE Forest globular audion wanted for reasonable price. Need *not have the filament intact.* W6FB.

NOVICE-General rig: DX-60, $65; SX-99, $95. Also: HW-30 Twoer, $40. WA6ZAJ/9, 820 N. LaSalle, Chicago, Ill.

SELL: Gonset G-76. DC pwr. supply. Highest offer over $250.00. All inquiries answered. W2QNI, 3635 Richmond Ave., Staten Island 12, N.Y.

120 Mfd. 3000VDC industrial condensers. $30 each. 10 mfd. 1000 VDC condensers, $2.00 each. W4BXG, Box 334. Alcoa, Tenn.

L & N Galvanometer wanted, type PI-24-C. Precision E200-C signal generator for sale, $35. Lucey, 725 ½ Porter, Glendale 5, Calif.

FOR Sale: NCX-3, $300; Adcom 350-12 pwr. supply, $90; Webster Band-spanner antenna, $20. You pay shipping charges. KØCCM/5, 100 No. Osage, Apt. 9, Bartlesville, Okla.

SELL: Heathkit Cheyenne Mobile xmtter, Electro-Voice #727 ceramic mike, MP-1 12 VDC mobile pwr. supply and Gonset Super 12 converter, $125.00. Takes all in mint condx. Dan Dinzik, W2OQX, 19 Hemlock, Elnora, N.Y. 877-7935.

EICO 720 xmtr, 730 mod. and Knight R-100 for sale. All professionally wired; can be shipped or mailed. $180 or make an offer. K8QA, 255 N. Graton, Romney, W. Va. 26757.

50 FEET of height for your 30-ft. high antenna! For less than $50 you can build a strong support to fit on your pole. Send $1 for plans to Schueler, 318 Riebeling St., Columbia, Ill.

SALE: 6-meter rig, 829B modulated by 6L6s with supply, $45. NC-155, excint condx, $150. K3KLE, 52 Maffet, Wilkes-Barre, Penna.

MUST Sell complete. (No shipping, sry!): HQ-170 with clock, spkr, and timer, $285; DX-100 converted to SSB, $160; SB-10 and pwr. supp., $95; E-V mercury model 911 mic, $9.50; Vibroplex key, $9.75; plus the following free: used Hy-Gain 3-element 20M beam; new Hy-Gain all-band vertical; SWR bridge field strength meter; BW-651 Match-Master, TR switch; Conelrad alarm CA-1; KW pwr. supply. Pr. 813 tubes and misc. A. Travis, 259 Grove St., Bangor, Me.

SIDEBAND *Engineering SB-33* transistorized transceiver and mobile rack, $290; 12-volt DC supply, $40, in mint condx. Chet Kueyn, W2BTP, 34 Dumbarton Dr., Huntington, N.Y. Tel: HA 3-3431.

FOR Sale: KWM II supply, $825; 75A4, perfect, $425; Telrex 3-el. 20 meter beam $80.50; 4CX250B, new, $25.00/pr. W2-LEC, Shrewsbury, N.J.

SELL: Fifty-four copies of QST, 1954 thru 1959. Best offer single or lot. D.o.b, Seattle, Wash. Leo J. Larkin, 3233 44th Ave. West, Seattle, Washington 98199.

KWM-1 transceiver, 312B-1 spkr, 516F-1 AC pwr. supply, 399B-1 DX adapter, extra xtal box with 4 xtals. K2PLZ, John Clarke, 252 East 89th St., New York 28, N.Y. FI 8-5669.

HEATH SB-10—$65, Apache—$165, Mohawk RCVR—$165, Mohican transistorized RCVR W/ac and dc supplies—$80, HR-10 RCVR—$60, HX-20 Mobile SSB—$145, HR-20 RCVR—$85, HP-10 Mobile Supply—$32, HP-20 Supply—$18, GR-91 RCVR—$28, FMO-1 FM Generator—$22, Tapetone "Skysweep 345" RCVR—$95, Hammarlund HQ-170C RCVR—$170, Hallicrafter's MIL. 28-143 mc RCVR—$55, Hazeltine 143-236 mc wave-meter/generator—$15, Navy RDZ-1 200-400 mc RCVR—$65. Most equipment excellent, questions—write, or have list other gear. W8GGK Jim Trout, Route 1, Stevensville, Michigan.

75A4, Ser. #4010 2-filters, $485; Central Electronics 100V, $450; HT-37, $285; HT-41, $225; SX101A, $240. All gear like new condx. Call Henry, WB2CNA, N.J. 201-44-43189.

HEATH Marauder HX-10 for sale. Excellent condition. Will deliver a reasonable distance. $325.00. K8AJD, 3013 Cameron St., Kalamazoo, Mich.

COLLINS, Estate of W3KPP: 32S-1 and 516F2, $400; 75S1, $300; 30S1, $850; new 4CX100A, $125; all for $1600.00. HT32, $350; H133A, $475, both for $800. G76 with AC and DC supp., $300. W3VRZ, Beaver Falls, Penna. 412-843-3144.

QSTS for sale. 1944 to 1962. All in gud condx, except 1947. $60 or you make offer F.o.b. Denver. 32 scattered issues from 1936 to 1945. Make offer. WØJRN, 5985 So. Milwaukee Way, Littleton, Colorado 80120.

ESTATE OF K9MBF: Collins 30S-1. One owner. $900. Contact Mrs. M.A. Knoller, 4908 N. Cumberland, Milwaukee 17, Wis.

HQ-170, $215; Sonar low-pass filter, $5. F. Greenbaum, 2125 Cruger Ave., Bronx 62, New York.

FOR Sale: Brand new, in perf. condx, Hallicrafters HT-32A transmitter, $450. Also SX-101A receiver, new, perfect, $250. Dr. B. F. Wexler, 1801 N. Wood Ave., Linden, N.J.

WANTED: Tower, 40 ft. or greater. Will pick up from any location within 100 miles of my QTH. Send description and asking price. WB2GKF.

WILL Swap NC-183 in A-1 condx for Communicator IV 2M or 1¼ M. Al Mente, 17 Lull St., Westwood, Mass. W1JPX.

ELMAC AF-68A, $145; 1 used, $110; Elmac M1070, 1 new, $45, 1 used, $35; Elmac PMR-8, used, $110. Cables for Elmac xmttr/rcvr/p-s set up, with spkr, S meter ant. relay, $15; Heath SWR, $7. New equipment is in excint condx. Used equipment in gud shape. All operational. No checks or c.o.d. deals. You pay shipping. W1GFY, Charles I. Knowlton, Box Pond Rd., Bellingham, Mass. 617-473-5304.

75A-4, 3.1 kc filter. In my opinion this Collins receiver is still the best ever produced. Ser. number 5164, right near the end of production, has been in dead storage for several years so it is in just like new condx. Will consider cheap receiver in trade. $550. F.o.b. K6HW, 3645 Riviera Drive, San Diego, Calif.

COLLINS 75S3, used less than 100 hours: $495. HT-37, $315 and HT-41, $240. All in mint condx and shipped in orig. cartons. Also, 275 Johnson Matchbox, $30.00. K8PSL, 32600 Plumwood, Birmingham, Michigan.

TRANSFORMERS, Kenyon, 2400 VCT, 400 Ma., 2.5 VCT, 10A, 5A, PR1, 106, 112, 118, 124, 200, or 220 AC. Ideal for that compact linear. New. $10. Voltage regulated power supplies, and many other items. Send for list. W2HUN, Moentner, 90-51 54th Ave., Elmhurst, 73, L.I., N.Y.

GONSET G-76 transceiver (gud condx) AC/DC supplies, mobile HWM-3 Triband antenna (20-15-10) w/mount, hardware, xtal calibr., Shure dynamic mike, cables, SWR bridge. Pick up deal only. $395. $395. WA2VGM, Irwin Kane, 1775 E. 18th St., Brooklyn, N.Y. 11229. ES 6-6576.

SALE: Heath Scope Model OM-3, $30, or trade for TV or FM alignment generator. F.o.b. Pike, 1211 Virginia Road, Wilmington 3, Del.

FOR Sale: Hammarlund SP600JX10, Serial #6009. In gud condx, $395. Harry Pearson, 202 Jamesville Rd., DeWitt, N.Y.

FOR Sale: SX-111 receiver, $150. Johnson Adventurer, $35. Both for $175.00. My QTH is W6ERV. Tel AN 1-1079.

PERSONALIZED Matchbooks with your call letters, fifty books $2.95 postpaid. Attractive Silver, Green, Red, Black, White colors with Gold or Silver letters. Check or money order to Callmatch Company, P.O. Box 101, Springfield, Va.

CODE Oscillator: 100% transistorized. Pure, stable tone for code practice. Just attach speaker, telegraph key, and battery. Completely wired, not a kit. Mail $2.95 to: Communications Specialties. Box A, 210 San Lorenzo, Pomona, Calif.

SURPLUS Inventory, fill your junkbox. Miscellaneous parts of all types. Send 10¢ for list. Custom Electronics Co., Box 98, Chrisney, Ind. 47611.

SX-111, new in February 1964, perf. condx: $150.00. McCanney, 401 E. 86th St., New York City 10028.

TV Camera, commercial unit. Perfect for ham TV. $250. Pete, W2FDU, 516-FR4-7807. 124 Meadowview Ave., Hewlett, L.I., N.Y.

G-66B and 3-way supply, $95. Robert Smith, K4YZT, 420 Woodroff Road, Newport News, Va.

COLLINS 32S1, 75S1, 516F2, in mint condx. $865. Will deliver to within 300 miles myQTH. K3FHO, Clearview Ave., Chalfont, Penna. Bucks Co.

COLLINS S/Line, 32S1, 75S1, 516F2 supply. Late serial numbers. Perfect in appearance and working condx: $850.00 cash. No trades, please. K90BQ, Jack McVicar, 2127 Adel, Janesville, Wis. 53545.

WANTED: Morrow RTS-600S AC power supply. Keith LaChapelle, 9000 Congdon Blvd., Duluth, Minn.

SELL: National NC-183, $100; Hammarlund HQ-160, $199; RME DB23A Preselector, $25; Kreco 12-volt dynamotor supply, $20; Sonar VFX680, $15. W2PLB, Charles Moskowitz, 720 E. 32nd St., Brooklyn, N.Y.

TELETYPE Equip. TT6, new, with converter aud. etc. Ready to print. Navy E.U. generator 110v Ac 1500w Self-starting. PE-108 AC gen.; Knight 6M xcvr & P/S; Tecraft (200 Mc) converter Tecraft (6M) xmttr 8 pwr. supp. Best offer. W9VRW, 2165 N. Oakley, BR 8-4646, Chicago 4E, Ill.

SX-100, used little, $175; Elenco SSB xmttr, 807 final, VOX, VFO, PS, instructions, $89. KW parts, cheap; double conversion FM rcvr, $27. 50 watt xmtr, $20. E. K. Taggart, Nashville, Indiana.

WANTED: 51J or R-388 or equivalent. W1ZUH.

HT-37, perfect condx. Swap for low-cost AM/xmtr and $$. K5TVI.

WANTED: Navy surplus Link model 886 remote control unit. Ralph Villers, Box One, Steubenville, Ohio.

PROCEEDINGS OF the IRE: February 1921, $5; October 1929, $3; September 1930, July August, October 1931, $2 each. Ten dollars buys all six copies. L. A. Morrow, W1VG, 99 Bentwood Road, West Hartford, Conn. 06107. Phones: 666-1541, 521-0416.

PAIR 813s, G.G. linear amplifier with heavy power supply. Band switching. Further details. Lou, Box 244, Lexington, N.C.

SELL Complete Novice station; DX-20, S-38B coax, 80-10 vert. $100. WN4SIQ, 1236 Forest Ave., Maysville, Ky.

MUST Sell for friend in Navy: BC-342-N, $40; 65W 6-meter xmtr and VFO, $25 less power supply and mod. 90W 2 meter xmtr, less power supply and mod. $25; 2 meter converter with power supply, $12.50. TC-2 Heathkit tube-checker, $15; 1 pair earphones, $1. F. F. Taylor, W7BX, 2025 Williams Ave., Chehalis, Wash.

SELL: NC-190 rcvr, $150; speaker and baffle, $10; Dow-Key 110VAC ant. relay, $10; low-pass filter, $10; xtal mike and stand, $20; buy all above for $200 and get free one Meck AM-CW transmitter; 10-80 meters, xtals, self-contained power supply, 40 W.I. gud wkg condx. You pay entire shipping. R. Evans, W2HPN, 395 Madison St., Franklin Square, N.Y. GE 7-2119.

TRADE: Stamp collection U.S./Foreign for ham equipment. WA4RBX, 5300 Grace, Richmond 26, Va.

COLLINS Bargain, perfect 32S-1, with 516F-2 supply: $450.00. K4AEI.

SELL: Hammarlund HQ-110, $140; Heath DX-40, $40. Both are in excint condx. Eric Oberer, KØDKQ/2, 100 Franklin St., Bldg 8, Apt. D14, Morristown, N.J.

WANTED: Antenna Manual by Editors & Engineers. W2IYR, SBE-33 transceiver, dc pwr. supply, New-Tronics Hustler RM-75 and RM-20 mobile ant's, $385. WA6VZI, Rte. 1, Box 494N, Blythe, Calif.

THUNDERBOLT, like-new condx, and new 4-1000A tube. Make offer or will swap. Want: KWM-1, KWM-2, 75S-1, 75S-2, 75S-3, 32S-1, 32S-2, 32S-3, SR150, SR160, SW240, NCX-3, SBE-3 or TR-3 with a power supply. Charles Rick, WØJWD, 3915 Shenandoah, St. Louis, Mo. 63110.

KWS-1 #634, perfect, $750; NC-300, $175; 7094, new, $16.00; Chambers Handbook 813 rig w/300W modulator/driver; Thordarson CHT, $100; Super 12, new, $35.00; MB40SL, $8.00. F.o.b. Northport, L.I., N.Y. Art Ford, W2HAE, 85 Franklin St.

TB500, excint condx. Brand new, never used. Frequency divider sections. Pick-up deal, $35.00. W2ETB.

HAM Radio Counselor, male, for coed camp in the Berkshires, Mass. Able to instruct campers in fundamantals of ham radio. Write to Robert Kinoy, Camp Taconic, 451 West End Avenue, New York 24, N.Y.

STOP! Don't buy, sell, swap until you see the latest interesting offers in Equipment Exchange! 12 big issues. $1.00. Sample copy free. Brand's, Sycamore, Ill.

SACRIFICE! Beautiful homebrew push-pull 810 amplifier (can be used on AM/CW or as a linear). Completely shielded and TVI-suppressed. Modulated by push-pull 813s. Complete with all power supplies. Highest grade components easily worth three times this asking price. Needs about two hours' work to put on air. First $150 takes it. Pick up deal or you pay freight. R. McIntyre, W8WOM, 3137 Mayfield Rd., Cuyahoga Falls, Ohio 44224.

NATIONAL FRR-24 dual diversity receivers and converters, etc. $495; FRR-21 low freq. recvr. $175; SP-600JX17, $425; R-390/URR, 500 kc. 32 mc., $675; CE 200 V, $625; URABA, $195; 51J-3, $675; Boehme Aut. keyer, $125.00; Wheatstone perforator, $175; Drake 2B $199.00; Thor 6 transceiver $295.00. Wanted: Teletype equipment. Alltronics-Howard Co., P. O. Box 19, Boston, Mass. 02101 (RI 2-0048.)

"RADIO Guide & Logbook"—Tune in the World . . ." (1920). Best offer takes. Also 5 de Forest DL5 type amplifiers Isolantite base audion. Jessie York, P. O. Box 130, Downsville, N. Y.

SALE: HX-50 factory wired for 160M, $350.00; HQ180A,r $325.00; both units only two months old; Viking I, extra 4D32 final, 122 VFO, $120.00. Will consider trade for camping trailer. K8TSG, 3829 Grenville Rd. Cleveland, Ohio. 44118. Phone 932-3405

SELL: KWS-1, spare 4X250As, guaranteed perfect condx., $650.00. Factory wired Valiant, in excint condx, $230.00. W2AEV, Ray Jones, 111 Hillside Road, Farmingdale, L. I., N.Y.

SELL: OSTs 1943 through 1957, less 4 copies. $3.00 per year or $40 complete run. IRE Proceedings 1960 through 1963, $20.00 complete. All prices F.o.b. Downers Grove, Ill. W9GJR, 5256 Fairmount Ave., Downers Grove, Ill.

FIELD DAY 50 ft. vertical (use as antenna or support). Use as long-john boom: 10-5-ft. sections, light rigid aluminum, nontapering, 3½" dia. only 1 set guys necessary, tripod base, aluminum stakes, canvas case, new govt. surplus, $50.00 firm. F.o.b. New York. Also 500 cycle filter for 75A4, $30. Ron Lumachi, 73 Bay 26th St., Brooklyn, N.Y.

EXCEPTIONAL Buy. Collins 75S-1 receiver with custom cover. Ser. 10553. Flawless. $335.00. Valiant transmitter, in beautiful condx. Custom cover. $185.00; Gonset 20 meter, Bantam Beam, $15.00. Jack Davis, K6MIV, 675 Sierra Meadow Dr., Sierra Madre, Calif. 213-356-1214.

FOR Sale: Hallicrafters S-108. Just realigned by factory. John R. Ottinger, 814-62nd St., Brooklyn, N.Y. TE 6-7105.

CAMP Counselors wanted with ham rig. Also Science, Electronic Counselor. Roberts, 353 West 56th St., NYC, 212 Circle 6-0052.

HEATH AT-1, $15; 1-177 tube tester with Adapter Kit MX-949A/U, $15; International FCV-2 6-meter converter factory-wired with case, $10; signal generator, $7.50. Super Pro power supply, $5.00; Westinghouse SC current relays, $1.00; Thordarson Automatic transformer T-47175, $2.00: 2-volt 12 amp. fil. transformer $2.50. Will trade any of the above for lens for Exacta Camera. John Bagwell, P.O. Box 15, Somerville, Tenn.

MOBILE and fixed all-band DC KW linear amplifier: w/Adcom transistor P/S; 4CX300s; 110OVAC blower and inverter; zener regulations throughout; finest components. Also 500 mfd. variable vacuum 10 KV. Best offer or swap. Dr. Arcuri, W2KSV, 8 Linden Ave., Pelham, N.Y.

FOR Sale: SX-111 Globe Chief 90A; Vibraplex Original bug, xtals, in gud shape. $160 takes all. K2ECP, Tom Dalton, Box 95, Hackettstown, N.J.

SELLING: Swan SW-240 transceiver AC pwr. supply, Hy-Gain 3-el. Thunderbird beam and 14 AVS vertical. K9QOT, 1110 Willow St., Belvidere, Ill.

FOR Sale: Collins 32V-1, Collins 75A-1, Gonset G-50, excellent condx, $200 each. Vernon Phillips, W7NPV, 523 West Babcock, Bozeman, Montana.

NEW Hallicrafters HT-41, one KW linear, $339, like new; HT-37s, $339. Dummy load specials 50 ohm 10-watt 6 for $2.00 postpaid. Van Sickle, W9KJF, 4131 N. Keystone, Indianapolis, Ind.

KWM-2 in exc. condx. $750; noise blanker, $60; mobile mount, $60.00; 516E1 DC supply, $145.00; Heathkit Sideband mobile twins, $200. W7HCJ, E. 6904 Sprague, Spokane, Washington.

HT-33A Gem. Bay area, converted to 33B, new ceramic final tube, in use. Will not ship, sry. $425. K6QNI, 4975 Grizzly, Berkeley, Calif. 848-2383.

HALLICRAFTERS SX-110 plus matching R-48 speaker. Cost almost $200. In excint condx, less than 1 year old. Will sell for $125.00. Will ship anywhere. Harvey Silberstein, WN2LBW, 49-17 Cloverdale Blvd., Bayside 64, L.I., N.Y.

USN Staff Corps Officers, ACTDU and retired, starting "Worked all Staff Corps" Award, need your QTH. Call, Awards held for substantiation list. WA5GVE, Kennedy, KNSCS, Athens, Ga.

FOR Sale: 150-watt transmitter, single 813, 80-10 meters, plus HT-18 VFO, $75; BC-779 Super Pro revr w/power supply, needs minor work on it, $70: TR-4 rotor, needs calibration, $12.50; DX-35, beautifully wired, with set of spare tubes, $35; Vibroplex Standard bug, $10. Shipping charges additional on all items. Walt Deemer, 450 Edgehill Rd, Ardsley, Penna.

GONEST: G-76 with both AC and DC pwr. supp. Recently factory realigned, all in mint condx; $410.00. Brian Zink, WA6KUM, 1075 E. 8th St., Chico, Calif.

SALE: Central 20A, VFO, Millen amplifier, Central Slicer, Heath Twoer, K2HFL, Arthur Lawler, 507 Colonia Blvd., Colonia, N.J.

SELL: QST all issues 1953 thru 1963, CQ 1956 thru 1961. Make offer each lot. W1BNO, Sandstrom, 590 Mount Elam, Fitchburg, Mass.

SELL: HQ-170C. Vy gud condx, $200. R. H. Bunnell, K2CBG, Branchville, N.J.

RME 6900. $245. Perfect, maintained by perfectionist. Prefer local deal. Will gladly demonstrate. Bob, 57 Gifford, West Hartford, Conn. 233-6763.

WANTED: Good SSB ham gear. Will swap Leica M3, strobe light, Bell & Howell auto-slide projector, B&H 8MM electric eye camera, autoload projector, many extras. What have you? Cash for value difference. G. Budwig, Box 97, Ramona, Calif.

FOR Sale: 75S-3, $550; Central Electronics 20A with matching VFO and QT-1 VOX, $130; DX-100, $100. All above in excint condx. Garry Hanson, 1433 Wildwood Dr., N.E. Cedar Rapids, Iowa.

FOR Sale or trade: Viking Ranger, PTT excint, Johnson Matchbox, excint; Shure 520SL microphone, excint. B. W. SWR Matchmaster, excint. SX-43 Hallicrafters, gud. Cash or will trade for cameras, lenses, darkroom equip., comper trailer. Inquire: Douglas Pitts, Box 248, Matador, Texas.

HW-12, HW-32, $115 each. Phelps, K1UBE, 103 Chambers St., Manchester, Conn.

SELL: SX-88, HA1, HQ-100, Simpson 260, 303, Heathkit IT21, AV2, AG10, PS3, FMO-1, TD1, VC3, RS-1, Radiaphone Panadapter 40M transmitter; Rustrack Model A recorders 19.8 and 18 kc receivers. Phone CR-56802 or write to Box 1975 Beverly Hills, Calif.

CLEGG Interceptor, like new, $300. Perfect Collins 75S-1 with commercially installed Waters Q-Multiplier, $310. G. Vilardi, WA2VTR, Box 257, Tallman, N.Y. Tel.: EL 7-1572.

RANGER II/PTT, ser. No. 1788. In mint condx. The first certified check for $190 gets. Viking of Minneapolis 85ES tape deck: swap for Heath HO-10 oscilloscope or Irving Hiverter or $55. Either item express collect. KØGYZ, 108 San Marco Blvd., Rapid City, So. Dakota.

FOR Quick cash sale: complete station, KWM-2 Serial #11954, with Waters rejection tuning, 312B5 station control, 516F2 AC power supply, PM2 portable power supply, SM2 Collins mike, $995. All in mint condx. Original cartons. Write or phone. WA2EBO, Jack Platt, 244 Hansen Ave., Albany, N.Y. Phone HE-84795.

WANTED: Nazi daggers and short wave equipment for cash or trade. Ham gear. Bayliss, 140-25 Ash Ave., Flushing, N.Y.

"HOSS-TRADER" Ed Moory offers following brand new equipment on a cash & carry no trade basis: New Galaxy 300, $209; Swan SW-240, $265; SB-33, $319; Collins 75S-3, $549; Hunter Bandit, $429; new TH-4 Hy-Gain beam and demo Ham-M rotor, $169. Used bargains: HT-37, $269; 2-B, $189; SX-101-A, $189; KWM-2 in sealed carton, $849; closeout of new SX-115, $399; 75S-1, $295; TR-3, $449; package deal: new KWM-2 and used 30L-1 linear, $1250; SR-160, $249; new Spitfire Kilowat Mobile Linear, $129; Heath Warrior, $179; GSB-101, $165; 20-A, $99; 32S-1, $409; 32S-2, $495; 30L-1, $359. Terms: cash. "Ed" Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

NEW England Hams! New, never used: P&H Linear LA-400C, 800 watts PEP, 400 watts CW, $140; little-used Drake 2B w/calibr. and Q-multipl.-spk. in absolutely mint condx, $230; Multi-Elmac AF-68 w/M-1070 pwr. supp. 6-12-115 volt with mic and cables, in mint condx. $160.00. new, never used Johnson T-R switch, $17.50. Dick Myers, 20 Wyman Rd., Lexington 73, Mass. Tel: VO 2-9031.

HATE To sell these: Viking Valiant for $150.00; SB-10 for $50 (wired to use together); Eric FM car-tuner, $50. Edward Johnson, 486 Wickson St., Oakland, Calif.

SR-150 and PS-150AC, $610; HQ-180C, $290; both immaculate in appearance and in perf. operating condx; both in orig. cartons with all manuals. Joe Reifer, WA2BQB/9, 2305 Sheridan Rd., Evanston, Ill.

RC610-D transmitter, gud condx; 500 watts, best cash offer. W8WKM, James Hunter, 1360 Frebis, Columbus 6, Ohio

Health TX-1, $165. Heath MR-1 and MT-1 with AC pwr. supply and mike, $125.00. K8KVX, 5118 Meadowbrook Dr., Columbus, Ohio.

SALE: Drake 2B, Q-multiplier spkr, xtal calibrator, $225; Heath HX-10 xmttr, $300; Electro-Voice mike 423A, $20; Hallicrafters T.O. keyer, $50; Matching Vibroplex key, $10; Heath SWR bridge, $12.00; Eico 460 'scope, $40; Ham-M rotor and indicator never used, $100; Hy-Gain 402B 40-meter beam, never used, $70. Hy-Gain TH-4 Tribander, never used, $90; Spalding Tower, heavy duty 48 ft., never erected, $100. Manuals for all but the tower. Vic Brodeur, 2211 Montclair St., Augusta, Ga.

WANTED: Commercial, Military, all types, ARC, ARN, ARM, BC, GRC, PRC, TRC, URN, URM, TS, 618S-T, 17L, 51R, others. Ritco, P.O. Box 156, Annandale, Va.

SELL: BC-611F, 3885 Kc walkie-talkie and batteries. Best offer over $20. Roy Schmiesing, Glenwood, Minn. 426 So. Devonshire.

100 WATT 80, 40 meter c.w. xmtr with power supplies, $45; UV 200 operating condx, $2.50; 47 issues of QST, 1936-1940, 1946, '47, 20¢ each for 6 or more, all for $8; Jan. 1922 Wireless Age, first transatlantic results, $1.50; special 1943 Aviation Communications and 1944 Signal Corps Radio News, $1.50 ea. W2CLF, 323 N. Highland, Upper Nyack, N.Y.

CW Audio filters, excellent skirt selectivity, sharp adjustable band pass. Prices start at $6.95. Write for free information. Dept. I, T.W. Holden, 301 West 16 Place, Chicago Heights, Ill.

4CX1000A, final and supply custom-built by Eimac. 3000 watts P.E.P. Supply 0-5000 V 1 amp, all immaculate, see 1957 QST, page 4 and 11 November issue. For sale in shack. Demonstrated. W1CPI, Wakefield, R.I. ST 3-5935, 3-3867.

WANTED: PP-109/GR, 12 VDC power supply and connecting cable or plugs for RT-68/GRC. State price and condition or will swap. T. H. Scamardo, 312 Trant, Bryan, Texas.

COLLINS KWM-2 (ser. No. 11835) for sale, with complete mobile installation, including noise blanker, MP-1 mobile power supply, 351D-2 mount, mike, speaker and five (5) New-Tronics antennas and mount. All purchased new in June of 1962 and used very little since; looks and works like-new. Best offer over $1,050. K6DUL, 2758 Forrester Dr., Los Angeles, Calif. 90064. Phone VErmont 8-9302.

HW-12 SSB transceiver, HR-10A xtal calibrator, HP-23 AC supply, factory aligned, all three, $150. Hy-Gain 20 meter Mono-Bander plus AR-22 rotor, $45.00; Johnson 250-23-1 Matchbox, $32. Johnson 250-20 low-pass filter, $7.50; Calrad dynamic mike, DM-11, w/stand, $7.50; Mastercrafters 7112 clock-timer, $6.50; RTTY-15 printer with table, $90. Want to buy: Strip chart recorder similar to Minneapolis-Honeywell/Brown. Give price, model and condx. Albert Weiss, W6UGA, 2370 Knob Hill, Riverside, Calfi.

SELL: Drake 2-A with 2-AQ speaker/Q-multiplier, xtal calibrator, extra xtals; in excint condx: $190.00. WA8DPY, 11760 Auburn Rd., Chardon, Ohio.

FOR Sale in the New York City area: All in mint condx: Collins 75A4, serial No. 3645, vernier dial, matching spkr, $550; Central Electronics 20A with VFO 160 thru 10 meters, $200.00; Johnson Ranger, factory wired, $150.00; Hallicrafters SP44 Panadaptor, $35.00; Drake 1A w/xtal calibr., $100.00; beautiful efficient homebrew final, pair 811As for 500 watts SSB or 350 watts CW/AM including pwr. supply and modulator, $150. All prices firm, local sale only. K2LGS. Auguste Schwab, Jr., 560 Woodmere Blvd., Woodmere, L.I., N.Y. Tel: 516-FR4-9470.

MISCELLANEOUS: Plate transormer, 4800 VCT, 1 amp. 115/230, $20.00; 2 mfd. 12.5 KV, 0.65 mfd 12.5 KV, $4.50 each; shipping collect, but prefer pickup deal. Strip heaters, 500, 750, 1000 watts: 826, 3C24, 815, 807W/5933, 2.5 VCT 10 amp. $3.00 each PPD. 807W/5933 (used), $1; 866A, 837, 5R4GY, 2/$3; 2C44, 316A, $0.50; WE417A/5842, $1.75; 832A, $4.50; 1616, $1; Willard 2v. 20 amp-hr $4 PPD. Samuel M. Bases, 19 Standish Ave., Yonkers, N.Y.

BRAND New! 4 months old NC-190, in original carton, $135.00. Also AT-1, 80-10 CW xmtr, $20. WB2DRE.

SX101A with deluxe knobs and spkr, HT32A, HT)B, less PL 172. All in mint condx, first $1000 takes them. Want: Crank-up tower, beam rotor, etc. W2WCO, 9 Poplar Place, Fanwood, N.J.

JOHNSON Viking Pacemaker, $199.50; Ranger $149.50; Johnson Viking kilowatt, desk model, $850.50. Phil Rand, P.O. Box 28, Redding Ridge, Conn.

MOSLEY CM1 receiver, new, a real bargain: $130. K6LJA, 1009 Riveriane, Santa Ana, Calif.

CERTIFICATE will be issued by Henry Ford Museum to any station that works Motor City Radio Club station W8MRM during the 24 hours prior to the Old Timers' Night banquet and program. Work W8MRM on May 30 (GMT) on 1.815, 3.660, 3.877, 7.040, 7.172, 7.215, 14.060, 14.230, 29.610, 50.178, 146.94 or 147.3 Mc. QSL for certificate. Stan Briggs, W8MPD, Sec'y. Motor City Radio Club, 1885 Pinetree Rd., Trenton, Mich. 48183.

SELL: Panel mounted power supplies; 14 mcs. converted Command transmitter; New 30 watt Varimatch modulation transformer; filament transformers: 28 VDC Command dynamotors; Crystals, panel meters. Send stamped addressed envelope for information. Roberts, W1KUK, 49 Daniel Rd., West Haven, Conn. 06516

$200 Takes my B&W 5100B, 51SB-B, in gud working condx and currently on the air. Roy, K6DUE, Woodland Hills, Calif. Phone 347-8586.

GOING Transceive, sell: 20A VFO QT-1, $125.00: HT-33, new 4CX300's, $275. Will sked. KØELU, Rte. 4, McCook, Nebr. 69001.

WANTED: Tech Manual for Navy "MBF" transceiver. W3LTH, 130 Lindenvale Dr., McMurray, Penna.

TRADE: Foreign RR engine. Pix for radio parts. State your needs. W2VP, Milton, N.Y. 12547.

2 EA. 4E27s, $4.00 ea; 2 each 4X150As, w/Johnson sockets, $6 ea; 4 each 811s, $1 ea; 2 each 4D21s (4-125s), $8.00; 5V, 16A xfrmr, $4. W4ZOP/2, 20 Ash Drive, Neptune, N.J.

G-76 AC pwr. supply wanted. No junk, pls! Write WA6BEY, 1181 Bryant Rd., Long Beach, Calif.

VALIANT Trans. and SX-101 MK-111, priced for a quick sale. Must have cash for school. In mint condx. $225.00 00EA. Both together, $425.00. K1YDW, c/o WA2ØHN, 516-PY-1-4783 after 8 PM or write QTH.

FOR Sale: SX-115 receiver, $350.00 cash. Call 609-494-2518. W2FWY, Erich Schmidt, 13th & Blvd., Ship Bottom, N.J.

FOR Sale: Elmac PMR7 receiver, $55; AF67 xmtr with T-R switch, $50; M 1070 AC/DC power supply, $30; RME 23 DB Preselector, $20. All equipment is in gud working condx. W9-FYX, Lenard G. Mumm, 3039 N. 73 rd St., Milwaukee, Wisconsin 53210.

FOR Sale: Heathkit Pawnee, $200; Hallicrafters SX-100 and spkr, $145.00; Johnson 6N2 converter, $35; Eico 730K modulator, $45; Heathkit, Twoer, $35; 2-meter vertical, $10; Dow-Key coax relay 6U or 110VAC, $7 ea. W6UZK, David Maxwell, 1939 Rock St. No. 11. Mountain View, Calif. Tel: 415-961-5863.

2 EA. 4E27s, $4.00 ea; 2 each 4X150As, w/Johnson sockets, $6 ea; 4 each 811s, $1 ea; 2 each 4D21s (4-125s), $8.00; 5V, 16A xfrmr, $4. W4ZOP/2, 20 Ash Drive, Neptune, N.J.

BEAUTIFUL! Sacrifice my 1963 Impala 2-door sport equipped w/Swan 240, supply, 3-band Webster topsider. Located San Diego, K2IQI/6, USS Summit Country LST-1146, EPO, San Francisco.

COLLINS 75-A2, speaker, calibrator, excellent. $250. W1BGW, 28 New Haven St., West Roxbury, Mass.

G-76 with AC/PS, $200; Super Six converter, $15; VF1, $8; modulator, pwr. supplies, 40-meter Command xmtr. Giveaway prices. W8DRV, 7761 Big Creek, Cleveland, Ohio 44130.

BUY, Sell or trade ham gear. Send for free copy of Ham Equipment Directory. Lupi, 1225 Hillside Pl., North Bergen, N.J.

SELL Or trade four 50-ft plywood masts complete with bases, guywires, erection boom. In 10-ft. sections, used only for Field Day. In excint condx, $120.00 or trade. Gene Hubbell, W9ERU, Box 350. RR #4, Rockford, Ill.

MOBILE Twins: G-77 and G-66, in excint condx, power supplies, spkr, cables, aluminum mounting frame, remote control switch, mike receptacle foot-switch, manuals. F.O.B. Cleveland, $300. W8GAS, 2231 Taylor Road, Cleveland, Ohio 44112.

HQ-129-X, clean, 21 Mc. bandspread dial, matching spkr, manual, $110; Heath O-11 'scope, manual, $60; coax relay, external switch, $10; KW LP filter, $4; two RCA 813s $7 each. Two 10 mfd. 2000 volt capacitors, $4 each. 10 amp. autotransformer, 95-135 volts, $6; 1250 volt, 300 mil. supply, $25. Cash and carry. George Rulffs, W2CJY, 38 Brookwold Drive, Mannasset, L.I., N.Y. 516 MA 7-0407.

COMPLETE Instructograph equipped with audio oscillator, headphones, telegraph key, ten tapes and instruction book. Costs $61. Will sell for $30. WN4OAO, 1218 N.W. 18th St., Ft. Lauderdale, Fla.

FOR Sale: Bandswitching 10-80, 500 watt c.w. rig, VFO, W/pwr. supplies, 3 ft. rack, 813 final, pick-up deal only: $125.00. RME 4350, DB20, 15 Mc. Preselector, $145.00; two new Eimac 4-400A tubes, $22.50 each; mtd. balun coils, $5.00; QST's June 1953 through Dec. 1962. Make offer, all F.o.b. W7DJU, 3208 Plymouth Dr., Bellingham, Wash.

RANGER II, Superior condx, $275. WB6AJH WB6AHJ, 5782 Ludlow, Garden Grove, Calif.

MOHAWK Receiver guaranteed in mint condition. Assembled and checked by engineer. Used only eight hours: $250. C. W. Read, W9LUS, 3821 W. State St., Ft. Wayne, Ind.

SELL: NC-183 with matching spkr. In excint condx. Original instruction book: $145. WA5EWT, 11921 Knippwood Lane, Houston, Texas 77024.

SWAP: Color slide photography equipment for 6-meter ham gear. WAØAXB, 223 Spruce St., Owatonna, Minn.

SELL Or trade DX-60, $55. Wanted SSB adapter. WA4ACZ, 1214 Edgedale, Salisbury, N.C.

HALLICRAFTERS SX-110 receiver with R-48 speaker, $110. In excint condx. Carl Schneeberger, 3361 S. Wabash, Chicago 16, Ill. Tel. DA 6-9750.

SELL: Vesto 61-ft. tower, new condx, never erected, complete with crankover head, mast clamp, thrust-bearing, motor plate, wooden platform. $495.00. F.o.b. Save $144.50. W3LOS, 138 Chautauqua Blvd., Erie, Penna.

SALE: HQ-110, $120.00; Millen Novice 75W, $30; Prop pitch motor, $20; modulator 30W, $20; cabinet, $10. Tower 60 ft. Will divide 20 ft. sections. Stainless G-90 on ground. For price write: W3JGW, Richard Kerlin, 635 Lenaer Rd., Harrisburg, Penna.

STILL Have for sale NC-300 with 6 and 2 meter converters, calibrator and speaker orig. mint condx, only $210. (Local deal only). Also B&W TR switch, $12.00: 1000 Kc. xtals, $1.50; Tubes: 832As, $4.00. Help me clean up. Write: Samkofsky at 201 Eastern Parkway, Brooklyn 38, N.Y.

SELL: Globe Champ 300 watt transmitter; Bendix compass receiver with loop and accessories: 80-meter transceiver with portable generator. Oscilloscope, rack cabinet and 6 volt/400 volt dynamotor. Will sell all for $300. Write K2UBF or phone ROchester LO-2-3226.

VIKING 500, excint condx, $395: Tektronix 315D 'scope, just calibrated, $100; new tubes (4) Eimac 4-65A, $7.50 each; (6) RCA 7094, $10 each; new transformers (2) 110/220 primary 2Kc 400 ma. secondary, $25.00 each. All prices f.o.b. Dick North, WA6EEJ, 18253 Swarthmore Drive, Saratoga, Calif.

WANTED: Heath Warrior Linear. Sell ART-13 for $39. W1ONW, Salem, Mass.

GOING Sideband: DX-100B, neut. final, w/spare final and mod. tubes, Drake low-pass, $153; HR-10 rcvr. 10-80m, w/xtal calibr. spkr: DX-60, w/HG-10 VFO, Johnson low-pass, $100: HX-11 50w. c.w. xmtr, input for xtal, VFO, mod. $30; GR-91 rcvr, 550 Kc-30 Mc, w/spkr, phones, ant. $35. Mark II surplus w/dynamotor, spare tubes, cables, $39. Don Kane, WB2BEZ, 241-12th St. West Babylon, N.Y. 11704.

WANTED: SRT-14 unit one, incl. xtal, oven and chassis, complete. Condition? S. J. Main, 1415 Hwy. 2, Grand Rapids, Minnesota.

GONSET Mobile Twins G66B with 12 VDC/110 VAC power supply; G77 with 12 VDC power supply, in excint condx. Wanted: Central Electronic sleer "A" or "B". W8ENZ, 5295 West Michigan Ave. Ypsilanti, Michigan. 48197.

SELL: Collins 75S-1. Purchased new, used only 3 months. $415.00. Lt. Huffman, K8WUM/6, Mather AFB, Calif. 363-7763.

SELL: Home brew receiver, ARRL design, plus combination, rcvr-xmtr, pwr. supply, $85. Write for more information. Charles Cronn, Scranton, Kans.

MARAUDER and Drake 2B, $500 or best offer. Deliver 75 Miles. K9KQN, 825 Munroe, Racine, Wis.

FREE! Blue Book listings mailed on request. Our used equipment discounts lead the field. Two week trial, 90-day guarantee, nothing down, up to 24 months to pay. Full trade-in value toward new equipment during guarantee period. You cannot beat our deal. World Radio Labs, Box 919, Council Bluffs, Iowa.

SAMCO—Radio Amateur's "Sampler Instruction Kit", 25¢. For creating QSL cards. Samco, Box 203H, Wynantskill, N.Y. 12198.

RANGER I with push-to-talk, $120; RDZ rcvr 200 to 400 Mc., $35; BC779 with internal power supply, $95; Viking 6 and 2 converter 14 to 18 output, $40; CW-3 fixed frequency receiver, $20; Communicator II, 6 volt, Communicator II, 12-volt. Will ship any way except truck. You pay costs. James W. Stuckey, W5ZJO, 10865 White Oak, Baton Rouge, La., 70815.

SALE: New Model 250-23-3 Johnson Matchbox, WA8IGO, Rt. #4, Marshall, Mich.

WANTED: Must be in like-new condx and unmodified: TN-16, TN-17, TN-18, TN-19, TN54B, APR-4 tuning units, R-595/ARR-7AX rcvr, R-44/ARR-5 rcvr: IP-148/APA-11A indicator; ID 59/APA-11 indicator; AT-38/APR-4 antenna. W5QMI, 9310 Beck Ave., Dallas 28, Texas.

HQ-129-X with matching spkr, $85; Heath VFO, $15; Hammarlund clock, $5; HQ-100, $95: Eico 730 modulator, $55. All in excint condx. K7QAK, 3543 West Hazelwood, Phoenix, Ariz.

HEATHKIT DX-60, gud condx, less than one year old: $65.00; HG-10 VFO, $30. Richard Bourgeois, P.O. Box 2746, Lafayette, La.

COLLINS 75A4, 75A2 and 32V3. In gud condx. Reasonable offer or trade on Nikon F and accessories. W6MUG, 14735 Wyrick Ave., San Jose, Calif. 95124.

ORGAN Poor. Need Zeus. Trade Thomas K. chord organ or H2 Thomas concert organ. WAØBPC, Bill Stevens, Butler, Mo.

TELREX Triband beam, model TC-99C, with balun in factory condition. Used six months. Catalogue price: $199.99. Will sell for $100. W1MZB.

WANTED: Cosmophone. Dave Bell, 1088 Rubio, Altadena, Calif.

VALIANT I factory-wired: $245.00; Globe Scout 680A, $50.00; HQ-110, $150; 60-ft. Air Force twist-lock tower and guys, $55. C. Lachterman, 3 Archer Ln. Scarsdale, N.Y. Tel: SC 3-7641.

WANTED: Cabinet for BC-348 rcvr. B&W 852 inductor. Fred Kost, W3HPO, 431 Flamingo St., Philly, Penna. 19128.

HALLICRAFTERS SR-150 and AC power supply, $525; Hunter Bandit 2000A linear, $400; both about 8 months old, look and operate like new, $900 for the pair. KØZBQ, Richard Schark, Rte 2, Ottumwa, Iowa.

SWAN: SW-175 transceiver, Heath HP-20 AC power supply. Never used mobile. Both for $168. K6AY, 2819 Park Blvd., Oakland, Calif. Tel: 415-452-3466.

PRINTED Circuit boards. Hams, experimenters. Catalog 10¢ P/M Electronics, Box 6288, Seattle, Washington. 98188.

EICO 430 'scope, new, $60. Sorry, delivery L.I.-NYC area only. WA2UTI, P.O. Box 216, Yaphank, L.I., N.Y. Tel: 516-YA-4-6262, ext. 2324.

SALE: DX-100, $160; NC-270 rcvr, $160. K8ROI, 9150 E. Coldwater Rd., Davison, Mich. Geo. Hall, Jr.

FOR Sale: Johnson Valiant xmtr. Guaranteed as gud as new: $250. WØTTX, 629 Mo. Lawrence, Kans.

FOR Sale: G-50, $215; SX-110, $100. Both in A-1 condx with cartons and manuals. F.o.b. Miami, Fla. W4IIS.

VIKING II, VFO, Dow-Key relay, mike, $150. William Pedersen, K2LYI, 335 Milton Rd., Rye, N.Y.

FOR Sale: SX-117, excellent condition,—$275; HA-10—$15; Factory wired Ranger,—$140; 275 watt Matchbox with SWR—$50; PS-150-120 power supply, unused,—$75; Ameco PCL preamp—$15. Lower offers considered. Art Champagne, WA1BFK, 24 Northview Dr., South Windsor, Conn. 06074

FOR Sale: Prop pitch, like new, selsyn and p/s control box. Call 828-4271, K1MTM.

TA-33 Sr, AR-22, in excint condx. Both $75. Richard Samuels, WA2NHM, 17 Country Village Lane, New Hyde Park, L.I., N.Y. Tel: HU-8-2128.

HQ-100C, $80; SX-28, $40; Johnson 250 watt Matchbox w/SWR bridge, $45; Gonset 20-meter bow-tie beam and TR-4 rotator, $25. W2FGK, 26 Alpine Lane, Hicksville, L.I., N.Y. Tel 516-WE-1-5663.

HEATH HR-10 ham-band receiver, in gud condx. $60. Myron Adams, 3 Ames St., Cambridge, Mass. 02139.

SELL: Absolutely perfect 75A2, #2707, spinner knob and matching spkr, $495.00. Viking Valiant, factory checked, spotless, $225.00. QSTs December 1931 through December 1963 and 18 binders. Make offer. WØRAK, 623 N. 5th. St. Peter, Minn.

SWAP New DB23 Preselector for older model general coverage receiver. W3HTF, 506 Dreshertown Rd., Ft. Washington, Penna.

ELMAC Mobile AF-67, $75; PMR6A rcvr, $65; 12V p/s, mtg., brackets, all for $120. Charles Kunde, 5770 Gary Rd., Roselle, Ill.

SELL: Like new condx, new 75A1, $200; HT-32, $300. WØFDY, 1112 Laurel, Garden City, Kansas.

SALE: Heathkit Shawnee and Pawnee, in excint condx. Sacrifice for $150 each or $275.00 for both of them. WA4AEB.

SELL: HT-37 w/D-104 mike, Drake 2A w/2AQ and 2AC in mint condx, best offer. K4BCP, Ken Wyatt Northway Drive, Rte. 4, Taylors, South Carolina.

WANTED: 32S1 and 516F2. K3VPH. Tel 814-2381940.

CLEANING Out shack: Triplett VOM/VTVM 631; Triplett transistor tester 690A; Millen supply 248; Eico 'scope 425; Precision scope ES-520; Simpson VOM 270 Gonset supply 3098 12V Transcon Vox Box H-308, Cornell-Dublier capacitor tester; Geloso tape-recorder 6-255-SP. All above in gud condx. Best offer or $225 for the lot. W1USP, Kamborian, Duckhill Road, Duxbury, Mass.

SELL: QSTS, Jan. 1937-Jan. 1960 complete including 13 bound volumes. Radio, Jan. 1936-Mar. 1942, complete; CQ, Dec. 1946-Jan. 1960, complete including bound volumes. 18 amateurs Handbooks, 1934-1959. New Heath Comanche w/manual, $90; AT-1, $20; Gonset 10-11 meter converter, $15; BC-221-T1 w/110V supply, $40 RCP 308 tube-tester, $8. Lysco 600 w/modulator, $70. RCA 6V-PB car radio, $10; Radio Shack CBK-1, $15, K3LZD, 413 Bliss Dr., Pittsburgh 36, Penna.

METER Protector. Will give positive and permanent protection to the meter of volt ohm meter, no more bent pointers, or burnt out movements from accidental overloads; protects meter from severe overloads: will not affect accuracy of volt ohm meter. Will protect any meter 20,000 ohms per volt or less, 100,000 ohms per volt model available if you specify. Install yourself in 5 minutes. $2.98 PPD, James Fiorino, W9WCN, 8 W. Main St., Du Quoin, Ill.

HAMMARLUND HQ-180, late model, serial # 03580, in original carton. Electrically and mechanically perfect. In new condx, $340.00. Ted Biczak, 13-15th Ave., East Paterson, N.J.

"TRADE-INS", Late 1963 models: Hammarlund HQ-100A, $149.50; HQ-110A, $195.00; HQ-145X, $225.00; HQ-170C, $235.; HQ-170AC, $29.00; HQ-180A, $345.00; HX-50 transmitter, $350.00; National NC-77X, $59.50; NC-121, $110.00; NC-155, $139.00; NC-190, $165.00; NCX-3 transceiver with AC-PS, $385.00. Limited stock. No trades. Satisfaction guaranteed. Slep Electronics, Drawer 178Q, Ellenton, Fla. Phone 722-1843.

SSB Transceiver, Heath HW-12, $99.00; Measurements Corp.; Signal Generator 2 to 400 megacycles (military model) $150.00; Precision E-200 Signal Generator $35.00; BC-221 with calibr. book in metal cabinet with regulated power supply, $55.00; Heath 0-6 5" 'scope, $20.00; antique Bell & Howell "Filmo" 16 mm projector, $20.00. Want gud GDO, #15 teleprinter. Prefer deals within 100 miles of NYC personal contact. W2CFT.

HAMMARLUND SP-600JX21, $400; tubes, never used: 4-1000A, $50; 4-400A, $20; 4-250A, $20. Albert Kubicek, W5DHB, P.O. Box 183, Prague, Okla.

CENTRAL Electronics: 100V for sale, gud condx, on the air, $435.00. Pick-up deal only. 7 new 826Gs, one new 4D32, 1 gud used 4D32. Make offer for tubes. W1OAK, 28 Batt Lane, East Haven, Conn. 467-5948.

VIKING Ranger F/W, in excint condx: $120.00; Matchbox 275 watt with SWR Bridge, $35.00; Hy-Gain 10-80 meters, trap vertical (18AV) antenna, $30.00 K9AXM, 932 W. Circle Dr., New Haven, Indiana 46774

COLLINS 75A4 with Vernier Knob in like-new condx: $450. Luther Lester, W5MIR, 3347 East Virgin St., Tulsa, Okla.

HEATH Apache, like new condx, new output tubes: $175.00; RCA AR88 rcvr gud condx, $175.00. F.o.b. Blair, Wisconsin. W9KSH.

SELL: Factory-wired Eico 720 and 730 both for $90. KØEFU, 4142 Columbia St., Des Moines, Iowa.

HT-37 Clean, works FB. $265.00; KW linear, pr. 813s gnd grid vaccum variable B&W 850A Cardwell 1500 loading blower. Pwr. supply complete except for plate xfrmr. With 3 ft rack cabinet. Bargain at $100. F.o.b. Miami, Fla. K4SCT, 1340 N.W. 190 St. Tel: 6216844.

FOR Sale: Heath single sideband station. HX-20 transmitter, HR-20 receiver, in excint condx, professionally wired, both for $250.00. D. Baird, K4VMA, 1408 Harvard Dr., Cocoa, Fla.

WANTED: Late model KWS-1 in gud condx. State serial number and if PA has test key knob on front panel. R. Bush, K2SWT, Little Valley, N.Y. 938-2721.

LOCAL Sale: QSTs 1930 to date. Will accept almost any offer. Tube-tester, Hickok, Model 539 A, in excint condx, $100.00. Call Mrs. Aherne, FL 3-9779, College Point, L.I., N.Y.

75A2 for sale. Also Hallicrafters S-108 rcvr and Globe Scout DeLuxe xmtr. Best offer. Going to college. Alan Kiecker, KØJFV, 112 Seventh St., N.W., Rochester, Minn.

TBS-50-D transmitter/Supply, $35; S-41G, $16; Magnecorder, $85; Pentron, $55.00. Used tape 7" reels, 60¢. Priced F.o.b. W9WFT, 2029 Bradley, Chicago, Ill.

WANT Talk with Hamilton College Alumnus Greater NYC. W2ICW, JI2 FL 7-7146.

KNIGHT T-150A xmtr, 150 watts AM-CW 80-6 with VFO and mike, used less than 10 hours. Best offer over $110. Bruce Sawyer, 625 Chinoe Rd., Lexington, Ky.

FOR Sale: RME 4350 and speaker with manual. W5ONQ.

SELL: Heath SSB rig, wired and tested, HR-20, HX-20, HP-20, AK-7, $325. K8GSP, 3418 Wetmore, Everett, Washington.

COLLINS 51S-1 receiver, $1150; Hunter Bandit 2000A, $350, both in gud condx. Collins VFO, new, $39. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

PE-101C dynamotors, input 12V, output 200 Ma. 13 lbs., $12.95. Bedford Electric Supply, Box 16, Bedford, Mass. 01730.

SELL: Johnson Pacemaker, in excint condx: $200 or your best offer. Will he willing to ship. W5KWH, 8701 Marble Drive, El Paso, Texas.

SELL Gonset Super 12—$20; 2e26 hb 20 watt mobile rig with 625 dynamotor ps—$15; Astatic 10M5a mobile mike—$10; All wking fb. Contact Bill Hornsby WA5ALI P.O. Box 3332. Lafayette, La.

FOR Sale: Test equipment. Latest Heathkit Models IM-13 VTM and IT-11 capacitor checker. Professionally wired, tested and calibrated. Unused. Both for $65. Separately, VTVM $35.00 and checker, $32. Postpaid. Oliver Zucco, Canaan, Conn.

1500 Turn litz-wound coils for NAA very long wave receiver, copy big naval stations for fine code practice. With schematic $3.50 PP. K8SNB, 326 Park End, Dayton 15, Ohio.

FOR Sale: 75A4, spotless condx, 3.1 filter, serial 449, $485.00; National, NC-183 D rcvr serial 475, 0449, $200; Eldico CW xmtr gud Novice rig, $35.00. All prices F.o.b. Will ship. All inquiries ans'd. K9ZWI, L. E. Krafft, 10 Gromer Rd., Elgin, Ill.

SELL: Heath "Tenner", 6 and 12-volt Vibrator supplies, 6-volt battery charger. Leon Steiberger, W2EVV, 55 Lenox Rd., Brooklyn, N.Y. Tel: BU-2-4737.

TRANSCEIVER, Heath 20 meter SSB, with AC supply, calibrator, $165. Used three months. Must sell. SX-71, good condition, with Q-multiplier, $89 Harry Partin, 5555 Blackstone, Chicago.

HT-37, perf. condx, $330.00; HQ-129X with spkr and Q-multiplier, $110. WA2WGU, 1122 Martine Ave., Plainfield, N.J. 201-755-6746.

WANTED: Manual and schematic for Navy Oct-2 Monitor equipment. Buy or I have manuals to trade. W4NZY, 119 N. Birchwool Ave., Louisville, Kentucky, 40206.

QSTS: 1947 through 1963 solid run. Best offer over $20. F.o.b. W1SGT, 203 Heath St., Brookline, Mass.

DX-100, $100; SX-140, $100. Both for $180. Or your best offer! Write for complete info. Don Marshall, WA5CTL, Box 262, San Augustine, Texas.

HEATHKIT Cheyenne-Comanche mobile combination with mobile and 110 VAC power supplies, mike, speaker, brackets and cables, gud condx, makes versatile mobile, portable, compact home station, $140. Seneca transmitter, nearly new, in excint condx, $140. Sixer with mobile supply and mike, excint condx, $40.00. K9KTL, 3514 N. Riley, Indianapolis 46218.

SELLING Out: G-50, $325.00; Comm IV-6, $375.00; Galaxy 300, $250; Adcom 350-12 $99.50. All new condx. Write for list. Al Kreissig, Box 852, Richardson, Texas.

BRAND New never used Hammarlund HQ-170-C with clock, $250.00; Elmac AF67 with AC power supply, $50 or trade. Magnecord M30 ½ track Hi-Fi tape recorder, $75. Originally cost $225.00, or trade comparable value. Will ship any above. Sam Ellner, W2TC, 54 Highwood Rd., Oyster Bay, L.I., N.Y. Tel: 516-WA2-6163.

SELL: DX-40, exclnt condx, $35.00; TA-40K, new, never opened: $25.00. K1PAD, 396 1-2 Willetts Ave., Waterford, Conn.

GONSET G-50, CDR rotor, Tel-Rex 6M beam. All for $295 or sold separately. Axelrod, 1289 Comm. Ave., Allston, Mass.

COLLINS KWM-2 and PM-2 portable AC pwr. supply: $850.00 and 30L-1, $400. All in A-1 condx, W9ATU, 1206 Fremont, Belleville, Ill.

WANT: HT-32 cabinet (or matching) also Techtronic 'scope. Prefer dual trace. Swap or sell Heath O-10 'scope, $55.00. Precision signal generator, $20. AR-22 rotator, $17.00. W7RTP, Goodyear, Arizona. 133 Las Flores.

LATEST Model 32S-1, $460; 516F2, $80; SX-117, $275.00; TF Keyer incl. Vibro-Keyer, $70; 10-O with stand, $18.00. All the above equipment is in mint condx. KØPFW, 4514 Waveland Ct., Des Moines, Iowa.

305 Photofacts (208 new) to No. 539, best offer or will trade for VHF gear or? Also CRT checkers, 1P-10 isolation xfrmr. WA6NAT, 1181 Quarry, Placerville, Calif. 95667.

COLLINS 75S1 and 32S1 with power supply. Also microphone and boom, and Micro-Match SWR meter. For best package offer, I will include a new low-pass filter and "bug". All equipment in exclnt condx. Roger Cramer, WA2SLZ, 228 Roberts Ave., Yonkers, N.Y.

VIKING II, SB-10/PS, VF-1, all: $225.00 PR 807's, mod. 6l6s, $75; S-40A, $40; 813/811 mod/PS, $99; 83 linear/PS. $90; Cheyenne, $60. Write for info. Al Foskett, K1NTR, 800 Wolf Hill Rd., Cheshire, Conn.

COLLINS 75A3 rcvr, perfect, $275; Heath Marauder HX-10 transmitter, professionally wired, perfect: $285. D. M. Burns, 1663 Meriline Ave., Dayton, Ohio 45410. Tel: 256-0345.

COLLINS KWS-1 transmitter S/N 969, new final tubes 7580, updated at factory 2 years ago; $750. Collins 75A-4 receiver S/N 3673 3.1 filter reduction knob, $450.00. Drake 2-B receiver with 2-AQ and one low frequency band added 2900 to 3500 KC like new, used less than 200 hours: $220. HT-37 transmitter S/N 337000-130060, like new condx: $275. W9FAA. Phone 7255407 Cassville, Wis. 53806.

COLLINS 75S-1, $295; 32S-1, $395; 516F-2, $75; console, $125. Cables free if sold as a unit. R. Churchill, K5PKK, 2012 Atlantic St., Dallas, Texas.

6M Eleven lement Telrex beam, AP22, $50. WA2FSD, Martin Siegel, 11 Burbury Lane, Great Neck, L.I., N.Y. 516-482-1857.

FOR Sale or Trade Collins 310B-3 VFO/xmtr 15W output and Johnson Courier 500W amplifier. Want Valiant and 20.000 ohms per volt VOM. C. Malinowski, 29 Main, So. Deerfield, Mass.

NEED Cash. Sell: Viking Invader 200 SSB xmtr, latest model, perfect, only three months old. $425.00. W2HFM, 60 Lindgren, Merrick, N.Y.

1 KW CW transmitter; bandswitching 80-10 M, remote VFO, 4-400A pi-network final, variacs in plate and filament supplies, 7 matched meters, well shielded. In 6 ft. rack but will fit in 31½" rack except for plate supply. Modernly designed and beautifully constructed. Will deliver within 100 miles for $250. Also Technical Radio LRR-6 receiver, $49; pr new 100THs, $9; new 4-400A, $15. K60KY. 860 Clark St., Riverside, Cal. Phone OV 4-2486.

WANTED: McCoy 48B1 xtal filter with carrier xtals; Triad TY-84; AF-67 and PMR-7A, new or mint only. Lowest bid gets cash. W7ZFB, 301 Burgwyn, Montgomery, Ala.

CHRISTIAN Ham Fellowship (non-profit, undenominational). Write for details on new Fellowship Organization, Christian Ham Callbook, also gospel tracts for ham "Your Best Contact". Write Harry Wieskamp, WA8CFH, 96 East 21st St., Holland, Mich.

TRADE: Sell DX-40, $40; Lincoln 6 meter, $30. Watcha Got? WA9FJG.

MOHWAK Receiver and RCA SRT-301 tape recorder. Both in xclnt condx. Make reasonable offer. WA2RKW, 1320 Abington Place, No. Tonowanda, N.Y.

DX-100 w/manual, Mk III loading change, spotting button and access hatch, $125; Harvey-Wells TBS-50D deluxe (80-2 Mtrs) w/manual, Bandmaster VFO, APS-50, P-S, coaxial relay and mike, $75. Receiver, 1500-18,000 kcs, BC-312M (ac) w/manual, $55; Heath QF-1 Q-multiplier w/manual, $8. G&G Radio Supply NYC, AC-DC pack for "Q-5er", wired, $8. K1SAU, Lowell, Mass. Phone 454-0746.

RECEIVER: RME 6900, S/N. Tops for SSB; CW, AM. For details write to Clayton, 2670 W. 25th, Cleveland 13, Ohio.

COLLINS KWM-2, #11466, 30L-1, #10816, PM-2 power supply, 312 B-4 station control, Shure 51 mike, all like-new condx, with E-Z Way Satellite Sixty tower, Ham-M rotor, Skylane 40-M quad with connecting cables: $1750. Price firm. R. Ream, WA4FTZ, 1338 Avon Ave., SW. Atlanta 10, Ga.

SELL: HQ-129X with Johnson xtal calibrator installed and with speaker and manuals: $85. Express collect. WA2JEM, Box 3, Montauk, N.Y.

FOR Sale: Collins transmitter 30D-1, $375; C-E multi-phase analyzer, $60; GR impedance bridge, #650A, $100: GR counting rate meter, #1500B, $75: Mosley portable antenna 10-15-20 w/SWR bridge, model TT-31, $60. R. C. Littler, 640 Snowhill Blvd., Springfield, Ohio, Tel: 513-322-8722.

FOR Sale: KWM-2 with noise-blanker. Waters filter, 110VAC and 12VDC supplies. 60% off list, one owner. Vy little use, logs available. K1YIK.

SB-33, in mint condition w/mobile power inverter; SR-90D mic; Hustler antenna w/40-20-15 resonator. Complete mobile and fixed station. College expenses force sale for $350. K1ZGJ, 327 Boston Post Rd., Weston, Mass.

COLLINS 75A4, ser. 3519, two filters; large vernier ratio dial, in mint condx, $420.00. L. B. Cox, W7ACD, Cottonwood, Ariz.

FOR Sale: HQ-110C, $129; AF-67, $60; Cheyenne, Comanche, transistor supply, cables and accessories, $130.00 F.o.b. Denver. WØEIE, 10474 Franklin Way, Denver, Colo. 80233. Phone 303-466-5632.

SSB Mobile; Heath HW-12 transceiver; HP-13 DC supply; HP-23 AC supply; Hustler mast and resonator, $195. Complete. W3BFM. Tel: 215-723-5356.

SELL: RME 6900 rcvr, $190; BC-221-Q freq. meter w/Buk, $50; Collins F455F31 mech. filter, w/complete specs 20DB xtal and 1N40, $30. All exc. condx. F.o.b. W3VXE.

TRANSCEIVER: National NCX-3 and matching AC p/s, mint condx, shipped in original cartons. $275, p/s $75. Darrell Goodrich, 1924 East 1st St., Lubbock, Texas.

COLLINS KWM-1 SSB/CW transceiver, noise-blanker, AC/PS. Mint, $385. W9OZY, 207 Rush, Roselle, Ill.

SELL: Custom Kilowatt power amplifier 10 to 80: single 3-400Z, grounded grid. Vacuum variable, General Electric meters. Complete with separate adjustable 3500 volt 350 mil power supply, $325.00. Pair of UE572s, grounded grid complete with 2000 volt 500 mil power supply, $175. W6HHN, 3467 Rambow Dr., Palo Alto, Calif.

FOR Sale: Marauder 6 months old, professionally wired, like new, $300. Going to Collins. F.o.b. Edward Kuligowski, 63 Conn Ave., Massapequa, L.I., N.Y.

SELL: DX-100, mint, $145; S-85, mint, $75; DX-35, good, $35.00. B. Nastoff, 320 W. 56th Place, Gary, Ind.

TELEPRINTERS, tape, page perforators, tape transmitters, relays, rotary switches, etc. Bargains, Valve Supply, 378 Bedford Ave., Brooklyn, N.Y.

WANTED: HRO50T coils, G, H, J, AA, AB, AC. Also have Vidicon 6198A will swap or sell. Wells Chapin, 118 Woodmancy Lane, Fayetteville, N.Y.

FOR Sale: Collins 312B4 console in perfect condx, $125.00; Collins 516F2 power supply, in real good condx, $80; Collins SM-2 microphone, $32.00: perfect condx. National NC-105 receiver, 3 months old, brand new $78 Johnson 250-23-3 Matchbox with coupler and indicator, professionally refinished to match Collins colors, $48; Collins 32S1 xmtr w/power supp., vyclean w/new G146s $465.00. All prices are F.O.B. Beaumont, Texas. K5WYJ, Jake Phares, 445 Jay St.

WANTED: Drake TR-3 transceiver or similar transceiver. K3BHB, 903 Western Ave., Jeannette, Penna.

AF-68, PMR-8 and pwr. supply, $200. Paul Werner, WA2BCP, 233 Cornelia St., Boonton, N.J. 07005, Tel: 201-335-0840.

GONSET Twins: G66B receiver, G77A transmitter; 110VAC, 6/12VDC power supplies: $200 for both, or will sell separately. Beasley, 131 Newbery, Oak Ridge, Tenn.

SELL: Heath DX-60, new, assembled, perfect, $65. John Meyers, WA40FG, 9248 Ridge Blvd., Jacksonville, Fla.

COLLINS KWM-2 (#12108), AC supply, speaker, original cartons, like new condx: $920. WA2BKT.

SELL: HX-20 with HP20 AC supply. Professionally wired and aligned, $210. Will ship. W3UB, Bryn Athyn, Penna.

HALLICRAFTERS SX-101 Mark III, $225; Globe 755A VFO, $25. Factory wired. Excellent. Don Vaughan, 4607 Briarcliff Rd., Atlanta, Ga. 30329.

FOR Sale: Elmac 4-400A's. Brand new, $30. Used and checked $27.00. Dick Hassing, KØRHO, 1834 Jefferson Ave., St. Paul, Minn. 55105.

FOR Sale: HX-500 (new), $375; Harvey-Wells "Z" Match, $45.00. Settling estate. Write W1PAZ.

WEBCOR Regent tape-recorder, in original carton, originally cost $249.00. Will sell for $185. W2RUK, 7 Charles St., Auburn, N.Y.

SELL: For widow of Old Timer KØPEJ, Johnson Thunderbolt, used vy little, $375; B&W 5100B, exclnt condx, $175. Or any reasonable offers. Prices F.o.b. KØHPB, E. Dohner, 436 W. Peakview Ave., Littleton, Colorado.

HALLICRAFTERS SR-150, DC power supply, mobile mount and cables, vy gud condx: $600. Will ship prepaid. Gary Uchytil, 1220 Juniper St., Junction City, Oregon.

FOR Sale: Los Angeles area only! Hammarlund HQ-140X receiver, $125. Wanted: Polycomm 2 meter rig, AC supply for Gonset G-76. Telephone OS-5-6701 or SP 2-4040.

MOVING To New York Area? W2YG retiring to California, will sell home completely equipped for ham executive. 1/3 acre mountainside house, select area, 40 minutes west of NYC. 4 bedrooms, 3 baths, lv room, 15.8 x 22, pine panel library (shack) 15 x 21. TV room, dining room, kitchen, basement shop. Screened-in porches, 2-car garage, radio door. Telrex 14 Mc. beam, drive-in attic. House cabled for remotes, stereo, interphone. Living area 2750 sq. ft. $42,500. W2YG, H. L. Vanderford, 146 Sagamore Rd., Millburn, N.J. Tel: 201-376-1493.

WANTED: One inch spark coil and two pint Leyden jars. (Manhattan Electric Supply Co.) to rebuild my original station. W1THM.

SELLING OUT: Valiant, SB-10, SX101A, K2HOZ, Bob Gelman, New York City. Call IN 2-5537.

BEST Offer takes my SX-100. Vy gud condx thru TLC, and appearance like new. Bill Cronin, 2975 Bainbridge Ave., Bronx, N.Y.

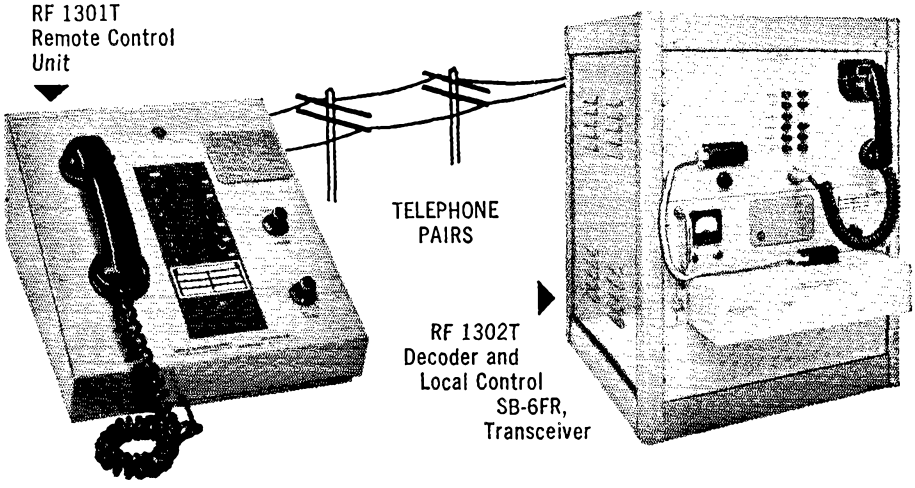
SELL: Swan 240 AC P/S DC P/S. Best offer over $400. J. M. Fernandez, W5IQH, Box 595, Franklin, La.

416B's, $3.00 each while they last! R. McCloud, W1DVT, Old Harvard Road, Harvard, Mass.

HAM, Over 18, to instruct at a children's camp in the Pocono Mountains in Penna. Own equipment required. Please explain type equipment and further qualifications to Pocono Highland Camps, 6528 Castor Ave., Philadelphia 49, Penna.

Index of Advertisers

REMOTE CONTROL OF SSB COMMUNICATIONS EQUIPMENT



The system provides 6 pre-set channels between 1.6 Mc and 16 Mc. Power output is 125 watts p.e.p. with selectable upper lower sideband.

A highly reliable system for controlling an SSB Transceiver from a distant operating location. All important transceiver functions can be controlled including Channel Selection, Mode Selection, Power On/Off and Audio Output.

This equipment is intended for use in systems where the operating position must be remote from the transceiver or antenna location. A typical example is when the control location is in a business office in the center of a city with no space for an antenna and the surrounding noise level is high. Another example is an airport control where interfering signals from radars and other electronic equipment make HF reception difficult.

The control link between the Remote Control Unit and the Transceiver can be either standard telephone circuits or multi-conductor cable, depending upon system components specified.

WRITE FOR DETAILS *on this and other items in the world's most complete line of single sideband communications equipment.*

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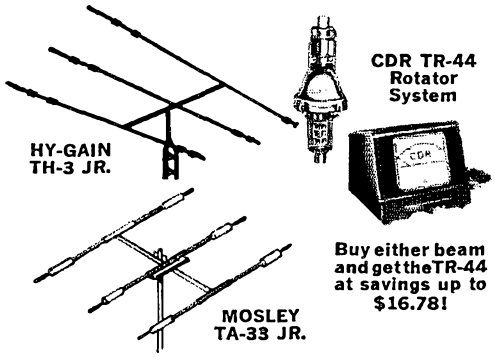
SAVE UP TO $16.78 ON THESE SPECIAL BEAM/ROTATOR PACKAGES



Buy either beam and get the TR-44 at savings up to $16.78!

Hy-Gain TH-3 JR. Beam & TR-44 Package

SAVE $13.75

3-element beam covers 10/15/20 meters with gain to 8 db and FB/ratio of 25 db. Handles 600 w. PEP input. Maximum 3-band performance in limited space. Durable, taper-swaged aluminum-tubing elements, Slim Line traps. Turning radius, 14′ 9″. Shpg. wt. 46 lbs.

23 SU 118-2-AF. TH-3 JR. with TR-44. *Only* **$114.95**
90 CZ 472-AF. TH-3 JR. Beam, *Only*..... **69.95**

Mosley TA-33 JR. Beam & TR-44 Package

SAVE $16.78

Trap-Master 3-element beam works 10/15/20 meters with up to 8 db gain and 25 db F/B ratio. Takes up to 600 watts, PEP input. SWR is usually less than 1.5:1 at resonance. 1¼″ O.D. boom is 12′ long. Wind load, 86 lbs. Turning radius, 14′ 9″. Shpg. wt. 49 lbs.

23 SU 119-2-AF. TA-33 JR. with TR-44. *Only* **$114.95**
89 CZ 787-AF. TA-33 JR. *Only*..... **72.98**

CDR TR-44 Antenna Rotator System

For support, control and rotation of either beam shown above. Consists of rugged rotor and accurately calibrated remote-control indicator unit. For 110-120 volts AC. (Less 7-wire control cable.) Shpg. wt. 20 lbs.

90 SX 479-AF. CDR TR-44 Rotator System *only* **$58.75**

KNIGHT MONEY-SAVING MOBILE FOLDOVER ANTENNAS

Efficient top-loaded single-band antennas. Feature foldover mast for low garaging and spring-loaded quick-disconnect for interchanging 6-ft. radiators (capsules) to shift bands. The three-ft. mast has std. ⅜″-24 stud. Fiberglas capsules have encapsulated coil and telescoping tuner rod for easy adjustment to resonant frequency. Overall ht. of capsule and mast is approx. 102″.

Stock No.	Description	Lbs.	Each
86 SX 571-AF	10M capsule	1	$ 7.50
86 SX 570-AF	11M capsule	1	7.50
86 SX 572-AF	15M capsule	1	7.50
86 SX 573-AF	20M capsule	1	7.50
86 SX 574-AF	40M capsule	1½	9.50
86 SX 575-AF	80M capsule	1½	11.50
86 SX 569-AF	mast section	2	7.50

Mounting Accessories. Av. wt., 1½ lbs.
86 S 279D-AF. Cad. plat. std. body mount.....**$3.03**
86 S 295D-AF. Cad. plat. bumper mt. with stainless strap.....**$5.97**
86 S 279D-AF. Spring mt. ⅜″. 24 stud.....**$2.04**

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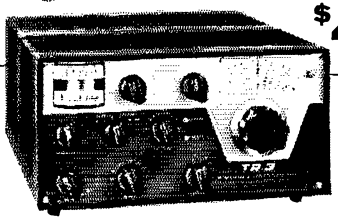

DRAKE TR-33 SSB TRANSCEIVER

Offers optimum SSB performance—two 9 mc crystal filters permit instant USB/LSB selection on all bands. Also provides carrier-controlled AM phone, carrier-shift and grid-block CW operation. Inputs are 300 w. PEP and 260 w. CW to 3—12 JB6 Power amplifiers. Covers 3.5-4.1, 7.0-7.6, 13.9-14.5, 21.0-21.6, 28.0-28.6, 28.5-29.1, 29.1-29.7 mc. Stable, linear, permeability-tuned VFO tunes 4.9 to 5.5 mc for all 7 operating ranges. Drift is less than 100 cps after warmup or for ± 10% line-voltage changes. Xmitter section also has full VOX and PTT, pinetwork loading. Receiver section features better than 1 μv sensitivity for 10 db S/N ratio. Separate RF and AF gain controls, product detector. 2.1 kc at 6 db IF passband, full AGC, built-in 100 kc crystal calibrator. 5½ x 10¾ x 14⅜″. (Less power supplies listed below.) Shpg. wt., 48 lbs.

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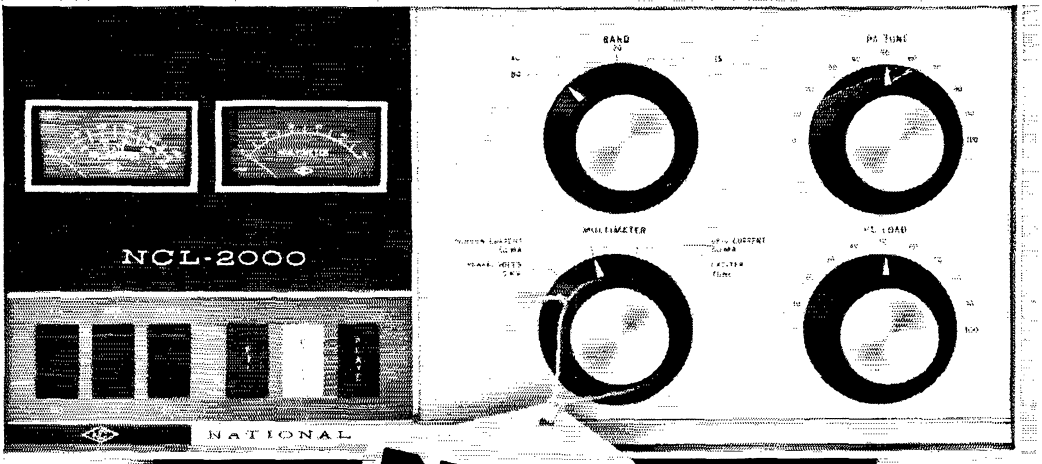
The output tubes in the NCL-2000 are a pair of RCA 8122 ceramic tetrodes designed specifically for high power SSB service, and 800 watts of available plate dissipation assure low distortion, linear operation at full output. The NCL-2000 utilizes a passive, untuned grid circuit, so that it may be adjusted to allow excitation to full output from any transmitter or transceiver providing from 20 watts to 200 watts of peak drive. The passive grid circuit in the NCL-2000 allows its use as a dummy load for easy exciter tune-up with amplifier plate voltage removed!

The National NCL-2000 is a particularly handsome unit . . . styled to complement any ham shack or equipment (of course we think it looks best next to our own NCX-3)! Compare these features with any unit on the market at <u>any</u> price □ one kilowatt average input, 2000 watts PEP on all bands □ may be driven to full output with 20 to 200 watts from the exciter □ ALC output for use with exciters incorporating such provision □ separate plate and multi-meters □ tune-up at 1 KW level to comply with F.C.C. □ built-in dummy load with multi-meter relative power indication for optimum exciter tune-up with amplifier plate voltage removed □ all changeover relays incorporated for use with either transceiver or transmitter-receiver combinations □ automatic switchover to exciter-only when plate voltage is removed □ most complete safety and overload protection, including interlock, automatic shorting bar, time delay and current overload relays □ National's exclusive one-year warranty.

Your National Dealer will have the NCL-2000 in June . . . why not call him today to reserve yours for immediate delivery.



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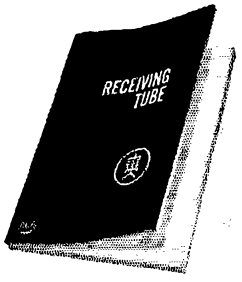

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