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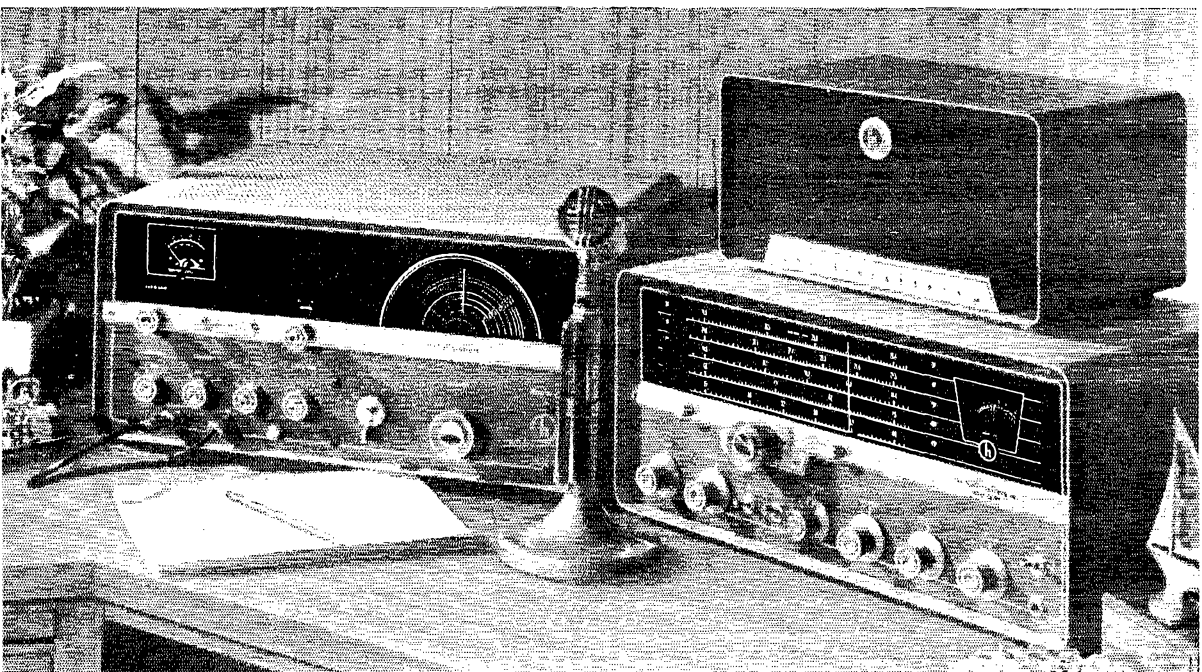
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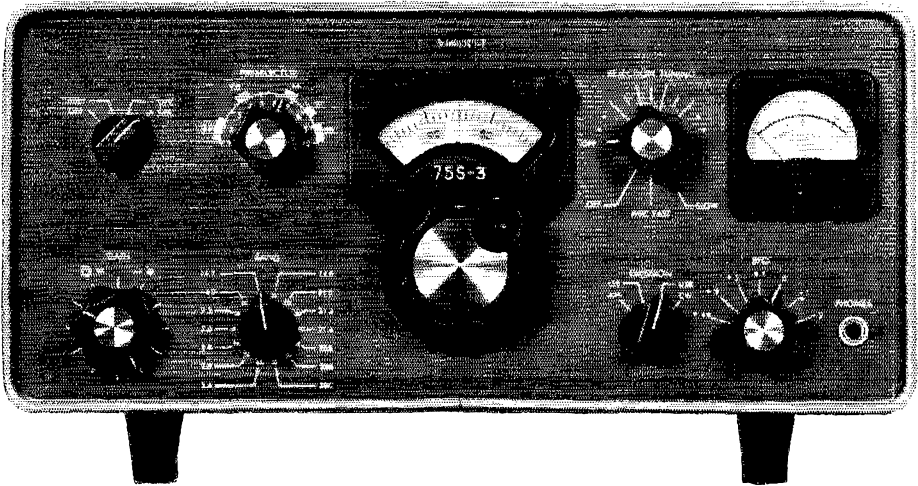
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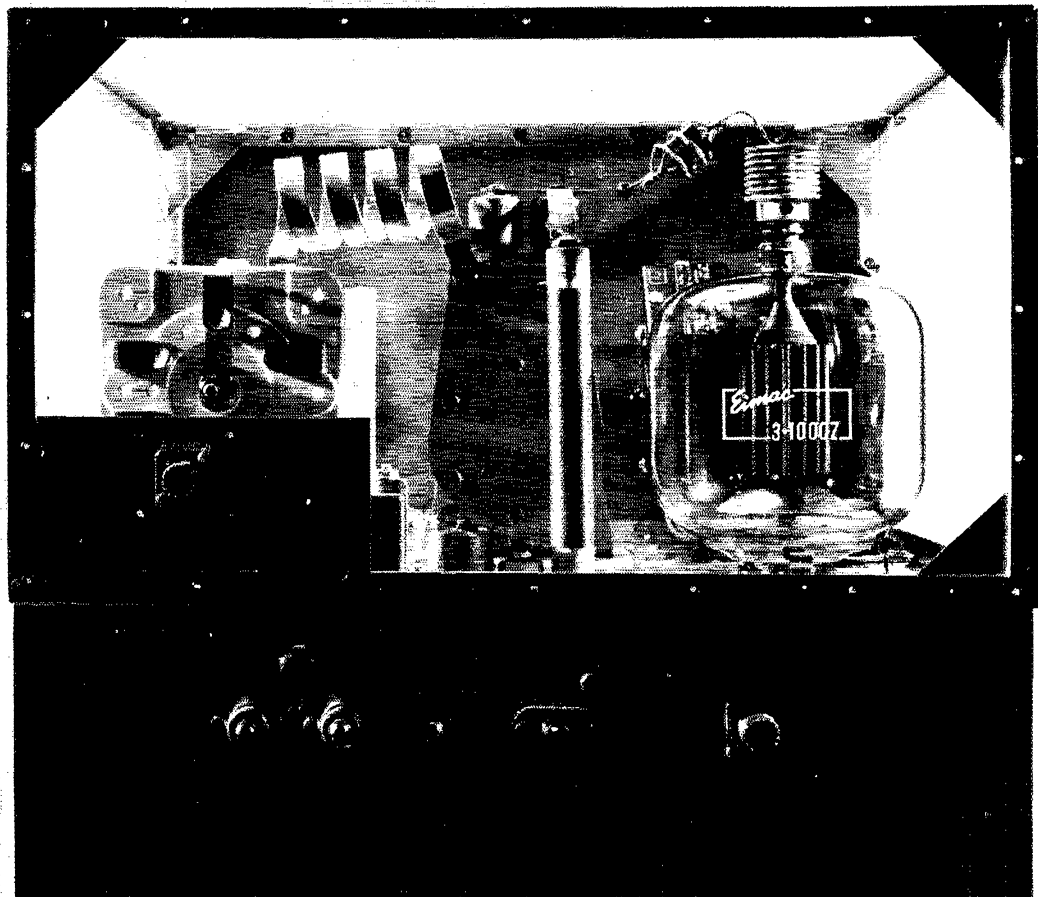
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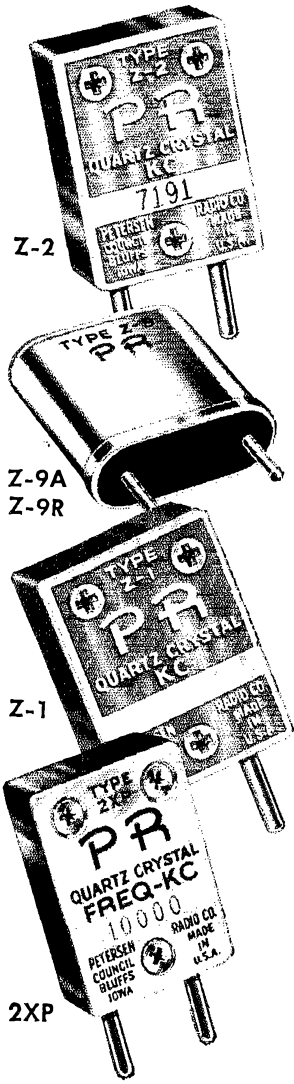
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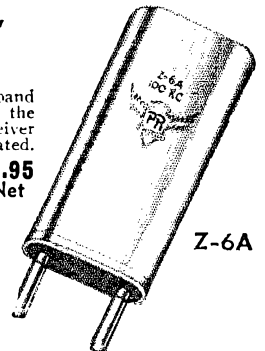
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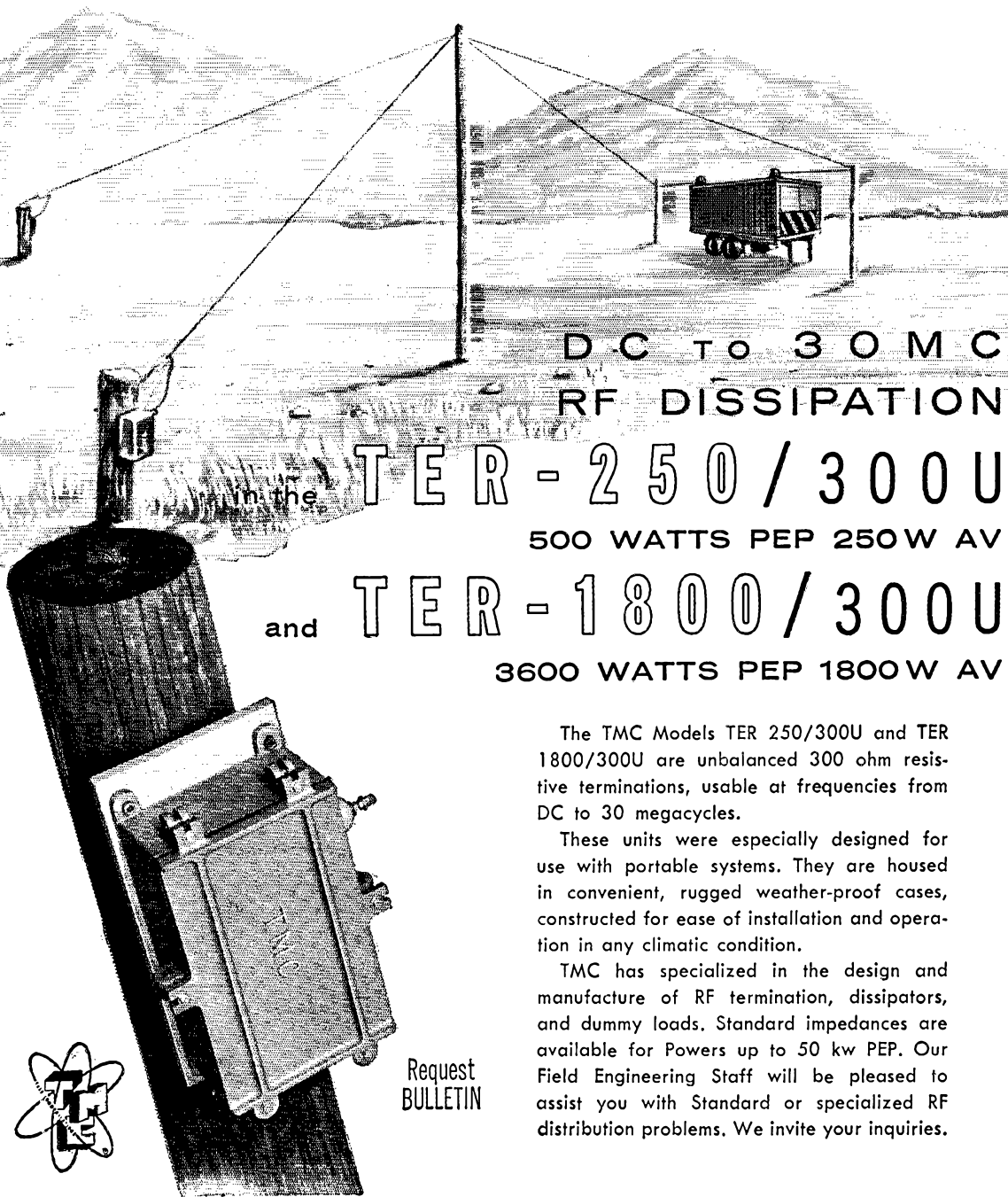
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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCAM, the administrative ARRL official elected by members in each Section. Club radio reports are also desired by SCAMs 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 OES, OES, OPS, OO and OBS. SCAMs 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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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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THE affairs of this corporation shall be governed by a Board consisting of . . . directors who shall be elected by the members for terms of two years."

Under the above provision in the League's Articles of Association, one-half of ARRL's amateur membership will shortly be choosing directors, their "legislative" representatives in our system of self-government. Routine business, technical and operational matters are handled by a professional staff of some 65 people at Hq., but only in accordance with the wishes and directives of the Board of Directors, who in turn derive their authority directly from you, the members.

The call for nominations appears on page 62 of this issue. If you reside in one of the divisions holding elections this year, read the announcement carefully and then act — to renominate your current director, or name another you think is better qualified. Particularly since each director now represents an average of over four thousand members, your candidate should be the best available, enjoying the confidence of the majority in your division. He should be a mature person of ability and stature, for he helps direct the affairs of an organization whose budget runs well over a million dollars per year.

For the League to continue as a strong democratic organization, and to continue its leadership in amateur affairs, all members must be concerned about our government. Nominate your candidate, then, and when the ballot comes, early in October, be sure to vote.

14 Mc.

PERHAPS it's too early for definite results, but we've been doing some extra listening in 14,335-14,350 kc. and have the impression that, in general, U. S. hams are avoiding use of the segment in compliance with the Board's request. The purpose is, of course, to provide space where s.s.b. DX can be heard without disruptive domestic interference.

Club bulletins are repeating the Board's request and mostly urging careful observance. Our Hq. correspondence shows mixed reactions. The occasional guy who is "agin" it is no surprise, nor is his defiant operation in the high end. But we are a bit concerned over a feeling, more general than it should be, that the plan will never work because it is on a voluntary basis, and therefore is doomed to failure.

Come, now! Europeans have a voluntary subdivision of choice and c.w. in their amateur bands. There is thorough cooperation, and the plan works fine. Are we any less disciplined

than they?

We're certain that Board members would be the first to admit that the ARRL recommendation doesn't solve every 14-Mc. problem. One example is the use of some sideband transceivers, set up only for transmission and reception on the same frequency. Without a separate v.f.o. or similar accessory, it is inconvenient to shift back and forth with such a rig from, say, 14,330 to 14,340 kc.

Maybe the plan won't work satisfactorily, but it is not in the amateur spirit ever to take the view that something *can't* work. At the same time, admittedly no one can say with certainty that it *will* answer our needs. We can only find out by trial. Let's give the Board's recommendation a fair one!

FEMB

KUDOS to the Field Engineering & Monitoring Bureau of FCC, which on July 1 marked its 50th anniversary. Most of us think of the Radio Act of 1912 as the first U. S. regulatory activity, but under the Wireless Ship Act, government monitoring and enforcement actually began the previous year.


At the start there was a staff of three men in three area offices, a budget of \$7,000. Today, under George S. Turner (W3AP), there is a staff of 400 in 51 offices and monitoring stations and a budget of \$3.2 million — to regulate the traffic of more than 2.5 million FCC-licensed transmitters.

The Commission complimented its field staff by adopting the following resolution:

"WHEREAS, the first radio inspection service was started by the United States Government 50 years ago with the appointment of William D. Terrell as a Wireless Ship Inspector effective July 1, 1911, and,

"WHEREAS, this event marked the beginning of service by that branch of Government known now as the Field Engineering and Monitoring Bureau of the Federal Communications Commission, and,

"WHEREAS, present and past members of this activity have rendered outstanding service in policing the air waves, detecting clandestine radio transmitters, eliminating interference, and contributing to the safety and well being of the General Public,

"NOW THEREFORE BE IT RESOLVED that on this Golden Anniversary of its field arm, the Federal Communications Commission, *en banc*, does hereby extend its sincerest thanks, congratulations and best wishes to all members of the Field Engineering and Monitoring Bureau and its predecessors." 



It looks as though W90BD may be our oldest living ham. Born on June 29, 1869, OM Starkey has just applied for renewal of his ham ticket, shortly after celebrating his 92nd birthday.

It's that season again. K9YOI and K9VQA worked each other on 75 phone for 72 hours, and want to know if that's a record. The previous high (low?) seems to have been 65½ hours.

K3GMD had to have his larynx removed by surgery, and so his many friends in the Washington area (led by the National Capital V.H.F. Society and W3AHQ) raised enough money to buy him an artificial larynx. He'd appreciate mail, too, from his friends and acquaintances around the country.

You can qualify for a Virginia Civil War Centennial Award (VA-CWC) as follows. If you are located in the U. S. or Canada, work 25 Virginia stations, 5 of whom must be in Richmond (the last capitol of the Confederacy). If you live anywhere else in the world, work 10 Virginia stations, 3 to be from Richmond. (Stations in Henrico and Chesterfield counties will be counted as Richmond stations.) All QSOs to have been made between April 1, 1961, and May 31, 1965. Prepare an alphabetical list of calls (and include a certification signed by two other hams or by an officer of a radio club that the applicant actually has the confirming QSLs) giving date, GMTIME, and mode of each contact. Include 50¢ or 4 IRC, and send the application to Awards Committee, Richmond ARC, P. O. Box 73, Richmond 1, Va.

COMING A.R.R.L. CONVENTIONS

August 5-6 — Oklahoma State, Tulsa.

August 26-27 — Central Division, Springfield, Ill.

September 15-17 — New York State, Niagara Falls.

September 29-30 — Ontario Province, Windsor, Ontario, Canada.

October 7-8 — Midwest Division, Omaha, Nebraska.

October 13-14 — Great Lakes Division, Cleveland, Ohio.

October 13-15 — West Gulf Division, Kerrville, Texas.

October 28 — Kentucky State, Lexington, Kentucky.

CENTRAL DIVISION CONVENTION

August 26-27 — Springfield, Illinois

Boasting a top array of speakers, the Central Division Convention is to be held at the St. Nicholas Hotel, Springfield, on August 26-27. The opening address will be given by Governor Otto Kerner, followed by Springfield Mayor Lester Collins and ARRL President Goodwin Dosland.

Saturday afternoon forums will include an RTTY demonstration by the Chicago Area Teleprinter Society; s.s.b. with guest speakers Fritz Franke, Wes Schum and Harold Vance; traffic with W9DO as moderator; RACES, AREC and Red Cross with L. Singer, Chief of Red Cross Telecommunications, CD Director Vernon Strongman and Jack Stanton, the SEC of Illinois Section; and Novice and beginner with Lewis G. McCoy, WIICP, of Hq.

Other forums will include v.h.f.-u.h.f., DX antennas, ARRL forum, transistors, mobile, MARS, and others. Question and answer panels will follow each forum. An s.s.b. brunch Sunday morning will also feature guest speakers.

The ladies who are not amateurs will be treated

to a guest tour of the Lincoln home, tomb and village in air-conditioned buses. Children will be taken to a theatre party and treats while the ladies are on tour. Competent baby sitters have been arranged during the convention. A ladies brunch is planned for Sunday morning (and the men are welcome), with the committee headed by Carole Hoover, K9AMD. Carl Mosley and his magic will be the main attraction at this session.

Highlighting the convention is the Hiram Percy Maxim Memorial Dinner which will be held Saturday night with U. S. Senator Everett G. Dirksen (Illinois), as speaker. Other notables will also be present. Entertainment and dancing will follow the banquet.

A Royal Order of the Wouff Hong initiation ceremony is also planned. FCC examinations will be given Saturday morning at 9 A.M. There will be contests for c.w. skill, mobile and hidden transmitters, and QSL cards.

Edmond A. Metzger, W9PRN, is convention general chairman. Registration is \$5.50 per person; banquet tickets are \$5.50 each. Further convention information may be obtained by writing to the "Land of Lincoln Convention Headquarters", 104 N. Sixth, Springfield, Illinois.

OUR COVER

Hope you have as much fun looking at this month's cover as we did in taking the picture. The photo gives you a pretty good top and bottom view of WH1DQ's nu-visor preamplifiers for 50 and 144 Mc., which are described on page 44 of this issue.

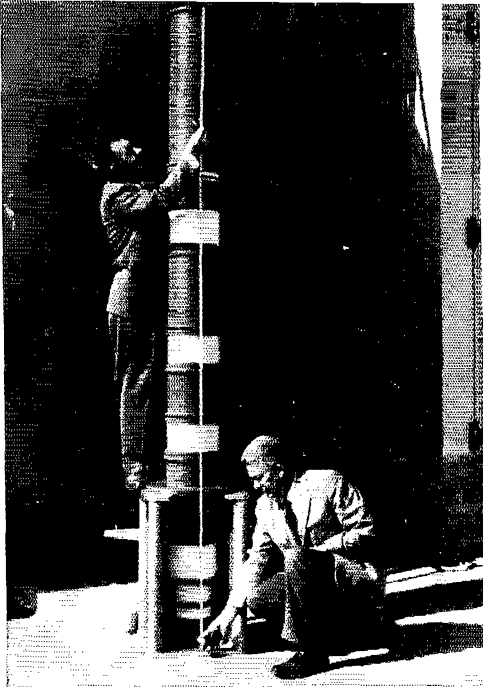


(See page 51)

An Introduction to the Klystron

BY GEORGE BADGER,* W6RXW

Klystrons come in all sizes, capable of handling anything from milliwatts to megawatts, at frequencies from about 200 Mc. up. Here W6UF and W6CHE show the giant size of an Eimac X-26 three-cavity klystron. Almost 10 feet high, this ceramic-insulated stovepipe is capable of better than 1.25 megawatts pulsed output in the 400- to 450-Mc. range.



Up to a year or so ago, few amateurs even considered making use of frequencies higher than 450 Mc., and those who did went at it with line-of-sight paths and low power as the modus operandi. Now, with moon bounce and satellite reflection established facts, and space communication just around the corner, we are on the threshold of an era that should see great amateur interest in u.h.f. and microwave techniques. One of the tools we may soon be using is the modern power klystron. Here is an opportunity to learn something of how these marvelous devices work, to prepare for the big push to frequencies above 1000 Mc. that almost certainly is in the offing.

As each successively higher-frequency amateur band becomes popular, new techniques must be employed to fully exploit its DX capabilities. U.h.f. communication by way of the moon and reflecting or relaying satellites holds promise of being one of the more exciting facets of amateur radio of the near future. The 1215-Mc. band is well suited for these modes of radio communication because high-gain antennas are of reasonable size, and receivers can be built with low noise figures. In this frequency region the *power klystron* is the tube of the future.

A high-power final amplifier for the 1215-Mc. band requires techniques and components new to the amateur art. Over the past ten years the power klystron has become the most widely used amplifying device for power levels of one kilowatt or greater at frequencies above 300 or 400 Mc. As the state of the communication art progressed over the years, it became apparent that conventional v.h.f. tube types suffered from limits of frequency and power handling capability. Transit time is the major fundamental reason that equipment designers are forced away from traditional tubes to the newer microwave tube types, of which the klystron has found widest use in high-power amplifier service.

* Eitel-McCullough, Inc., San Bruno, Calif.

Transit time is a phrase used to describe the finite time of flight of an electron between electrodes in a vacuum tube. When the electron transit time from cathode to grid and from grid to anode becomes an appreciable part of the r.f. cycle, efficiency, gain and general performance of the tube are severely reduced. Some excellent work has been done by tube designers through the years to reduce transit time in conventional tubes by making the spacing between elements very small. Unfortunately, this results in tube designs which are difficult to fabricate and which have severe power handling limitations. For a kilowatt at 1296 Mc., "something new must be added!"

Velocity Modulation

In the conventional r.f. power tube, the electron flow from cathode to anode is chopped into short pulses of current each r.f. cycle by the grid. The charging of the output tuned circuit by these pulses (or bunches) as they reach the anode produces r.f. power output. At low frequencies, the pulses can be of controlled duration and well defined. At ultra-high frequencies, transit time effects cause the bunches to be poorly defined, degrading tube performance.

In the power klystron, well-defined electron

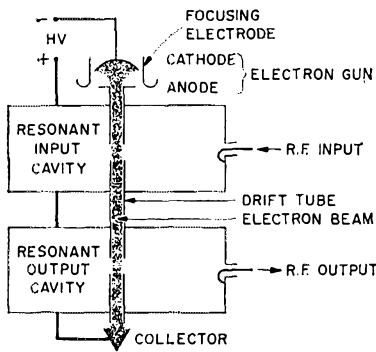


Fig. 1—Simple two-cavity klystron illustrates theory of "bunching." The electron beam passes from cathode to collector via the drift tube and is influenced by action of resonant input cavity, which acts to bunch electrons into groups. Energy is extracted from the electron beam to excite the output cavity and provide r.f. output.

bunches are formed from a continuous electron beam, by a technique called *velocity modulation*. The klystron uses transit time to advantage in producing reasonable efficiency, exceedingly high gain, and other desirable characteristics such as constant input power regardless of signal, good linearity, and high stability.

How the Amplifier Klystron Works

Referring to Fig. 1, the essential parts of the amplifier klystron are the *electron gun*, the *drift tube*, the *resonant cavities*, and the *collector*. The electron gun consists of a cathode, an anode and a focusing electrode, which act to form an electron beam. Electrons from the heated cathode are accelerated and attracted toward the anode and, therefore, a current flows as in a diode, when high-voltage d.c. is applied to the anode.

The gun electrodes are arranged to focus the accelerated electrons through a hole in the center of the anode. The electrons form into a cylindrical electron beam which flows at constant velocity

through the resonant cavities and hollow drift tube into the collector. R.f. drive power applied to the coupling loop on the input resonant cavity causes r.f. voltage to exist between the *re-entrant cavity posts*. (See Fig. 2, evolution of the resonant cavity from a lumped tuned circuit.) These posts are also the ends of adjacent drift tube sections. The spaces between adjacent drift tube ends are called *interaction gaps*. Interaction between the cavity r.f. voltage fields and the electron beam takes place in these gaps. Electrons flowing past the input gap are affected by the r.f. exciting voltage existing across the gap. During the instant when the r.f. voltage is "positive" (in direction of electron flow), electrons in the gap are very slightly accelerated. An instant later, during the alternate half cycle of r.f. voltage, the cavity field has reversed and electrons in the gap are retarded. Some of the electrons flowing in the beam are now moving faster and others are moving slower than the average rate. The beam is velocity modulated. As the beam drifts toward the resonant output cavity, the fast electrons tend to catch up with the slower electrons, in a process called *bunching*. When the electron bunches reach the output cavity gap, they are well formed, and charge the output resonant circuit, acting as sharp pulses of r.f. current. The cavity acts as a resonant coupling device, and power is coupled from the cavity to the transmission line and antenna.

A comparison may be drawn between the interaction of electron bunches with the output cavity and the interaction of r.f. pulses between screen and anode in a conventional tetrode operating at low frequencies. The essential difference is that in the klystron, the electron bunches are not formed by a control grid, but rather by velocity modulation of a continuous electron beam.

There is more to a typical klystron amplifier than is shown in the simplified diagrams of Figs. 1 and 2. The 3K2500LX three-cavity klystron used in the recent moon-bounce experiments¹ is

¹ Orr, "Project Moon Bounce," *QST*, September, 1960.

EVOLUTION OF THE KLYSTRON CAVITY

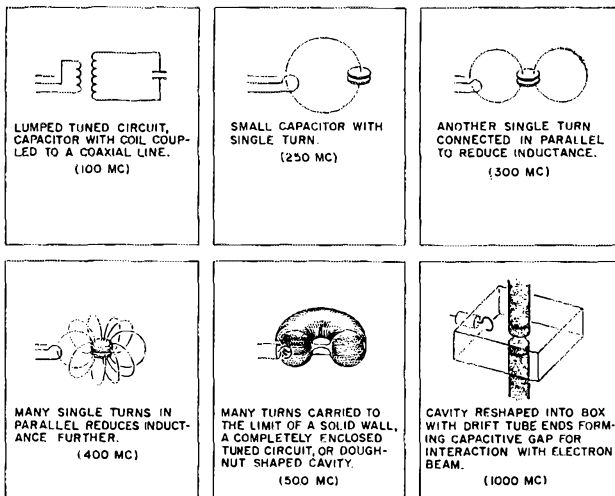


Fig. 2—The klystron cavity may be thought of as evolving from a simple resonant circuit. A small capacitor with a single turn loop (center, top drawing) is revolved through 360 degrees to produce a three-dimension resonant cavity. The cavity walls provide the circuit inductance, and the center portion provides the capacitance (center, lower drawing). A slight physical modification of this concept results in the square resonant klystron chamber. The ends of the drift tubes provide the resonating capacitance, and the box may be tuned by varying the volume by means of movable walls,

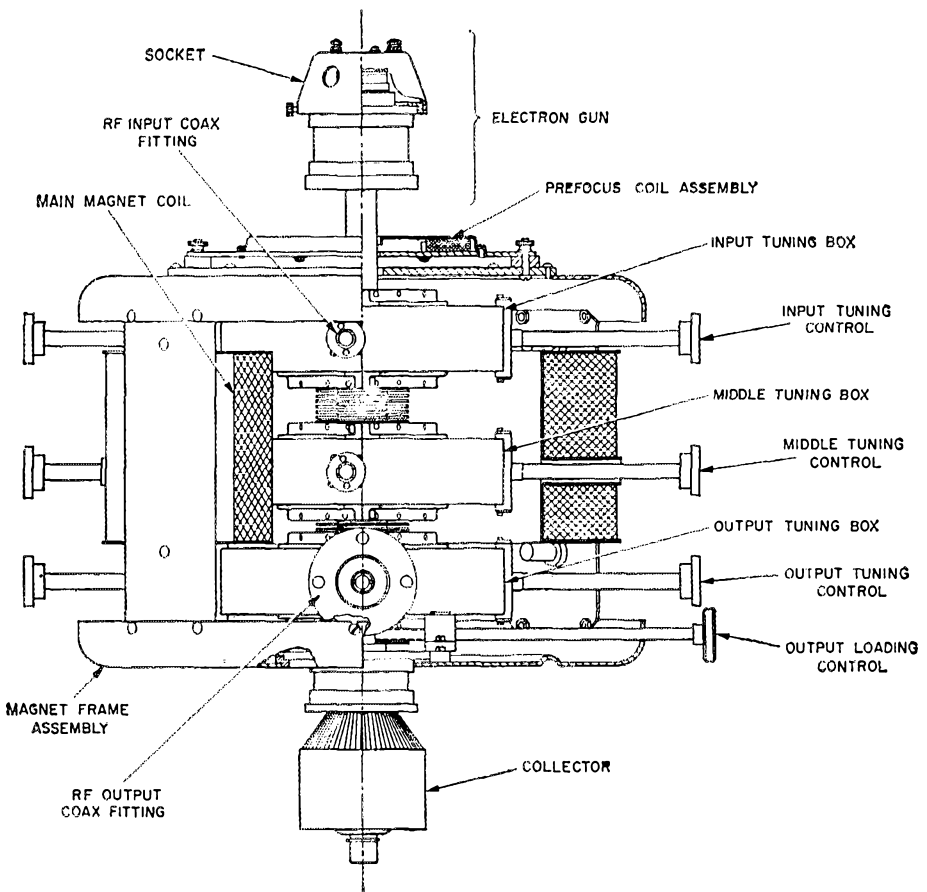


Fig. 3—Cutaway section of three-cavity klystron. The klystron is mounted in a magnet assembly which supports the tube, tuning boxes and magnet coils. Prefocus coil is mounted atop the frame. Cavity tuning is accomplished by the three tuning controls at right and left. Klystron is cooled by air blast directed at cooling fins mounted along the drift tube.

shown in the photograph on page 15. Fig. 3 shows this tube mounted in an Eimac Amplifier Circuit Assembly. The *socket* provides connection to the heater, focus electrode and cathode. The *magnet frame assembly* provides support for the klystron and *magnet coils*. It is made of iron and provides a return path for the axial magnetic field and serves to shield the magnetic field from components outside the magnet frame. The magnetic field keeps the beam focused as it passes from the gun, through drift tubes and cavities, to the collector. The *prefocus coil*, mounted in an iron frame atop the assembly, provides a magnetic lens for focusing the beam into the main magnetic field.

Most power klystrons have three or more cavities, because a multiple-cavity klystron will provide substantially higher gain and efficiency than the simple two-cavity tube. Klystrons have been built with six or more cavities, having power-gain figures in excess of 90 db. On the next page is a detailed view of an Eimac external cavity, showing how it is fastened to the klystron to complete the r.f. circuit. The knob at the left serves to move tuning doors, changing

the volume of the box and hence the resonant frequency. A typical input coupling loop (top center) and metallic finger stock for good r.f. contact may be seen in this view. For the moon-bounce amplifier, these tuning boxes were modified in size with file, hacksaw and solder to tune to 1296 Mc. *Tuning controls* to adjust the resonant frequency of the *input*, *middle*, and *output cavities* of the klystron are shown in Fig. 3. The output loading control adjusts the load coupler which is used to change the position of the antenna coupling loop in the output cavity.

Amateur Use

Setting up a complete 1215-Mc. final amplifier around a klystron and associated hardware is largely a matter of doing a good mechanical job and applying the proper a.c. and d.c. voltages. You don't have to be a genius to do it right. Fig. 4 is a simplified diagram showing the important power connections and defining the various symbols commonly used with these klystrons.

In addition to the electrical characteristics listed in Fig. 4, the following formulas will be found to be useful:

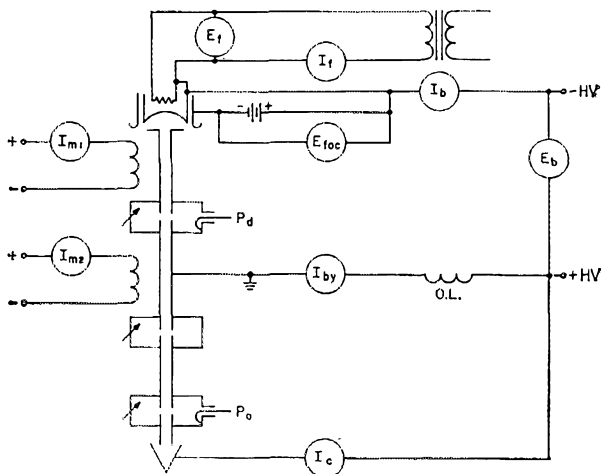


Fig. 4—Simplified schematic of d.c. klystron circuits. Note that positive potential of collector supply is at ground potential. The following terms are used to indicate klystron potentials and currents: E_f —filament voltage; I_f —filament current; E_b —beam voltage; I_b —beam current; I_{by} —body current; I_c —collector current; O.L.—overload relay coil; I_{m1} —magnet current; P_d —driving power; P_o —output power.

$$\text{Efficiency, per cent} = \frac{P_o}{E_b \times I_b}$$

$$\text{Beam Transmission, per cent} = \frac{I_b - I_{by}}{I_b}$$

Filament voltage is obtained from a transformer which must be insulated for more than the beam voltage as the filament assembly of the klystron is at a high negative potential with respect to ground. Filament voltage should be metered at the tube terminals. The beam current (I_b) meter reads all of the current leaving the cathode of the klystron. Most of this current arrives at the collector (I_c). The remaining current is lost to the klystron body during the long trip from cathode to collector. Current lost to the anode and drift tubes is called body current (I_{by}). This loss current should be held to a very small value so that the beam transmission efficiency is higher than 90 per cent and the body current overload relay (O.L.) should be set accordingly. A collector current meter is unnecessary since $I_c = I_b - I_{by}$.

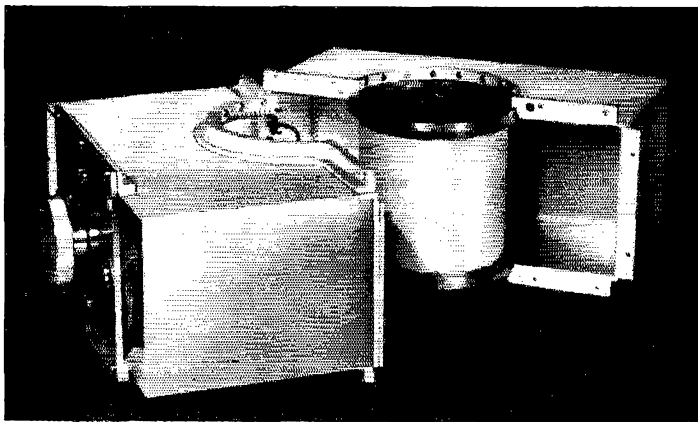
The focus electrode draws very little current (about 5 ma., max.) so the voltage may be obtained from a small power supply, battery, or cathode bias resistor well insulated from ground. The d.c. potential for the magnet coils should be

adjustable and must be metered. You can tell if the klystron has sufficient r.f. drive power by the way it tunes, so a drive-power indicator is unnecessary. A calibrated power-output meter is a nice convenience, though expensive. Some indication of relative output is essential for proper tuning. An adjustable probe or loop connected to a crystal diode and meter (P_o) and arranged to sample the output coaxial line is all that is necessary.

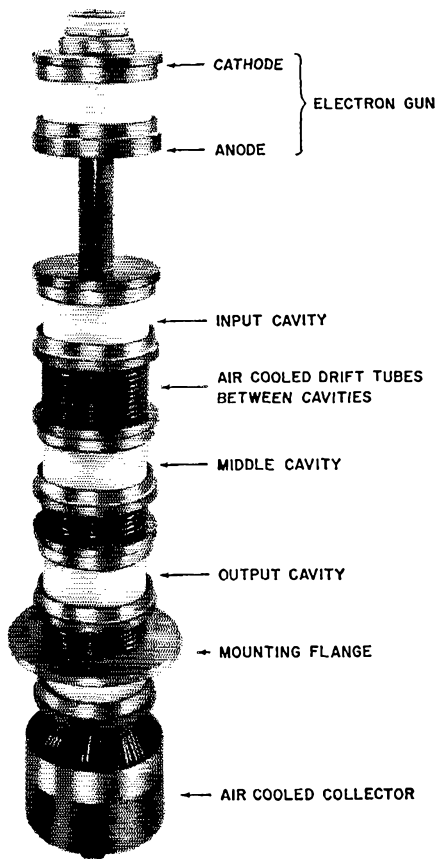
The body-current and relative-power-output meters are important during tuning and should be physically located so that they may be conveniently viewed while adjusting the klystron.

Typical operating characteristics of the 3K2500LX in amateur service are as follows:

- E_f 7.5 v. a.c.
- I_f 5.8 amp. a.c.
- E_b 4.5 kv. d.c.
- I_b 220 ma.
- E_{loc} 90 v. d.c.
- I_{by} 25 ma.
- I_{m1} 0.5 amp. d.c.
- I_{m2} 2 amp. d.c.
- P_d 2 watts
- P_o 1296 Mc.
- P_i 1000 watts.



Model of external klystron cavity. The tuned chambers clamp about the ceramic sections of the tube shown in the picture on the next page. Tuning adjustments are made by moving the adjustable end sections of the chamber. The ceramic section of a typical klystron is shown ready to be affixed within the cavity.



The Eimac 3K2500LX is an example of a three-cavity klystron. The tube is forced-air cooled, and uses ceramic insulation. The tuned chambers are external to the tube, in the form of resonant boxes placed around the cavities. The tube is usually mounted in a vertical position, with the electron gun at the top of the assembly.

The efficiency of the klystron operating under the above conditions is quite low, about 30 to 35 per cent. The power output therefore is about 300-350 watts.

The 3K2500LX was designed for ground military use at 1 kw. power output on a somewhat lower frequency band. For one-kilowatt input amateur service, the klystron must operate at approximately one-half the design voltage, and on other than the design frequency. Had the klystron been designed specifically for the ama-

teur 1215-Mc. band, the driving power required would be only a few milliwatts.

Tuning the klystron amplifier is quite simple; possibly easier than an equivalent lower-frequency transmitter using conventional tubes. First, the filament voltage is set to 7.5 volts, and five minutes is allowed for the cathode to reach operating temperature. Now the magnet currents are set at 0.5 amp. and 2.0 amp. Apply about 2 kv. beam voltage and adjust the pre-focus coil position and current for *minimum* body current (about 15 ma.). Bring the beam voltage up to operating level (4.5 kv.) and again adjust the pre-focus coil for minimum body current. The beam current should now be approximately 220 ma.

Apply excitation and bring the r.f. drive level up to about 100 milliwatts. Increase the coupling of the sampling loop until there is an indication on the output meter. Set the output loading control for maximum (loop position vertical in the cavity). Tune the middle cavity slightly above resonance (adjust so as to reduce the volume of the cavity). Now increase the drive to about two watts and tune the middle cavity back toward resonance for maximum power output. You will know you have sufficient drive if in tuning further toward resonance the power output drops suddenly to about 10 per cent of its maximum value.

Tune the cavity lower in frequency for maximum power, touch up the magnet currents, and you're on the air! Good luck; see you on the high end!

The Future

This is just the beginning of one of the most enticing eras for amateur radio. Today, a klystron costs about as much as a good complete s.s.b. station, so don't rush down to the local parts house for your new moon-bounce bottle this week. Few hams could afford the first s.s.b. stations, nor could more than a few buy the first rotary sparks. History will repeat itself, however, and inexpensive parametric amplifiers and velocity-modulated klystrons may grace the shacks of the average hams of the future. In any event, with moon bounce and satellite reflection an accomplished fact, and actual space communication probably not far off, it's certain that future DX men will not be entirely dependent upon the vagaries of the sunspot cycle. Widespread amateur interest in u.h.f. communication is nearer than you think!

QST

Strays

Any Elbeetians in the house? The Elbeetian Legion is composed of the old-time Lone Scouts of America, which merged with the Boy Scouts of America in 1924. Contact Charles Merlin, Box 127, Hudson Heights, New Jersey, and get some up-to-date information about the Lone Scouts.

W6MLZ informs us that the "This is Your Life" program featuring W6NAZ (p. 67, April QST) will be re-run over NBC early in August, perhaps the 6th of the month but varying in different areas. Check your local TV listings and watch a splendid show on ham radio.

The Grounded-Grid Linear Amplifier

Effect of Circuit Design on Linearity and Stability

BY WILLIAM I. ORR,* W6SAI, RAYMOND F. RINAUDO,* W6KEV,
and ROBERT I. SUTHERLAND,* W6UOV

Timely information on operating the popular grounded-grid circuit to make the most of its inherent advantages as a linear amplifier.

IN the "good old days" of ham radio, linear amplifiers were used by a few amateur phone stations as a (relatively) inexpensive way of obtaining high power. Class-B modulators were as yet unknown, and the cost of glassware necessary to generate two or three hundred watts of Class-A audio power was exorbitantly expensive for all but the well-heeled hams.

Loy Barton's classic *QST* article (circa 1931) describing the inexpensive Class-B modulator system sounded the death knell of the linear amplifier for amateur service until the advent of single sideband, which recently blew the dust from this ancient mode of operation and modernized it to fit today's operating conditions.

What Is A Linear Amplifier?

To the hi-fi enthusiast, the linear amplifier is a high-fidelity music amplifier. To the s.s.b. enthusiast, the linear-amplifier package, when placed on the end of a sideband exciter, will make the exciter sound bigger, louder, and more commanding to other amateurs. The fact of the matter is that the s.s.b. linear amplifier is a high-fidelity amplifier in the true sense of the word. Although the hi-fi man thinks in terms of fidelity,

and the sidebander thinks in terms of linearity, they are both talking about the same thing.

It is interesting to note that a good hi-fi audio amplifier can theoretically be converted into a low-distortion linear amplifier for sideband service by replacing the audio circuits with suitable r.f. tank circuits. Indeed, for r.f. work, push-pull circuitry is not even required as it is in audio service, because the flywheel action of the r.f. tank circuits will supply the missing half cycle. Finally, the operating parameters for a particular tube — plate, screen, and grid voltages, driving voltage, load resistance — are easily calculated for audio work, and apply equally well for r.f. service. For example, the 811-A tube is rated for Class-B audio service as a high- μ triode. Compare these ratings with the Class-B r.f. linear data listed in Table I.

Why Linearity?

For sideband service the r.f. power amplifier must be truly linear. It must be capable of high-fidelity reproduction. *That is, the envelope of the signal existing in the plate circuit must be an exact replica of the envelope of the exciting signal.* This statement is a good definition of a linear amplifier. It implies that the power gain of the stage must be constant regardless of the signal level. Any devia-

* c/o Eitel-McCullough, Inc., San Carlos, Calif.

TABLE I—811-A Operating Data

Class-B Audio Service (Two Tubes)	Class-B R.F. Service (S.S.B.) (One Tube)	
	Grid Driven	Grounded Grid
Plate Voltage	1250	1250
Grid Bias	0	0
Peak Grid Voltage	175	88
Zero Signal Plate Current (ma.)	54	27
Max. Signal Plate Current (ma.)	350	175
Load Resistance (ohms)	9200	4600
Max. Signal Grid Current (ma.) (1)	26	13
Power Output (watts)	310 (2)	141 (3)

(1) Varies from tube to tube. (2) Computed power output. (3) Measured output including circuit losses.

The operating parameters of a Class-B amplifier stage remain the same regardless of whether the tube functions in audio or r.f. service. Grounded-grid operation is similar, except that the exciter must supply additional feed-through power. Since Class-B audio service requires two tubes, all currents and plate load resistance must be halved for single-tube r.f. service. Class-B audio data are readily available for most tubes and can be used for r.f. service, as shown above.

tion from this happy state creates distortion products that appear in the signal passband and adjacent to it.

Unfortunately, many amateurs judge a sideband signal by its "quality"—that is, the "pleasing" aspect of the voice being transmitted. Many times one hears the report "Your quality is excellent, old man. You have a fine signal"—yet the listener observes that the recipient of this flattering observation has a signal as broad as a barn door, complete with whiskers and splatter that obliterate half the phone band! Obviously, the criterion of quality of a sideband system is what you *don't* hear, not what you *do*! The place to examine a sideband signal for linearity and quality is in an adjacent channel, not in the frequency band of the signal itself!

How Good Is "Good Quality"?

The excellence of a sideband signal is judged by the amount of (or lack of) sideband splatter in nearby channels. Theoretically, a sideband signal should be about three or four kilocycles wide—just as wide as the voice passband of the equipment. However, the poor sideband operator's ear has been brutally deafened by so many rotten signals that he often accepts any s.s.b. signal as "good quality" as long as it does not blanket the dial of his receiver.

Over the years a nice, easy, vague figure of "30 decibels down" for distortion products has become a password for good-quality, low-distortion, amateur sideband equipment. Since the measurement technique is usually undefined, and practically no amateurs have equipment sufficiently sophisticated to measure the intermodulation products of a sideband signal, this figure has become a byword for most commercial and homemade amateur equipment on the air. Valid or not, this magic number seems to be the socially correct distortion figure applicable in all cases to all equipment!

Distortion — What It Means

If the output signal of a linear-amplifier stage is a replica of the exciting signal, there will be no distortion products. However, as vacuum tubes and circuit components are not perfect, this situation is as yet unreachable. As shown in Fig. 1, the transfer characteristic of a typical tube is approximately linear. This tube suffers no pain when amplifying a single signal (such as a carrier or a single tone), but has the interesting property of *mixing* when a multiple-signal source is applied to it. This means that a voice signal (made up of a multiplicity of tones) will become distorted and blurred by the inherent mixing action.

A standard test to determine the degree of mixing for a given circuit or tube is the *two-tone test*, in which two radio frequencies of equal amplitude are applied to the amplifier and the output signal is examined for spurious products (Fig. 2). These products, or "garbage," fall in the fundamental signal region and atop the various harmonics. The tuned circuits of the amplifier filter out the spurious signals falling in the har-

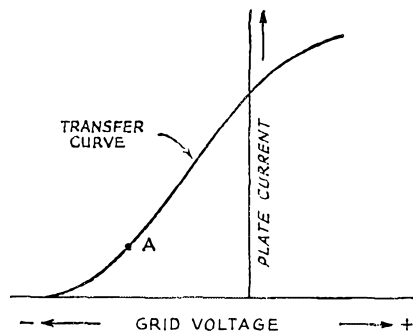


Fig. 1—Plate current vs. grid voltage curve (dynamic characteristic) of a vacuum tube. This curve is linear in the center portion and exhibits deviations at either extremity. The shape of the curve and the choice of the zero-signal operating point (A) will determine the distortion produced by the tube. Mixing action caused by nonlinearity produces distortion products which cannot be eliminated by the tuned circuits of the amplifier.

monic regions, which are termed "even-order" products. The "odd-order" products, unfortunately, fall close to the fundamental output frequency of the amplifier, and cannot be removed by simple tuned circuits. These are the spurious frequencies that cause a poorly designed or incorrectly adjusted linear amplifier to cover the dial with splatter.

Shown in the illustration are two frequencies that make up a typical two-tone test signal. In this example, they are 2000 kc. and 2002 kc. Now, if the amplifier is perfect, these two signals will be the only ones appearing in the output circuit. An imperfect (but practical!) amplifier will have various combinations of sums and differences of the signals and the harmonics generated by the nonlinear transfer characteristic of the tube. Some of these unwanted products fall within the passband of the tuned circuits of the amplifier and are radiated along with the two test tones.

If the odd-order products are sufficiently attenuated, they will be of minor importance and can be ignored. The sixty-four-dollar question is: Of what magnitude can these spurious products be without becoming annoying? How much "garbage" can be permitted before the signal becomes intolerable to the operator trying to maintain a QSO in an adjacent channel?

The answer to these questions depends upon the type of information being transmitted and the degree of interference that can be tolerated in the adjacent channel. Certain forms of information (not voice) require an extremely low value of spurious products within and adjacent to the passband, otherwise the information will be seriously degraded. Odd-order products greater than 0.001 per cent of the wanted signal may be damaging to the intelligence. Translated into terms of decibels, this means the unwanted odd-order products must be 50 decibels below the wanted signal! This takes *some* doing, and is orders of magnitude more strict than is necessary in amateur voice communications.

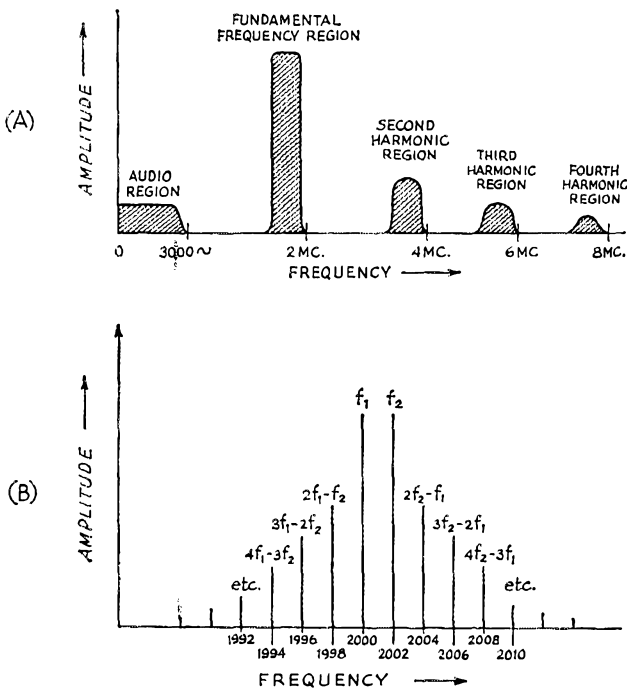


Fig. 2—Intermodulation (mixing) distortion caused by nonlinearity is illustrated by two-tone test signal (f_1 and f_2). Even-order products (A) are substantially eliminated by the tuned circuits of the amplifier, but odd-order products (B) fall within the passband of the tuned circuits and are not removed. (B) shows the mixture of spurious signals that make up distortion products falling within the fundamental range.

In actual practice, it would seem that if the odd-order products are less than 0.1 per cent of the peak signal power level, the adjacent-channel QRM will be tolerable in everyday amateur communications. This indicates a distortion-product magnitude 30 decibels below the peak output power level of the transmitter. Such a state of affairs can be attained by modern techniques and tubes without too much trouble, provided attention is given to circuit design and operating parameters of the equipment. Of course, if distortion levels less than this can be reached, so much the better. Unfortunately, some equipments presently operating in the amateur bands and masquerading as "linear" amplifiers exhibit distortion levels of 20 decibels or less below peak power output. Use of equipment of this dubious quality quickly reduces the popularity of the operator to zero, and will probably lead to a brick through the shack window if continued!

The Grounded-Grid Linear Amplifier

For amateur service, the grounded-grid circuit professes to be the answer to many of the ills besetting the linear amplifier. It generally requires a level of drive that is compatible with the great majority of sideband exciters (70 to 100 watts). With proper choice of tubes, it may be operated in a zero-bias condition, eliminating the need for expensive and heavy grid (and screen) power supplies. Neutralization is not usually required. In addition, claims are made that the inherent feedback of the grounded-grid amplifier improves the stage linearity and drops the magnitude of the distortion products. This all sounds too good to be true, and an examination of the grounded-

grid amplifier may be in order to see if it is the answer to the sidebander's prayers.

The classic grounded-grid amplifier is shown in Fig. 3. The control grid is at r.f. ground potential and the driving signal is applied to the cathode via a tuned circuit. The control grid serves as a shield between the cathode and the plate, making neutralization unnecessary at medium and high frequencies.

The input and output circuits of the grounded-grid amplifier may be considered to be in series, and a certain portion of the input power appears in the output circuit. This feed-through power helps somewhat to stabilize the load the amplifier presents to the exciter, and also provides the user with some "free" output power he would not otherwise obtain from a more conventional cir-

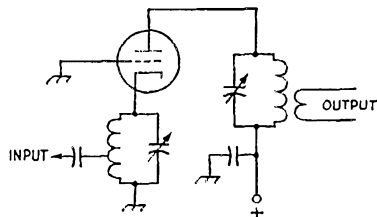


Fig. 3—The grounded-grid amplifier has the input circuit between cathode and ground. The control grid acts as a screen between the plate and the cathode, making neutralization unnecessary in most circuits. The input and output circuits are in series and a portion of the input power appears in the output circuit. The driver stage for the grounded-grid amplifier must be capable of supplying normal excitation power plus the required feed-through power. High-C cathode tank preserves waveform of input signal and prevents distortion.

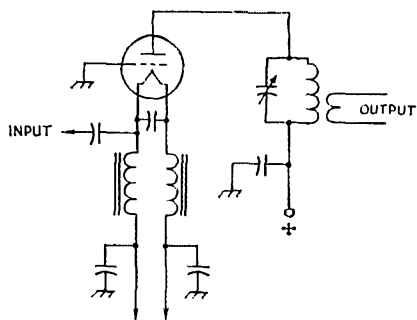


Fig. 4—Popular amateur-style grounded-grid amplifier uses untuned filament choke in place of cathode tuned circuit. Laboratory tests showed that this simplified configuration produced higher intermodulation distortion products and had less power output than the "classic" circuit of Fig. 3, regardless of the type of tube used. In addition, the untuned input circuit proved hard to match and drive with pi-network-type sideband exciter.

cuit. The driver stage for the grounded-grid amplifier must be capable of supplying the normal level of excitation power required by the amplifier plus the feed-through power. Stage power gains of 5 to 25 can be achieved in a grounded-grid amplifier.

Measurements made on tubes in the Power Grid Tube Laboratory of Eitel-McCullough, Inc., showed that an improvement of 5 to 10 decibels in odd-order distortion products may be gained by operating various tubes in the grounded-grid configuration of Fig. 3, in contrast to the same tubes in the grid-driven mode. The improvement in distortion figure varied from tube type to tube type, but all tubes tested showed some order of improvement when cathode driven.

The tuned cathode circuit consisted of a bifilar coil, which carried the filament current, and a large-value variable capacitor. The circuit was high- Q , with the excitation tap placed to provide a low value of s.w.r. on the coaxial cable to the exciter.

The Untuned Cathode Circuit

After sufficient measurements had been made with the circuit of Fig. 3, the apparatus was modified to simulate the popular untuned cathode input circuit of Fig. 4. It was immediately found that all the tubes tested in the previous circuit gave noticeably poorer results when used with an untuned cathode circuit. Power output dropped by 5 per cent or so, greater grid driving power was required, and linearity suffered to a degree. Specifically, the third-order products rose approximately 3 to 4 decibels over the values produced by the circuit of Fig. 3, and the fifth-order products rose 5 to 6 decibels over those figures recorded with the tuned cathode circuit. The higher order distortion products also rose accordingly. These results were consistent regardless of the *type* of tube under test, showing that the deterioration was a result of circuit imperfections.

Observing the input waveform at the cathode of the grounded-grid amplifier revealed a pronounced distortion of the r.f. waveform, caused by the loading effect over one-half cycle of a single-ended Class-B amplifier (Fig. 5). Plate and grid currents drawn over this portion of the cycle loaded the input circuit. The exciter thus sees a very low load impedance over a portion of the cycle, and an extremely high impedance over the remaining part of the cycle. Unless the output regulation of the exciter is very good, the

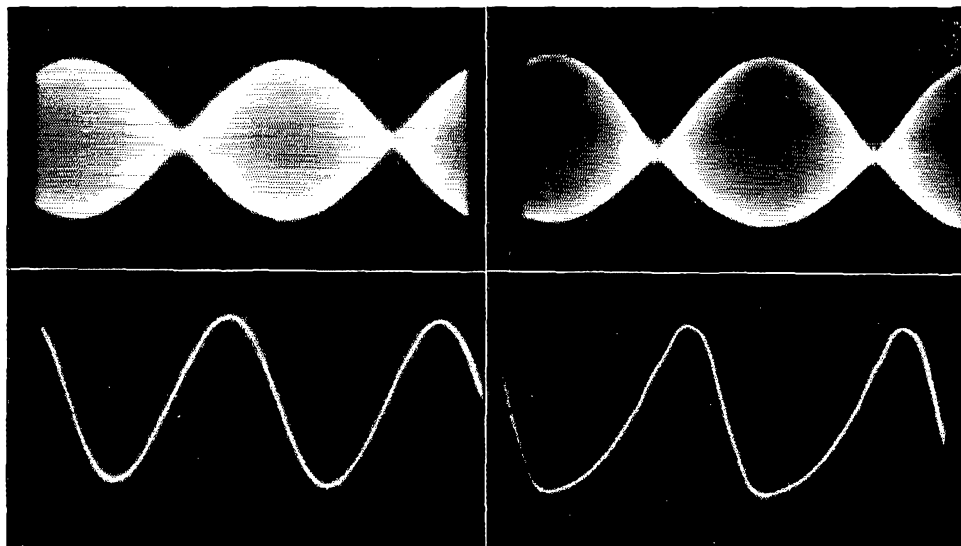


Fig. 5—Waveform distortion caused by half-cycle loading at cathode of grounded-grid amplifier can be observed in oscilloscope studies. Upper left: Two-tone test signal when tuned cathode circuit is used. Lower left: 3.5-Mc. waveform (single tone) from sideband exciter as seen at cathode tank. Upper right: Two-tone test signal when untuned cathode circuit is used. Lower right: 3.5-Mc. waveform (single tone) from sideband exciter, showing severe distortion of waveform when untuned cathode circuit is used.

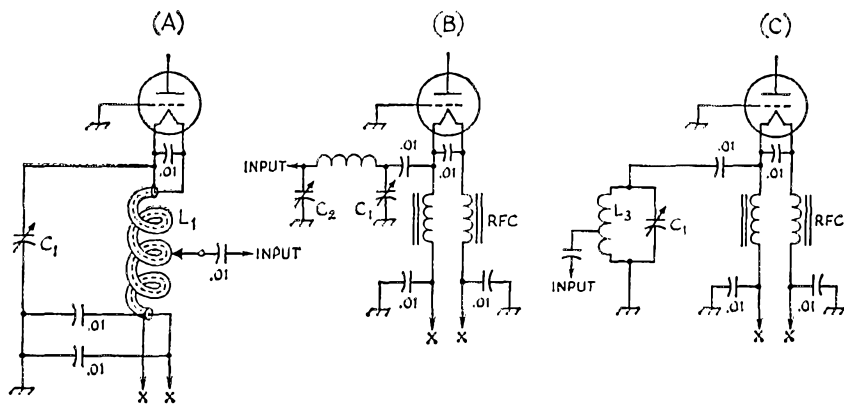


Fig. 6—Tuned cathode network for zero-bias tube may take the form of bifilar circuit (A), pi network (B), or a shunt LC circuit (C). A Q of 5 is recommended for optimum results. However, as this leads to rather bulky circuits at the lower frequencies, the Q may be decreased to 2 or 3 without serious effects. Capacitor C_1 is a 3-gang broadcast-type unit. Coils L_1 , L_2 , and L_3 are adjusted to resonate to the operating frequency with C_1 set to about $13 \mu\text{f}$. per meter of wavelength. Capacitor C_2 is approximately 1.5 times the value of C_1 . The input tap on coils L_1 and L_3 , or the capacitance of C_2 , are adjusted for minimum s.w.r. on the coaxial line to the exciter.

portion of the wave on the loaded part of the cycle will be seriously degraded, as shown. The exciter used for these tests was operating Class A and was well swamped to improve regulation. Under normal circumstances using an amateur-type exciter, degradation of the input waveform may reach a more serious degree.

Obviously, the circuit Q of the exciter output tank at the end of a random length of interconnecting coaxial line is not sufficient to prevent this form of wave distortion. In addition to degrading the intermodulation figure, this waveform distortion also might cause mysterious TVI troubles as a result of the high harmonic content of the wave.

The solution to this problem is to employ either a high- C tuned circuit of the form shown in Fig. 6A, or untuned filament chokes in conjunction with a simple pi-network or tuned circuit as shown in Figs. 6B and 6C. Either arrangement will supply the necessary flywheel effect to retain good r.f. waveform at the cathode of the stage.

Adjustment of the Tuned Cathode Circuit

The cathode circuit is resonated to the operating frequency by means of the variable capacitor. Resonance is indicated by maximum grid current in the amplifier. A low value of s.w.r. on the coaxial line to the exciter is established by adjusting the tap on the tuned circuit, or by varying the input capacitor of the pi network. S.w.r. correction should be made with the amplifier running at maximum input. When the tap is correctly set, maximum grid current and minimum s.w.r. will coincide at one setting of the capacitor. No cutting and trimming of the coaxial line is required, and the exciter will be properly loaded. This is a boon, indeed, to the owners of s.s.b. exciters that have a fixed pi network.

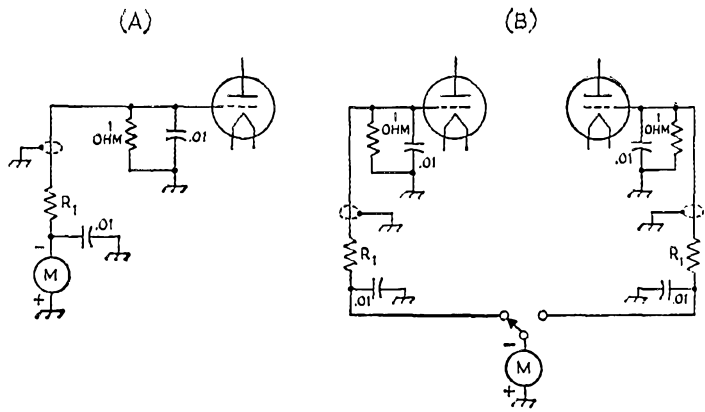
Grid-Current Measurement

Measuring the grid current of a cathode-driven

amplifier can be exasperating, as it is a ticklish job to "unground" the grid sufficiently to permit a metering circuit to be used yet still hold the grid at r.f. ground potential. The inherent inductance of most bypass capacitors permits the grid circuit to float above ground at some high frequency, and as a result, the amplifier exhibits instability and parasites. This problem can be avoided by using the measuring circuit of Fig. 7A. The control grid is grounded through a 1-ohm composition resistor, bypassed by a 0.01- μf . disk capacitor. The voltage drop generated by the flow of grid current across the resistor can easily be measured by a millivoltmeter calibrated to read in terms of grid current. Individual grid currents for each of a parallel pair of tubes may be measured by the circuit of Fig. 7B.

The internal resistance of the 0-1 d.c. milliammeter plus the series resistor R_1 determines the maximum current that can be measured. Suppose it is desired to read grid current of the order of 60 milliamperes. It would be convenient, therefore, to have the meter read 0-100 milliamperes, as the reading of the meter scale can easily be multiplied by 100 to obtain the actual value of current. Now, when a current of 100 milliamperes flows through 1 ohm, there exists a potential of 0.1 volt across the resistor. Therefore, the meter should read 0.1 volt full scale to correspond to a grid current of 100 ma. Assume the meter has an internal resistance of 55 ohms (such as the Triplett No. 221-T). The voltage drop across the meter itself is 0.055 volts when one milliamperere flows through it, but at one milliamperere the resistance must be 100 ohms for a voltage drop of 0.1 volt. The difference between 100 ohms and 55 ohms, or 45 ohms, must therefore be added in series with the meter to convert it to read 0.1 volt full scale. On the other hand, the meter by itself across the 1-ohm resistor would indicate 0.055 volts full scale, corresponding to a grid current of 55 milliamperes. If the grid current is

Fig. 7—Grid current in a grounded-grid amplifier may be measured across a low impedance without upsetting the stability of the amplifier. (A) Grid is grounded by a 1-ohm composition resistor in parallel with a 0.01- μ f. ceramic disk capacitor. Resistor and capacitor leads are cut very short, and lead to metering circuit is shielded. (B) A single meter may be used to measure individual grid currents of two tubes.



below this latter figure no series resistor will be required for the meter. Conversely, higher values of grid current would call for greater series resistance.

Summary

The use of the tuned cathode circuit in a grounded-grid linear-amplifier stage improves linearity, increases the power output, makes the

stage easier to drive, and reduces the burden placed on the sideband exciter. It is the firm belief of the authors that the advantages of this circuit are well worth the added cost of parts and the extra controls. It is, of course, possible to dispense with the tuned cathode circuit provided the user understands the handicaps he must assume by omission of this important circuit element.

Q57

NEW BOOKS

Surplus Radio Conversion Manual, Vol. III, published by Editors and Engineers, Ltd., Summerland, California. Edited by William I. Orr. 88 pages, 8½ by 11 inches, paper cover. Price, \$2.50.

The seemingly endless stream of war surplus equipment keeps interest high in converting surplus gear to amateur use. The *Surplus Radio Conversion Manual, Volume III*, is the third in a series of conversion manuals which include information, some of it in step-by-step fashion, on modifications. This new volume gives specific data on the popular "command" sets (including the v.h.f. models), SCR-522, LM frequency meter, BC-348 receiver and many more. If you are using or plan to use surplus equipment, this manual will be a good time saver as well as a source of reference material and schematics.

Transistors, by B. R. A. Bettridge. Published by Trader Publishing Co., Ltd., Dorset House, Stamford St., London S.E. 1, England. 25 pages, 6 by 8¾ inches, paper cover. Price, 3s. net.

A concise coverage of transistors, this book seems to have been directed to the service man and technician. Its chapters are devoted to the nature of the transistor, common base and emitter circuits, low-frequency amplifier circuits, complete transistor receivers and general servicing notes. The last chapter, on servicing, contains information on making measurements, on possible causes of damage, signal tracing, and testing of transistors and transistor circuits. Schematic diagrams of typical transistor receiver circuits are included.

Fixed and Variable Capacitors, by G. W. A. Dummer and Harold M. Nordenberg. Published by McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, N. Y. 288 pages including index, 167 illustrations, cloth cover, 6 by 9 inches. Price, \$10.00.

A real aid in selecting and using fixed and variable capacitors in modern electronic equipment, this book also

contains reference information on characteristics and construction details. Just about all types of capacitors are covered — paper, mica, ceramic, glass, vitreous enamel, electrolytic, gas-filled, to name a few. Details of variable capacitors such as the trimmer and precision and general purpose types are given. Included is general information on capacitor applications, techniques of measurements, future potentials and new experimental models.

— E.L.C.

Strays

W2BNX (Bill Uzzell, 42 Prescott St., Garden City, N. Y.) would like to hear from anyone who has ever had any first-hand experience in trying to prevent a power company from running a high-voltage transmission line across his property and, or who has brought legal action because of radio interference caused by such electric-power transmission lines.

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K1CBB (Howard J. Lamade, jr., 20 Bradley Park Drive, Hingham, Mass.) would like to hear from any hams connected with the printing or publishing business. If there's enough interest, he'll see about starting a net.

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It's that season of the year when you'd better be sure you have adequate lightning protection. Grounding switches and, or gaps are the order of the day. W5BVG reports that the electrical storms in his area are so intense that they register higher on his untuned field-strength meter than does his 400 watt!

An S.S.B. Product-Detector Adapter

Any heterodyne system, such as is employed in s.s.b. reception, responds equally well to signals on either side of the heterodyning oscillator frequency. In cases where the receiver does not have sufficient selectivity to reject the undesired image, rejection can be effected by means of an adapter employing a phasing system of the type described here.

Using the 7360 in a Phasing System

BY CARL F. BUHRER,* K2OHF

THE proper demodulation of a sideband signal can be accomplished by combining it with an excess of carrier injection voltage in a diode detector or by means of a product detector. A product detector alone, however, will not reject signals on the undesired side of the injected carrier; these must be eliminated either by a selective i.f. strip or by means of a suitable phasing system and double product-detector combination. The theory of such a system is described in the ARRL publication *Single Sideband for the Radio Amateur*. The adapter described is being used with an NC-125. Its cable plugs into the receiver in place of the 6H6 a.m. detector. A minor modification of the circuitry was necessary that does not affect a.m. operation.

Circuit Description

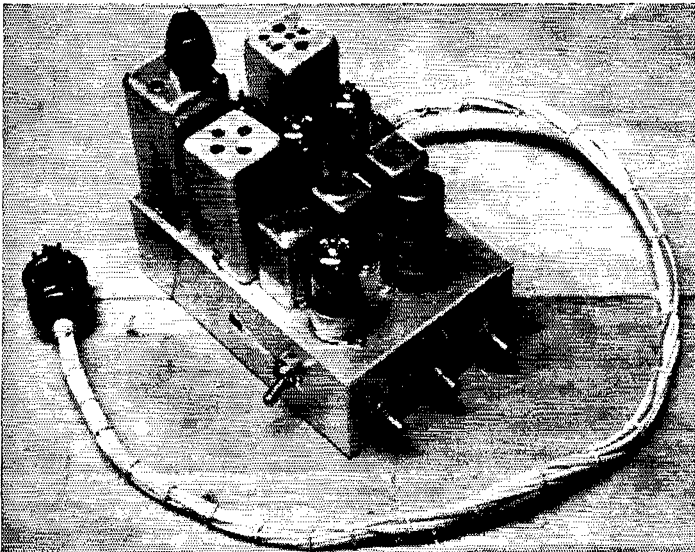
Two type 7360 tubes are used as product detectors, as shown in Fig. 1. Their design and application have been previously described.^{1,2} The 6AG5 injection oscillator is used to produce two 10-volt peak-to-peak 455-ke. waves on the

grid of each of the 7360s. The resistor and capacitor across the secondary of T_2 , with resistance and reactance equal, provide equal-amplitude injection signals 90 degrees out of phase. The deflecting electrodes are fed with push-pull i.f. signals biased at +25 volts. The audio output from the plates is reduced by means of T_3 and T_4 to a lower impedance necessary to feed the phase-splitting potentiometers, R_1 and R_2 , at the inputs of the phase-shift networks. Here the audio signals, which were 90 degrees out of phase, are given a 90-degree relative phase shift so they are now either in phase or 180 degrees out of phase. Those in phase cancel in T_5 , while the others add to give useful output. The phase relations are such that only one sideband is heard. Switch S_1 determines the sideband selection, the center off position resulting in double-sideband response. The low-pass filter at the output restricts the audio range to where the networks perform well but the filter could probably be omitted.

Construction

The adapter was built on a $2 \times 4 \times 6$ -inch aluminum chassis (which is a bit too small), and is connected to the NC-125 by a cable with octal connectors. Most of the parts are standard, but some are modified or surplus. The 455-ke. trans-

* 25 Lafayette Ave., Hempstead, N. Y.
¹ Vance, "S.S.B. Exciter Circuits Using a New Beam-Deflection Tube," *QST*, March, 1960.
² Filipczak, "Using the 7360 in the HBR-16," *QST*, December, 1960.



Plan view of the product-detector adapter. The i.f. transformers are at the left-hand end of the chassis, the three audio transformers at approximate center and the phase-shift unit to the right. The b.f.o. unit at the extreme left was eliminated later in favor of a crystal oscillator.

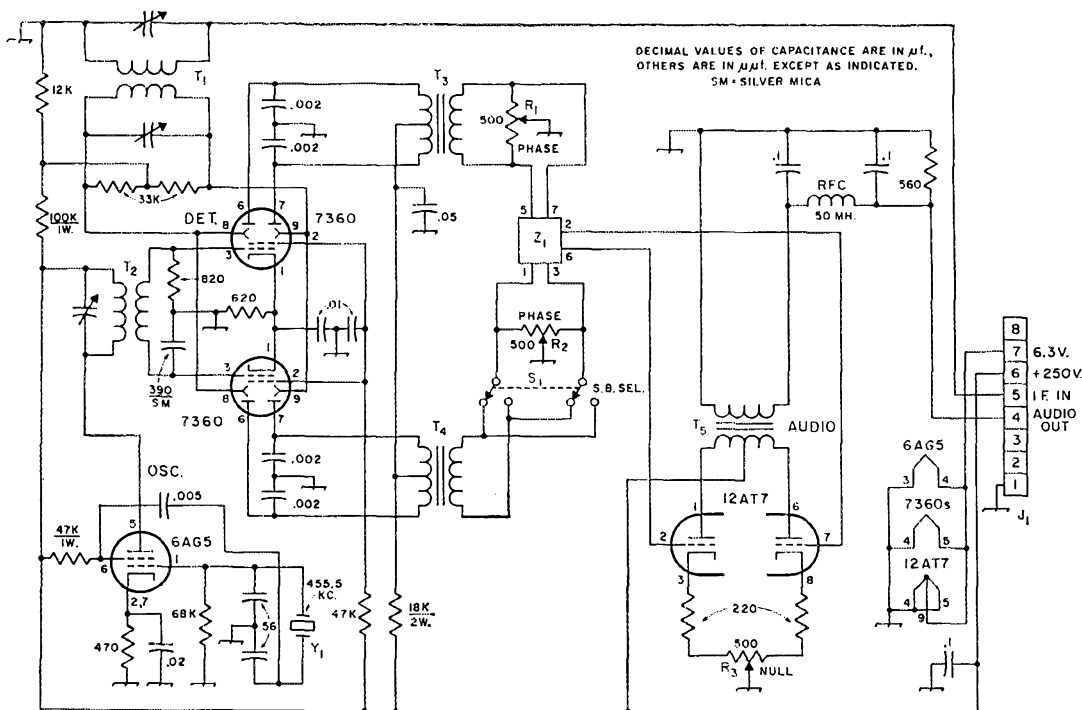


Fig. 1—Circuit of the s.s.b. adapter. Resistances are in ohms and resistors are 1/2 watt unless indicated otherwise.

J₁—Octal plug.

R₁, R₂, R₃—500-ohm control, linear taper.

S₁—D.p.d.t. center-off toggle switch.

T₁, T₂—455-kc. interstage i.f. transformer (Miller 112-C2).

See text for modification of T₃.

T₃, T₄, T₅—Audio transformer: 20,000 ohms center-tapped to 500 ohms (see text).

Z₁—Phase-shift network (B & W 2Q4).

Y₁—Surplus crystal, 455.55 kc. (FT-241, Channel 46).

formers are of the capacitor-tuned variety. In T₂, the tuning capacitor and half of the secondary winding were removed. The small coil was then slid to within 1/4 inch of the primary winding. The three audio transformers were obtained in surplus. Each has three center-tapped windings of 22,000 ohms, 5200 ohms, and 600 ohms, but any center-tapped 20,000-ohm to 500-ohm (or 600-ohm) audio transformer should be satisfactory provided that T₃ and T₄ are identical.³

Alignment and Operation

After connecting the detector to a power source, check to see that the oscillator is working. Set T₂ such that 10 volts peak-to-peak appears on each 7360 No. 1 grid.

A possible way to do this without using an r.f. probe or a wide-band calibrated oscilloscope would be to temporarily disconnect the grounded side of the 820-ohm resistor and insert a v.t.v.m. (or 0-1 millimeter) bypassed by a 0.1-μf. capacitor between it and ground. Grid current will produce a negative voltage reading if the peak r.f. exceeds the cathode bias of about 5 volts, and the r.f. amplitude should be held below the point where this occurs.

Move the receiver tuning upward to give a

1000-cycle beat note and using an a.c. v.t.v.m., adjust R₁ so that the voltages on Pin 7 and Pin 5 of the 2Q4 are in the ratio of 2 to 7. Do the same for Pin 3 and Pin 1, using R₂. Set R₃ to its center, flip S₁ to whichever position rejects the audio best, and adjust R₂ and R₃ to null out any remaining 1000-cycle tone, disregarding audio harmonics. Now tune the receiver down to 1000 cycles below zero beat, throw S₁ to the opposite side, and adjust R₁ and R₃ for a null. Repeat this several times, using only two of the potentiometers on each side of zero beat. Either this procedure or the opposite one, in which the roles of R₁ and R₂ are reversed, should lead to proper alignment.

In the NC-125 the wiring of the 6H6 socket was modified as follows:

Pin 7 was connected to 6.3 volts a.c.

Pin 2 was grounded through the 4.3-ohm heater dropping resistor.

Pin 1 was grounded along with Pin 8.

Pin 6, which had been used as a tie point, was connected to the B+ line.

These changes leave a.m. operation unaffected, but when the adapter replaces the 6H6, its input connects to the i.f. output transformer in place of the detector diode plate, Pin 5, and its output feeds in to Pin 4 in place of the series noise limiter cathode and then to the audio stages. Similar connection should be possible with many other receivers.

³ Transformers used in the W2EWL s.s.b. exciter should be suitable. See QST Ham-Ads.

• *Beginner and Novice* —

Six Meters with the TV/Surplus 150-Watt Amplifier

Adding a Plate Tank for 50 Mc.

BY LEWIS G. McCOY,* WIICP

AFTER describing the 150-watt amplifier^{1,2} for 80 through 10 meters, several requests were received asking if the unit could be modified for 6 meters. The tubes used in the amplifier, a pair of 1625s, have ratings which permit full input up to 60 Mc., so it was decided to try the amplifier on 6. Unfortunately, it was impossible to modify the existing tank circuit, as the physical layout of the parts wasn't suitable for v.h.f. work.

Incidentally, this article is written strictly for

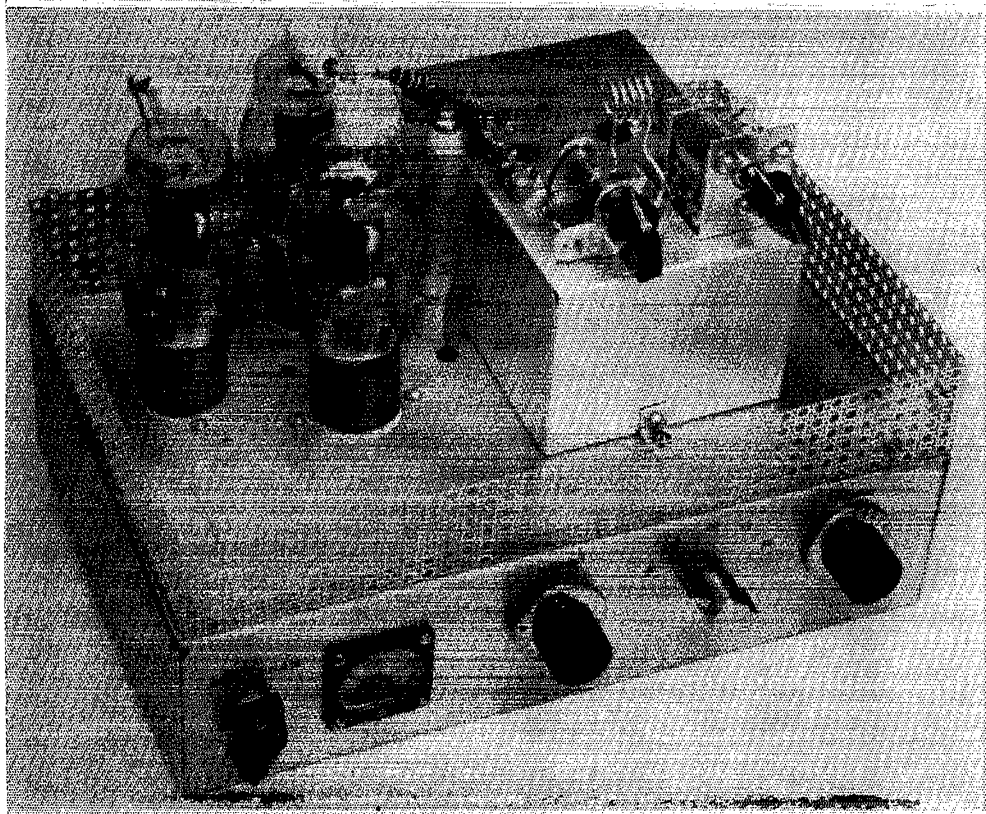
* Technical Assistant, *QST*.

¹ McCoy, "Surplus Tubes + an Old TV Set = 150-Watt Amplifier," *QST*, April, 1961.

² McCoy, "Plate Modulation for the TV-Set/Surplus 150-Watt Amplifier," *QST*, July, 1961.

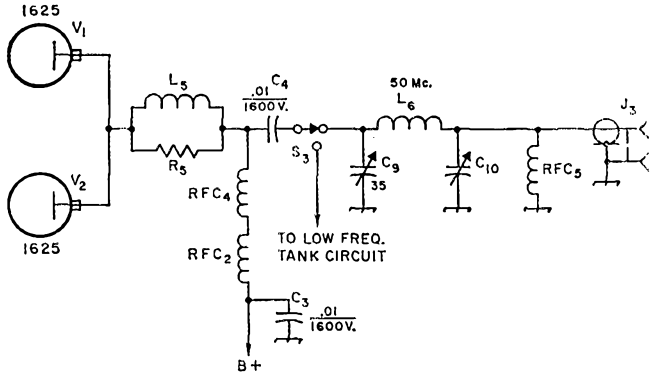
the benefit of those hams who already have built the amplifier. If you are a v.h.f. man and want an amplifier just for 6 meters, it is recommended that you build one of the units described in the v.h.f. section of the ARRL *Handbook*. These amplifiers offer better design in that their physical layout of components is made for the shortest possible leads, which makes for better over-all efficiency.

In order to do the best job with this amplifier, a separate tank circuit was constructed so that shorter plate leads to the 1625s could be used. In the original unit the tank circuit was mounted below the chassis and plate leads brought up to the tubes. While long plate leads may be suitable



This view shows the addition of the 50-Mc. tank circuit. The aluminum chassis on which the tank is mounted is to the right of the 1625 amplifier tubes.

Fig. 1—Circuit diagram of the 6-meter tank circuit. Decimal values of capacitance are in $\mu\text{f.}$, others in $\mu\mu\text{f.}$



- C_9 —35- $\mu\mu\text{f.}$ variable (Hammarlund MC-35-S).
- C_{10} —365- $\mu\mu\text{f.}$ or more, variable (Miller No. 2111, Allied Radio 61-H-009).
- L_5 —4 turns No. 20 wire wound on 100-ohm, 1-watt resistor, turns spaced to cover length of resistor body.
- L_6 —5 turns No. 12 wire, 1/2-inch diam., turns spaced wire diameter.

- RFC_4, RFC_5 —50-Mc. r.f. choke (Millen 34300-22, Ohmite Z-50, National type R60).
- R_5 —100-ohm, 1/2-watt.
- S_3 —Homemade switch; see text.
- J_3 —Coax chassis receptacle, type SO-239. For other circuit designations, see April, 1961, QST.

for the lower bands, they should be avoided on v.h.f.

The exciter used to drive the amplifier should have 7 or more watts output. Anything less than this will not provide enough drive, since the grid circuit of the amplifier is untuned. A previous article² described the construction of an inexpensive plate modulator for the amplifier and this same modulator can be used in the 6-meter setup.

Circuit Details

Fig. 1 is the circuit of the new tank for 50 Mc. The 1625s are operated in parallel, the same as on the lower bands. One of the problems encountered when the circuit was tested was the presence of a v.h.f. parasitic. The parasitic suppressors used with the low-frequency tank didn't appear to do a job. After trying several combinations, the problem was solved by using a copper strap between the plates of the 1625s, plus the use of L_5R_5 . In addition, two 10-ohm resistors, one in the grid lead to each tube, were installed as shown in Fig. 2. It was found that these steps also took care of the parasitic when the low-frequency tank was used.

The r.f. choke used in the original circuit was not designed for 6 meters, so a more suitable choke, RFC_4 , was connected in series with the low-frequency unit. $C_9, L_6,$ and C_{10} make up the pi-network tank. Band changing from the low-frequency tank to the 6-meter unit is accomplished by switching the coupling capacitor C_4 to whichever tank is used. In order to save cost and simplify the circuit, the switch for this purpose consists of a flexible lead and a Fahnestock clip, as detailed in the next column.

Construction

The 6-meter tank circuit is mounted on top of a 3 × 4 × 6-inch aluminum chassis. This chassis is installed on top of the amplifier deck in the open area alongside the amplifier tubes, as close to RFC_2 as possible. The 6-meter chassis can be

secured to the amplifier top either by using self-tapping screws or by making up right-angle brackets. The perforated shield used to cover the amplifier tank circuit on low frequencies is removed for 50-Mc. operation.

A four-terminal bakelite tie-point strip should be mounted on top of the chassis close to RFC_2 . One of the terminals is used for the junction of $L_6, RFC_4,$ and C_4 . The other end of C_4 is connected to the adjacent terminal. Also connected to this terminal is a short piece of flexible lead (or metal braid) which is terminated in a Fahnestock clip. This is the "arm" of S_3 . Pieces of tinned wire—No. 14 or 16 is suitable—are soldered to each of the next two terminals and the wires dressed so that a length of about 1/2 inch projects up from the terminal lug. These are the "contacts" of S_3 , and the Fahnestock clip can be slipped onto the appropriate wire to make contact to whichever tank circuit is to be used.

The 50-Mc. coil, L_6 , is mounted between the stators of C_9 and C_{10} . J_3 is mounted on the rear of the 50-Mc. chassis.

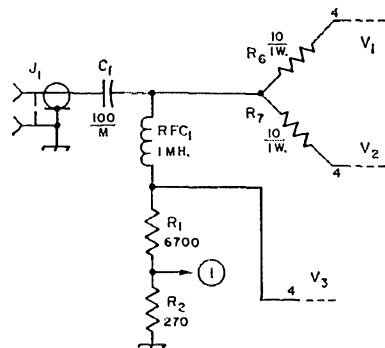
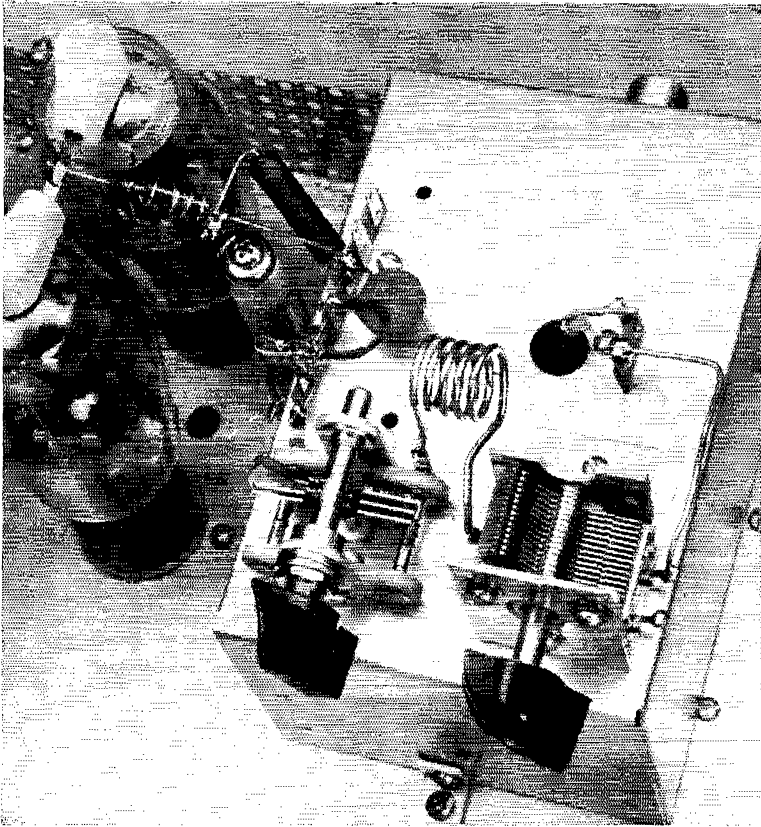


Fig. 2—Circuit diagram of modified grid circuit for the 1625 amplifier. R_6 and R_7 are 10-ohm, 1-watt, composition-type resistors. Do not use wire-wound. Other values are from the April, 1961, QST article.



The variable at the left is the tank tuning capacitor and the one on the right is the loading capacitor. The tank coil is installed between the stators of the two capacitors. To the rear of the tank tuning capacitor is the terminal strip that holds S_3 , the homemade switch. Note that the plate caps of the 6BE6s have a short copper bonding strip connecting them together.

Tune-Up Procedure

Tuning up on 50 Mc. with a pi-network circuit is just about the same as with the lower bands. You can use a 100-watt lamp bulb for a test load. First, tune your exciter for grid drive, a meter reading of about 8 ma. being sufficient. We used the "Tech Special,"³ which has about 7 watts output on 50 Mc., to drive the amplifier. At first there wasn't enough drive, so a $\frac{1}{4}$ wavelength piece of RG-58, U coax (about 40 inches) was used to couple the exciter to the amplifier. This got the drive up to 8 ma. If your exciter provides only marginal drive, you may have to experiment with different lengths of coax for coupling the exciter to the amplifier.

³ McCoy, "Tech Special," *QST*, June, 1960.

Be sure that the plate voltage is off before making any tank circuit connections. Then connect S_3 so that the 50-Mc. tank circuit is being fed, set C_{10} to maximum capacitance, and turn on the plate voltage. Tune C_9 for a dip in plate current and then start decreasing the capacitance of C_{10} , keeping the amplifier in tune by adjusting C_9 . The light-bulb load should light up and you can bring the loading up to about 100 watts input for phone or 120 watts for c.w. Tune-up procedure with a feed line attached is similar, but you'll probably find the settings of C_9 and C_{10} differ from those with a lamp load.

The efficiency of the amplifier on 6 is a little better than 50 per cent. While this isn't as good as the lower bands, it is a fair output for an amplifier designed to cover several bands. **QST**

Strays

Being blind does not hamper the code-copying ability of W9GPS one bit, and he can copy 35 w.p.m. from W1AW with no difficulty. However, he was not aware of the high-speed transmissions from W1MX and W1NJM, and so one night when he ran across a high-speed tape sending code practice he assumed that it was the 35-w.p.m. run from W1AW. But much to his chagrin he found he was missing a character here and

there. You can imagine how relieved he was when the tape concluded with the sentence, "End of transmission at 55 w.p.m."

— . . . —
K9QEI wants to establish a "personality net." You can qualify if you are or are trying to be a disc jockey. Just send the dope on broadcast station call, frequency, format, and yourself to K9QEI at 126 Rock Island Ave., Peoria, Ill.

A Multioutput

Variable-Voltage

Power Supply

This power unit will supply the voltage requirements, both positive and negative, for most low-power experimental electronic work. Output voltages of both polarities are independently and continuously variable over a wide range by means of panel controls.

BY HOWARD COHEN,* K2IT0

THE operation of electronic equipment involving vacuum tubes or transistors requires a source of power to supply the various operating voltages. In the case of complete units, such as receivers, amplifiers and test equipment, a power supply is often an integral part of the unit. In such instances, the supply is designed to provide the exact voltages required. However, in experimental work it usually becomes desirable to have an independent power source that is highly versatile to accommodate the many combinations of plate, screen and biasing voltages likely to be encountered. A variable-voltage supply that is inexpensive, and readily adjusted by controls for a wide range of conditions represents the ultimate in convenience for many types of low-power experimental electronic work.

Circuit

The power supply whose circuit is shown in Fig. 1 is a unit that is suitable for use with any

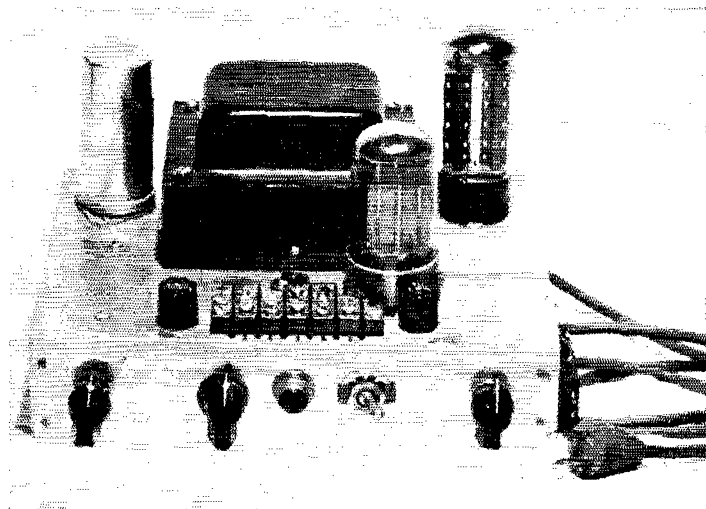
* Federal Manufacturing and Engineering Corp., 1055 Stewart Ave., Garden City, New York.

equipment requiring voltages within the range of 0 to approximately 300 at currents up to 200 ma. It is based on a conventional full-wave rectifier circuit utilizing a 600-volt 250-ma. center-tapped transformer, T_1 , a 5U4GB rectifier, and a capacitor-input filter consisting of C_{1A} , L_1 and C_{1B} .

The full positive output voltage of the supply (approximately 300 volts at full load) may be taken from Terminal A. Variable positive output voltages may be taken from Terminals B and C, where C_{1C} and C_{1D} provide additional filtering. The variation in output voltage is obtained by means of a type 6080 (or 6AS7GA) dual triode which is used as a variable series resistor. The series resistance represented by the plate-cathode circuit of the tube is varied by adjustment of the grid bias by means of potentiometers R_1 and R_2 .

Switch S_2 permits the two triode sections to be used individually to provide two independently-variable output voltages, or to supply a single controlled output voltage with the two sections in parallel when the load current exceeds the

This versatile power supply furnishes two continuously-variable positive voltages and one negative, in addition to both positive and negative fixed voltages. Components are identified in the text.



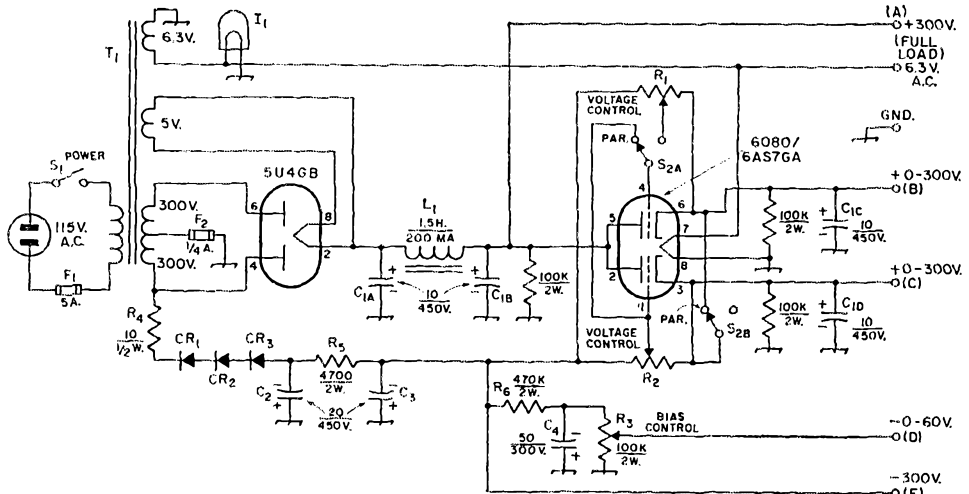


Fig. 1—Circuit of the versatile power supply for experimental work. Capacitances are in $\mu\text{f.}$ and resistances in ohms. Capacitors marked with polarity are electrolytic. Components not listed below are labeled for text reference only.

C_1 —Quadruple 10- $\mu\text{f.}$ 450-volt electrolytic.

CR_1, CR_2, CR_3 —130-volt 65-ma. selenium rectifier.

I_1 —6.3-volt pilot lamp.

L_1 —Filter choke, 1.5 h., 200 ma. (Stancor C-2327).

R_1, R_2 —2-megohm 2-watt control.

R_3 —0.1-megohm 2-watt control.

S_1 —Power switch—S.p.d.t. toggle.

S_2 —Single-triode-to-parallel switch—D.p.d.t. toggle.

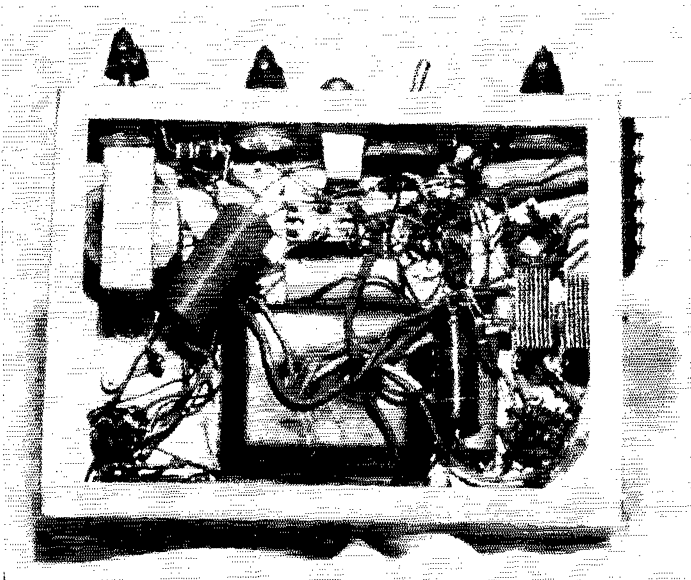
T_1 —Power transformer: 600 volts, 225 ma., c.t.; 5 volts, 3 amp.; 6.3 volts, 9 amp. (Stancor P-8164 or similar).

maximum value permissible within the plate dissipation rating of a single section. See Fig. 2. A supply of this type tends to be self-regulating at any selected position of the bias potentiometer. If the voltage across the load tends to increase, either as a result of increased line voltage or a decrease in load current, the biasing voltage will also increase, tending to resist an increase in the output voltage.

Negative biasing voltages are obtained from the same transformer, T_1 , through a half-wave

rectifier using three selenium rectifiers in series (three are required to provide the necessary rectifier voltage rating), and a resistance-capacitance filter consisting of C_2, R_5 and C_3 . This section supplies operating bias for the two control potentiometers, R_1 and R_2 . The full output voltage of the negative supply is available for external use at Terminal E. Negative voltage, adjustable from 0 to -60 by means of potentiometer R_3 , is provided at Terminal D, where C_4

(Continued on page 152)



Bottom view of the variable-voltage power supply.

● Technical Topic

Tapped-Coil Pi Networks

WHEN a pi network is used as the output tank of an r.f. amplifier, it is commonly considered desirable to base the design on a tank Q of 10. Lower values of Q may not provide adequate harmonic suppression or furnish enough flywheel effect for efficient tube operation. Higher values of Q result in greater tank-circuit loss because of the increase in circulating tank current which accompanies an increase in Q . However, the maximum theoretical impedance transformation possible in a pi network limits the output load impedance to a value not less than the plate load resistance divided by the square of the tank Q . Thus for a 50-ohm output load, the Q must be greater than 10 for plate load impedance above 5000 ohms. But, in any event, it is desirable to keep the Q as close to 10 as transformation considerations will permit.

If the selected Q is to be maintained over a range of output load impedances, all three circuit elements — input capacitance, inductance and output capacitance — must be capable of adjustment, since only one set of values will produce a match with a single selected value of Q . Earlier forms of pi network made use of a continuously-variable inductor of the roller-contact type. However, in many of the more recent designs, the variable inductor has been dropped in favor of a simpler and less-expensive arrangement using a tapped coil which restricts the inductance to a single value for each band. It should be borne in mind that such circuits are designed primarily for a single value of output-load resistance — usually 50 or 70 ohms — and that higher load resistances can be matched only by allowing the Q to vary.

From the considerations mentioned above, it

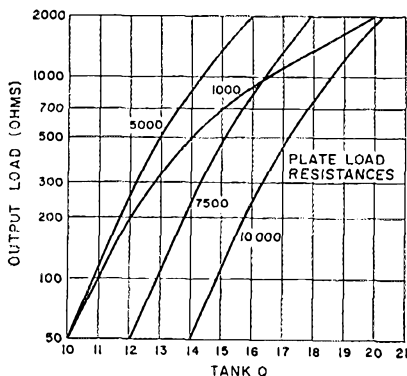


Fig. 1—Curves showing the increase in Q required to obtain a match between various plate-load resistances and output-load impedances with a pi-network when the inductance has a fixed value. The 1000-ohm curve is based on a Q of 10 for a 50-ohm load as the minimum Q desirable for harmonic suppression. The other curves are based on the minimum Q that will provide a match to a 50-ohm load.

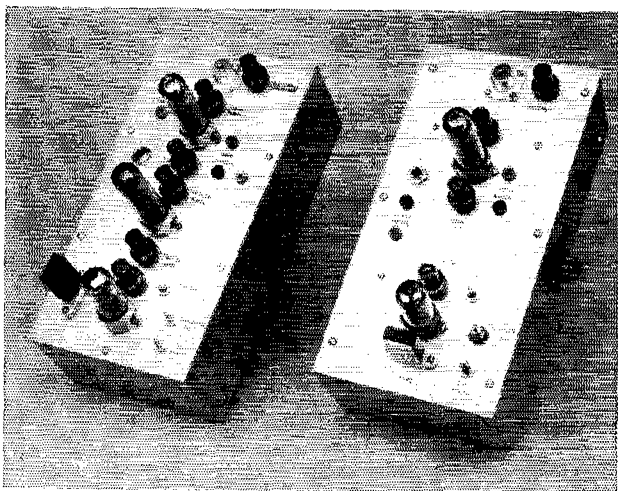
is of interest to know in which direction the Q must vary and by how much. A series of calculations produces the curves shown in Fig. 1. This graph shows how the Q must vary to match various plate-load resistances to output loads of higher value than 50 ohms when the network is designed basically for minimum permissible Q at 50 ohms. The curves show that an increase in Q is required as the output-load impedance increases. They also show that for the same basic Q at 50 ohms, the increase in Q required is greater for lower values of plate-load resistance.

To what degree does this increase in tank Q affect tank-circuit loss? Tank current increases directly as the tank Q and, with a coil of fixed resistance, tank-circuit loss increases as the square of the tank current. The curve for a plate-load impedance of 1000 ohms shows that a match to a 2000-ohm load requires doubling the tank Q . The tank-circuit loss therefore increases by a factor of four. If the loss at Q 10 is 5 per cent, it will increase to 20 per cent at Q 20. At higher plate-load resistances, the necessary increase in Q is somewhat less.

In terms of db., the increase in tank-circuit loss is not of too serious consequence. However, there are other practical considerations. It takes a surprisingly small amount of power loss in a tank coil to cause the coil to run hot. An increase of 3 or 4 times in tank-coil dissipation may be sufficient to damage a plastic-supported coil unless the conductor size is generous and the coil well ventilated. High- Q circuits also require more-frequent retuning in covering a band of frequencies. But perhaps the most serious problem is that the tank capacitor must have considerable reserve capacitance. If the Q must be doubled to obtain a match at the higher load impedances, the tank capacitance must be doubled. Providing this reserve capacitance may not be a problem at the higher frequencies, but if 80 meters is to be included, the capacitor required for this band may not only present a space problem but its minimum capacitance may be so high that there will be difficulty in holding the Q down to a value that will permit reasonable tank-circuit efficiency at the higher frequencies. In some cases, the latter problem has been met by providing a dual capacitor, one section only of which is used for the higher frequencies.

These difficulties may be overcome, of course, by the use of an additional network, such as an antenna coupler, which may be adjusted so that the load presented to the output circuit of the transmitter is a constant value regardless of the actual impedance represented by the antenna. An antenna coupler also provides the means for compensating for reactive components that so often make "random"-type antennas so difficult to handle directly with a pi network.

— D.H.M.



The r.f. units for 144 Mc. (left) and 50 Mc. are as much alike mechanically and electrically as possible. Shown here side by side, they have their crystal oscillators at the low end of the picture. Provision is made for measuring grid and plate current by plugging a meter into insulated tip jacks. The transmitters plug into the side of the modulator and power-supply chassis (to be described in a later issue), or they may be connected to it through 4-wire cables of suitable length.

A Two-Band Station for the V.H.F. Beginner

Part II - The Transmitters

BY EDWARD P. TILTON,* WIHDQ

You can build a transmitter for 50 or 144 Mc. with fewer parts and simpler circuits than the ones shown here. You might even develop the same power output for a bit less money than we have spent. But simplicity and low cost can be delusions. We started with v.h.f. crystals, for example, and came up with a one-tube 6-meter rig and a two-tube for 2. They were unstable, both as to warm-up drift and frequency shift under keying and modulation, so they were ruled out. The same tube lineup we show can be used with fewer tuned circuits, but it may radiate strong unwanted harmonics, and be something of a neighborhood nuisance.

These r.f. units were designed to be easy to build and adjust. They are stable in operation, and are relatively free of unwanted frequencies that could cause TVI. They scrimp on no essentials, and they have features that may save you money in the long run. Both employ crystals that are inexpensive and reliable. By shopping for surplus crystals you can afford enough of them to operate close to any desired frequency. Shifting from one spot to another is done with a minimum of retuning, thanks to a reserve of driving power all along the line. The oscillator circuit is readily adapted to v.f.o. control, should you want to go to it eventually. The transmitters can be keyed for c.w., and the signal will sound

like a c.w. signal should, without the annoying yoops so often heard in v.h.f. c.w. work. With this equipment your signal will require no apologies, and you will have a fine base on which to expand to higher power later on.

The Circuits

It will be seen that the transmitters are very similar. They are so much alike, in fact, that we did not repeat duplicate parts of the circuit in the diagram of the 144-Mc. model. The two transmitters will be described concurrently, and unless the text states otherwise, what is said will apply to both units. The crystal oscillator is the pentode section of a 6CX8 dual tube. The 6CX8 triode is a doubler stage. Crystals between 8000 and 8222 kc. are used for the 2-meter band (8056 to 8166 kc. for the Novice-Technician portion between 145 and 147 Mc.) and 8334 to 9000 kc. for the 50-Mc. band. Those between 8334 and 8350 kc. should be used for c.w. operation only, as they multiply into the first 100 kc. of the 50-Mc. band, which is set aside for that mode only. Appropriate crystals between 6000 and 6750 kc. may also be used, as may 12- and 24-Mc. crystals. The latter two are overtone types, and will not be as stable as those for 8 or 6 Mc.

The oscillator requires no adjustment other than moving the core in the plate coil, L_1 . This is tuned between 24 and 27 Mc., depending on the crystal frequency. The 6CX8 pentode triples the frequency for 8-Mc. crystals and quadruples

* V.H.F. Editor, QST.

Part I of this series appeared in the July issue, p. 12.

it for 6-Mc. ones. Loosely coupled tuned circuits, L_1 and L_2 , in the oscillator plate and doubler grid emphasize the desired harmonic and help to reject unwanted other frequencies that are developed in the oscillator.

Attenuation of unwanted frequencies is aided by the use of inductive coupling between the doubler plate circuit, C_1L_3 , and the following grid circuit, C_3L_4 . Note that here a single-ended stage is coupled to a push-pull one. The capacitor C_2 is used to balance this circuit for coupling to L_4 . It places a capacitance similar to the plate-to-ground capacitance of the tube at the opposite end of L_3 from the plate. Its adjustment is not critical.

The stage following the doubler looks the same in both schematic diagrams, but it is an amplifier for 50 Mc. and a frequency tripler for 144 Mc. Its plate-screen circuit is modulated when the 50-Mc. transmitter is used for voice work. In the 144-Mc. model this stage triples from 48 to 144 Mc. and drives a similar stage as an amplifier. Modulation is applied to the latter stage in 2-meter phone operation. Both tripler and amplifier are 6360 dual tetrodes. Power input to the amplifier runs about 15 watts on phone, but may be increased to 20 watts or more on c.w. The key is inserted in the amplifier cathode jack, J_5 . Tuned antenna coupling conveys the transmitter output to a coaxial line to the antenna

change-over relay, which is part of the modulator unit, to be described later. Tip jacks are provided for measuring tripler and amplifier grid current, and amplifier plate current.

Construction

The transmitters are built on aluminum plates that are screwed onto aluminum chassis 5 by 10 by 3 inches in size. Leads are brought to a plug mounted in the right side of the transmitter chassis, for plugging into the power socket on the left side of the modulator chassis. The transmitter and modulator units may also be operated apart by making up a suitable cable for connecting the two. Drilling templates for the transmitters are available on request from ARRL.¹

It will be seen that various components come close to the edges of the plate on which the transmitter is built. To avoid possible damage when the units are mounted on or removed from the chassis, it is desirable to cut notches in the folded-over edges of the chassis to give plenty of clearance around these parts. This is particularly true of the output tuning capacitors, which are vulnerable in this respect.

¹ Templates for drilling the transmitter top plates, the tuner chassis, and the principal surfaces of the two converters are available, no charge, from ARRL. Send a stamped self-addressed envelope, and state which template you wish. Always give the ARRL publication, edition, page number and figure number, if any, in requesting templates.

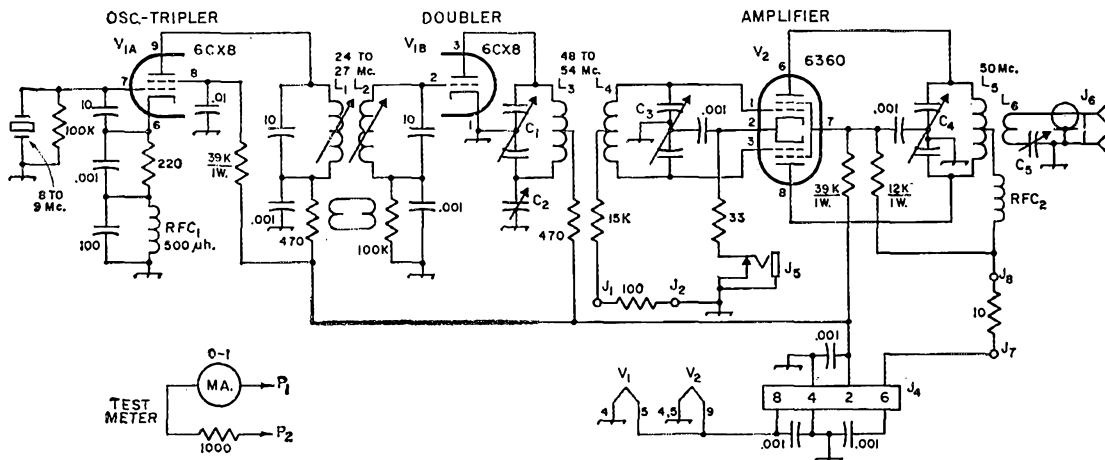


Fig. 3—Schematic diagram and parts information for the 50-Mc. transmitter. Fixed 10- and 100- μ mf. capacitors are mica; 0.01- and 0.001- μ f. are ceramic disk. Decimal values are in μ f. Resistors are $\frac{1}{2}$ watt unless specified; values in ohms. The oscillator and doubler stages of the 144-Mc. transmitter are similar.

C_1, C_3, C_4 —8- μ mf. miniature butterfly variable (Johnson 160-208 or 9MB11).

C_2 —8.7- μ mf. miniature variable (Johnson 160-104 or 9M11).

C_5 —50- μ mf. miniature variable (Hammarlund MAPC-50-B).

J_1, J_2, J_7, J_8 —Insulated tip jack.

J_4 —8-pin male chassis fitting (Amphenol 86-CP8).

J_5 —Closed-circuit phone jack.

J_6 —Coaxial output receptacle, SO-239.

L_1, L_2 —3- μ h. (approx.) iron-slug coil (Miller 4404). Link L_1 and L_2 with 1-turn loops of insulated hookup wire.

L_3 —10 turns No. 20 tinned, $\frac{3}{4}$ -inch diam., 16 t.p.i., c.t. (B & W No. 3011).

L_4 —8 turns like L_3 . L_3 and L_4 are side by side, 1 inch apart center to center.

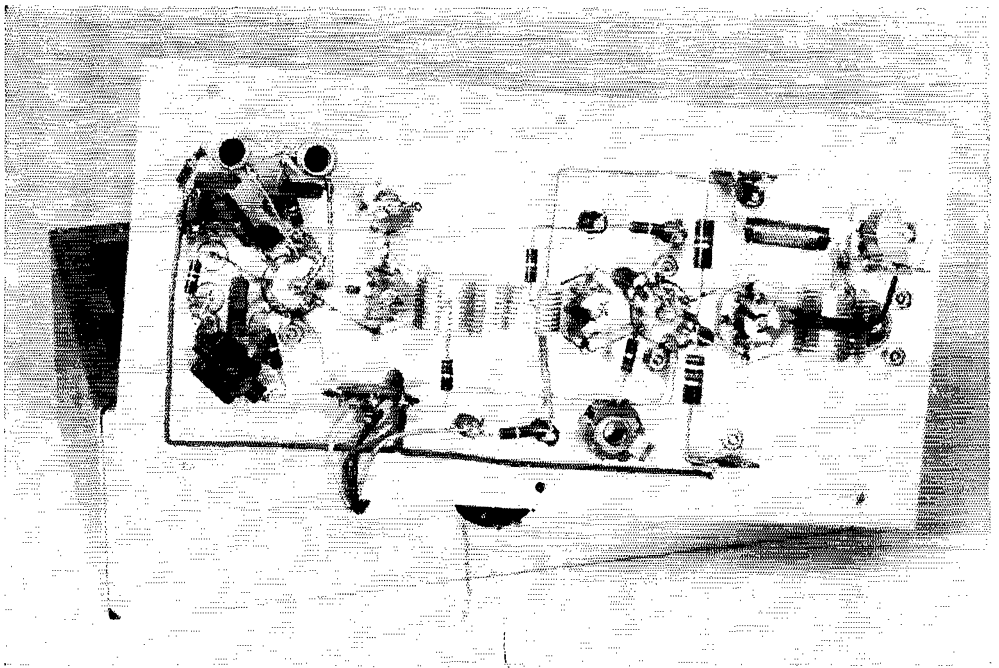
L_5 —11 turns like L_3 .

L_6 —1 $\frac{3}{4}$ turns insulated hookup wire around center of L_5 .

P_1, P_2 —Insulated tip plug.

RFC1—500- μ h. r.f. choke.

RFC2—Single-layer v.h.f. r.f. choke, 4 to 7 μ h. 42 turns No. 26 enamel, close-wound on $\frac{1}{2}$ -inch dowel.



Bottom view of the 50-Mc. transmitter. The crystal oscillator is at the left. The amplifier plate circuit and antenna loading control are at the right.

The transmitters are shown together in the top view, with the 144-Mc. model at the left. The crystal oscillator and doubler are at the bottom of the picture for each, with the antenna jack and tuning capacitor at the opposite end. In the bottom views the oscillator tube and components are at the left end of the assembly. The oscillator plate and doubler grid coils appear in the upper left corner. These are $\frac{3}{4}$ inch apart, center to center, in the 144-Mc. transmitter, and 1 inch in that for 50-Mc. Smaller-diameter coils were used in the former, though similar ones could have been used in each. The coupling link between these coils is made of a single piece of insulated wire looped around one coil, the leads crossed over and then looped around the other coil and then the ends soldered together. The figure-8 loop is visible in both pictures.

The spacing between the inductively coupled coils elsewhere in the transmitters is given below the schematic diagrams. It will be seen that the doubler plate and tripler-amplifier grid coils, L_2 and L_3 , are side by side, whereas the tripler plate and amplifier grid coils in the 144-Mc. rig, L_5 and L_6 , are mounted on the same axis.

Wiring of the transmitters is extremely simple. Use tie-point strips liberally for terminating power leads and mounting resistors and bypass capacitors. Shielded wire can be used for power leads, though it was not done in these units. Run power wiring flat against the plate. The ready-wound coil stock can be tapped most readily if the turn where the tap is to be made is pressed down toward the center of the coil with

a small screwdriver. Connection to the tap is then made on the inside of the coil, using a small soldering iron. The coils are supported by their own leads, soldered to the tuning capacitors as directly as possible. Cutting of Miniductor stock was described in Part I.

Adjustment and Operation

The transmitters can be tested with any power supply that will deliver 200 to 300 volts d.c. at 100 ma., and 6.3 volts a.c. or d.c. at $2\frac{1}{2}$ amperes. A single 1-ma. meter can be used for all tests, if it is provided with a 1000-ohm series resistor and flexible leads with terminals, as shown at the lower left side of Fig. 3. (The s.w.r. bridge meter will be used this way in the complete station.) If the supply delivers more than about 200 volts, it would be well to connect a 5000-ohm 10-watt resistor in the supply lead temporarily, to keep the transmitter from drawing excessive current at the start of testing.

We will test the oscillator and doubler first. Disconnect the screen resistors from both 6360 stages in the 144-Mc. transmitter, or from the amplifier in the 50-Mc. rig. This will keep these stages from drawing anything but grid current. Plug the test meter, with the 1000-ohm resistor in series, into J_1 and J_2 . It will read as if its scale were 10 ma. (A reading of 0.4 will actually be 4 ma.) With the tubes already heated, apply plate voltage briefly, through Pin 2 of J_4 . If the first two stages are functioning there will be some grid current reading.

Using only short test periods at first, adjust

the cores in L_1 and L_2 , and the settings of C_1 and C_3 , for maximum grid current. Now adjust C_2 for maximum grid current. It will be seen that C_1 and C_2 interlock. Move first one and then the other until the combination is found that gives the highest grid current. This should be at least 1 ma. in the tripler of the 144-Mc. transmitter, and 2 ma. for the 50-Mc. amplifier, when a supply voltage of 250 is used, and it may be up to twice those values. If a dropping resistor was used in the power supply lead, it may now be removed, provided that the plate voltage does not rise to over 300.

And how do you read voltage? It's nice to have a voltmeter, but you can make your own. Remember Ohm and his famous Law? Connect a 1-megohm resistor in series with your 1-ma. meter, with or without its 1000-ohm resistor, for the latter will make only a 0.1 per cent difference. Connect the negative side of the meter to the chassis, and the positive side (with the 1-megohm resistor in series) to the point where you want to measure voltage. You can now read voltage on the meter scale. A meter reading of 0.3 ma. will mean 300 volts, 0.28 would be 280 volts, etc. It is desirable to have a fairly accurate resistor for this purpose, if you want to read voltage to useful accuracy. A precision resistor will be a good investment here, but get one that is accurate to plus or minus 5 per cent, in any case. Some resistors may be as much as 20 per cent off, unless you specify otherwise.

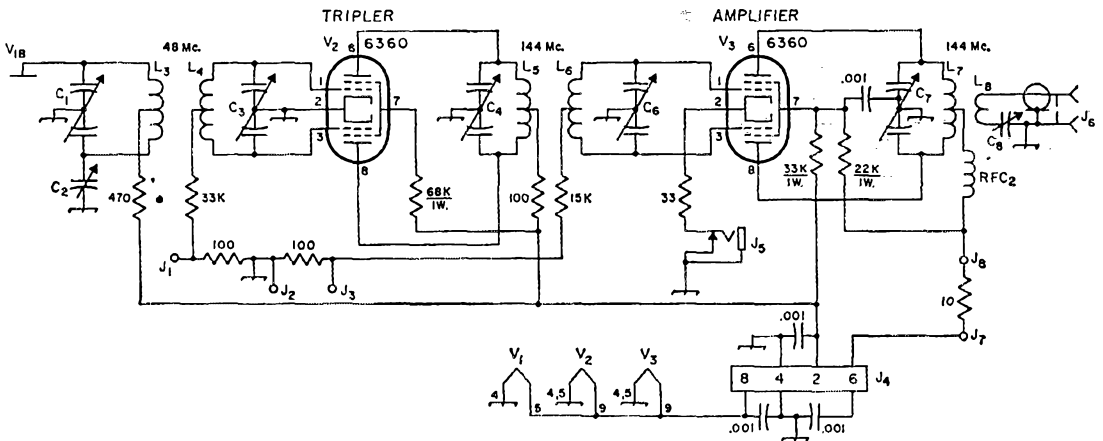
50-Mc. Amplifier Adjustment

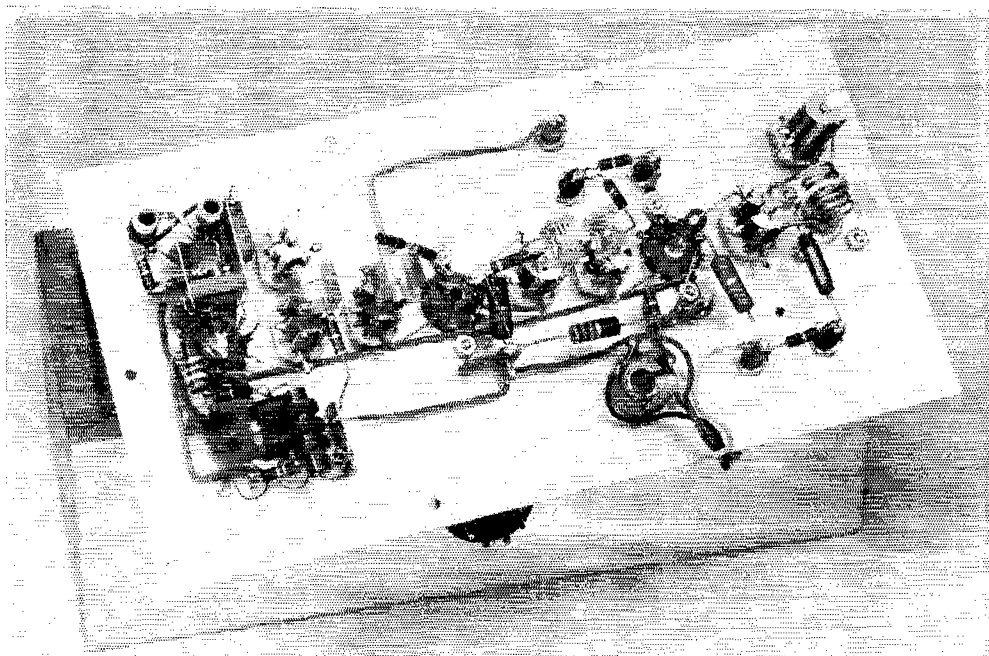
The 50-Mc. amplifier may now be adjusted, but first we need some kind of dummy (non-radiating) load. The best load is a bank of resistors that will total about 50 ohms and be able to dissipate at least 8 watts.² To use such a load properly requires some form of power output indicator, inserted in the line to the load. The s.w.r. bridge, to be described later, serves this purpose.

Lamps of various kinds can be used, but they are inferior loads. They do have one advantage, however: they give a rough visible indication of power output. Probably the best lamp load is made of 4 or 5 blue-bead pilot lamps (No. 44 or 46) connected in parallel. A 25- or 40-watt lamp may also be used, but it will be far from a 50-ohm load, and very misleading as to tuning of the final plate and loading circuits. If such a lamp is used, short out the loading capacitor, C_5 , temporarily.

With the two previous stages having been tuned for maximum amplifier grid current, reconnect the screen resistors. Modulation is not needed at this stage, so Pins 2 and 6 of J_4 may be connected together initially. Plug the meter and 1000-ohm series resistor into J_7 and J_8 , to measure amplifier plate current and apply voltage. The meter will now read as if it had a 100-ma.

² Such a load was described by the writer in *QST* for March, 1960. The issue is still available from ARRL for 50 cents, postpaid.





The 144-Mc. transmitter is similar to that for 50-Mc., but it requires one more stage. Oscillator and doubler circuits are at the left end. Side-by-side coils in the doubler plate and tripler grid circuits come next. The tripler plate and amplifier grid coils, right center, are mounted on the same axis. The amplifier plate and loading circuits are at the far right.

scale. Adjust C_4 quickly for minimum plate current, which should be about 50 to 80 ma., if a load is connected to J_4 . If the load is a lamp or bank of lamps, adjust C_4 for maximum brilliance. With the pilot-lamp load C_5 may now be adjusted for maximum brilliance. Retune C_2 and C_3 several times for greatest output. If a regular home light bulb is used for the load, short C_5 temporarily and adjust C_4 for maximum brilliance. Maximum output will occur at approximately minimum plate current, but there may not be exact coincidence, so C_4 should be adjusted for the lowest plate current that gives maximum output.

The 6360 is so designed that there is no need for neutralization if the transmitter is properly designed and built, but a stability check should now be made. Plug the meter back into the grid-current jacks, turn on the transmitter, and *briefly* remove the crystal from its socket. There should be no grid current with the crystal removed. The input to the amplifier will run excessively high under this test, so do it for a short check only.

Another test for stability is to observe the grid current and plate current simultaneously, while watching the output. A perfectly stable transmitter will show maximum grid current, minimum plate current and maximum output at a single setting of the plate capacitor. Some divergence from this ideal is permissible, if other indications given above are achieved.

144-Mc. Adjustment

Thus far we've been talking about the 50-Mc.

transmitter. Adjustment procedure is similar for the 144-Mc. model, Fig. 3, except that there is a bit more to it. Proceed as above to the point where you have gotten grid current in the tripler stage. Now connect the screen resistor of the tripler and put the meter in tip jacks J_2 and J_3 , to measure amplifier grid current. Apply voltage through pin 2, and tune C_4 for maximum amplifier grid current. This should be at least 2 ma., but it may be as much as 5.

Now plug the meter into J_7 and J_8 and apply plate voltage through Pins 2 and 6. Adjustment from here on is similar to the 50-Mc. amplifier. Because of the drain imposed by the extra 6360 stage, the plate-supply voltage will be a bit lower with the 2-meter transmitter, a fact to keep in mind when figuring the input you will have to modulate.

Once the transmitters are made to work on a given frequency you may want to tune them so that shifting frequency can be done with a minimum of retuning. There is a surplus of grid drive with the tube lineups shown, so "stagger-tuning" is entirely practical. For instance, the 2-meter transmitter can be adjusted so that any frequency between 144 and 146 Mc. can be used merely by inserting the proper crystal and retuning the final plate circuit. Plug the meter into the amplifier grid jacks, J_2 and J_3 . With a crystal near 8000 kc. in place, tune for maximum grid current. It will be more than you need. Now put in a crystal for some point near 146 Mc. The grid current will probably be 1 ma. or less, and the output somewhat low, even when

the final plate circuit is retuned. Adjust one of the core studs (either L_1 or L_2) upward slightly, and see if the grid current rises. Retune C_1 or C_2 slightly to further increase the grid current. Do the same with either C_4 or C_6 . By judicious juggling it will be possible to get around 3 ma. grid current on any frequency over a two-megacycle spread, simply by plugging in the proper crystal. You then merely retune C_7 for the lowest plate current that will give maximum output, after changing the crystal. It is not necessary to readjust either C_2 or C_3 at any time, once they have been properly set. Adjustment procedure for spreading the coverage of the 50-Mc. transmitter is similar, but simpler because of the lesser number of stages.

Ideal amplifier grid current in both transmitters is around 3 ma., though either will work well with down to about $1\frac{1}{2}$ ma., or up to 4. More than 4 ma. is likely to reduce the output, and either insufficient or excessive drive will affect the modulation adversely. The amount of grid drive for c.w. operation is much less critical, it being merely necessary to have enough to insure efficient operation. Even 1 ma. will do. Keying the transmitters for c.w. work is done by plugging a key into the cathode jack. J_5 .

There will be more on transmitter and antenna adjustment in a later issue, when the modulator and s.w.r. bridge are described. Meanwhile, you may want to check operation of the various

Stage	Plate Voltage	Plate Current	Screen Voltage	Grid Current
144-Mc. Transmitter				
Osc.	255 v.	12 ma.	140 v.	—
Dblr.	255 v.	10 ma.	—	—
Tplr.	255 v.	50 ma.	125 v.	1 ma.
Amp.	230 v.	70 ma.	170 v.	3 ma.
50-Mc. Transmitter				
Osc.	270 v.	14 ma.	150 v.	—
Dblr.	270 v.	10 ma.	—	—
Amp.	250 v.	70 ma.	170 v.	3 ma.

stages. Plate current may be measured in any stage, to be sure that it is running at safe input. Connect a 10-ohm resistor in series with the lower end of the 470-ohm isolating resistor in the plate circuit of the stage to be checked. Now, connect the 1-ma. meter (with its 1000-ohm resistor in series) across the 10-ohm resistor. This will make the meter read as if it had a 100-ma. scale, just as when you plug into J_7 and J_8 . Additional tip jacks shunted with 10-ohm resistors may, in fact, be permanently a part of the transmitters, though there will be little need to use them after the stages are once checked and found to be operating satisfactorily. The accompanying table shows typical voltages and currents measured in the original units. QST

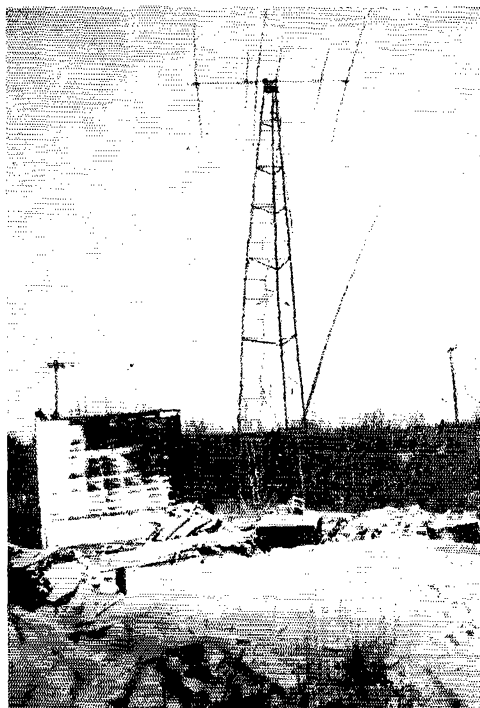
Strays

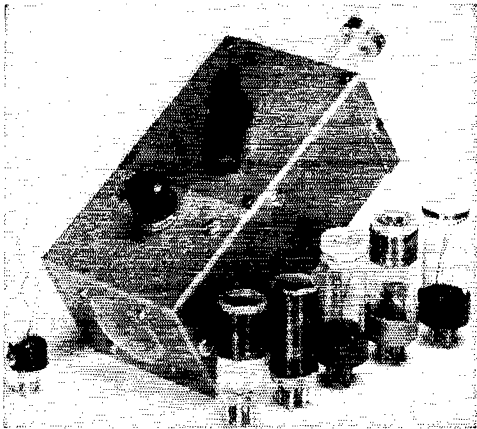
K7HDB points out that QSLs to iron-curtain countries may not be handled if the stamps used are in our recent Champion of Liberty series. Several of his envelopes bearing the Jan Masaryek stamp were returned.

K8YGN, (Jerry L. Walrath, 2733 Winona, Flint, Mich.) is trying to locate anyone who served as a radio operator with Headquarters Company, 85th Infantry Regiment, 10th Infantry Division, in Bamberg, Germany, between January 1956 and March 1957.

K1GGG found a recent hospitalization slightly easier to take when K1LGB brought in a Communicator loaned by W1RMZ. Then the Mobilers, a large group of 2-meter operators in western New England, kept him busy with many QSOs. (He was doubly rock-bound -- quartz and gallstones.)

This at the right is all that remained of VE3DMZ after a fire wiped him out on Jan. 2. However, thanks to the generosity of VE3KJ, the Scarborough Radio Club, the Lindsay Antenna Co., and World Radio Laboratories of Council Bluffs, much of his ham gear has been replaced. He also lost all his QSLs, and if any of you remember working him, he'd appreciate a duplicate QSL from you.





The meter with its set of coils covering 2 to 220 Mc. The plastic indicator under the tuning knob has the usual 10-scale intervals marked with Braille characters, but could readily be equipped with an ink scale. The small speaker for auditory indications is mounted on the near end of the box. The power consumption is 5 ma. at 9 volts.

Transistorized Auditory "Grid-Dip Meter"

BY ROBERT W. GUNDERSON,* W2JIO

Wide-Range Battery-Operated Test Oscillator

HERE is a portable battery-operated grid-dip oscillator with a frequency range of 2 to 220 Mc., measuring only $5\frac{1}{4}$ inches long, 3 inches wide and $2\frac{1}{2}$ inches thick, with built-in 9-volt battery supply and auditory indicator circuit. The auditory indicator is a "must" for the blind technician; for the sighted, it is a convenience which allows him to check the g.d.o. without bothering to look around at the meter movement.

The circuit is built in a small two-piece aluminum box (LMB type 136) with the half containing the two end aprons holding the instrument; the other half, with the two long side aprons, serves as the bottom cover. A $1\frac{1}{2}$ -inch p.m. speaker is centered on one end apron, with the coil socket centered on the opposite one. The tuning capacitor is mounted on the top of the case about $1\frac{1}{2}$ inches from the end apron containing the coil socket. The sensitivity (pitch) control is mounted about $1\frac{1}{2}$ inches from the other end apron. The pitch control is fitted with the on-off switch, thus cutting down on the number of controls and allowing more space for a dial scale. In the unit built here at W2JIO the dial is Brailled, although an ink scale can easily be fashioned. The output transformer for use in connection with the auditory indicator is mounted on the end apron beside the speaker. The bottom half of the box contains the clamp for holding a 9-volt battery in place, and this half is also fitted with four small feet.

If a visual meter movement is used, much of the electronics may be omitted, with the oscillator simply coupled to a diode, a potentiometer (used as a rheostat) for setting the meter reading, and a small 50-100 microammeter. But if you've

Names fail us, in trying for a moniker for this unit, since it has no grid and no meter to dip. Nevertheless, it does the work of a grid-dip oscillator, with the added convenience that you don't have to look at it while you're checking a circuit. Originally described in The Braille Technical Press for January of this year, we think it has just as many advantages for those with normal sight as for those without.

never tried an auditory indicator you'll be very pleasantly surprised at the ease of operation provided by this device.

Auditory Indicator

The auditory circuit makes use of the transistorized "Auditory Gimmick" described in so much of the equipment designed for blind technicians. Basically, it is made in the form of a simple Hartley oscillator. Fig. 1, using a p-n-p transistor (2N107), with an n-p-n (2N35) connected as a d.c. amplifier control circuit to vary the bias (and hence the frequency) in accordance with changes in energy coupled to the base of this d.c. amplifier. Energy is coupled from the r.f. portion of the instrument through a small capacitor, and is rectified by a shunt-type diode whose output feeds into the sensitivity-control potentiometer. The greater the energy the higher the pitch, and vice versa.

The indicator circuit in this unit is built on a standard 7-pin miniature socket which serves as a multiple tie-point assembly for the entire circuit — resistor R_1 , capacitors C_1 and C_2 , the

* Editor, The Braille Technical Press, Inc., 984 Waring Ave., New York 69, N. Y.

two transistors, and the leads from the small output transformer T_1 . The socket is mounted to the chassis by running a 4-36 machine screw through the center hole, and mounting it to the top of the box. The low-impedance secondary of the transformer is taken directly to the speaker terminals. A single tie point is fastened to one of the speaker's mounting screws for B positive, and this point is bypassed both for r.f. and low-frequency energy by C_4 and C_5 in parallel.

The germanium diode, isolating resistance R_2 , and the r.f. bypass capacitor C_6 are all supported by the potentiometer (R_3) terminals.

R.F. Oscillator

The r.f. oscillator has gone through a number of changes in the course of arriving at the circuit shown, beginning with an RCA 2N247, which gave a maximum frequency of about 90 Mc., then the RCA 2N384, which got us up to about 135 Mc., and finally the Philco T-1832 (2N1742) which makes the instrument work extremely well up to 220 Mc. Actually, a higher frequency is easily possible — we just didn't bother to try going much higher with this particular layout because the design of the tuned circuit didn't lend itself to u.h.f. The emitter, base and collector of the r.f. transistor, Q_3 , are mounted directly to the pins of the coil socket, to keep lead lengths to a minimum. The remaining two pins of the coil socket are used for the lower end of the tuned circuit and for B positive.

The oscillator has the p-n-p transistor connected in the common-base arrangement, with the tuned circuit connected between the collector and ground (base), a resistance inserted in series with the emitter, and with a feedback capacitance.

connected from emitter to collector. A word or two about the design problems involved in the oscillator portion of the circuit might be in order, since changing transistors necessitated some slight circuit modifications which should be of interest.

The original circuit design with the 2N247 drift transistor used a feedback capacitor of 10 $\mu\text{f.}$, with an emitter resistor of 4700 ohms at the lower frequencies, and 220 ohms at the higher frequencies. We found that for some reason the circuit refused to oscillate at the low frequencies, particularly with the tuning capacitor set near the maximum-capacitance end of its range. We suspected, and rightly too, that the feedback capacitance was insufficient, and so added another 15 $\mu\text{f.}$ in the two low-frequency coils, after which the circuit worked fine. The 2N384 drift-field transistor behaved about the same, except that it oscillated at a higher frequency (135 Mc.).

When we installed the Philco T-1832 (2N1742), whose maximum oscillation frequency is 1300 Mc., we found an entirely different state of affairs. The circuit performed very well at the higher frequencies, but at the lower frequencies, and at frequencies in the vicinity of 10 to 20 Mc., with the tank capacitor nearly fully meshed, oscillations ceased. Increasing the feedback capacitance from collector to emitter helped slightly, but the circuit would still fall out of oscillation with the tuning capacitor completely meshed. The addition of a small capacitance shunted from emitter to base did the trick, and the drop-out no longer occurs. This extra shunt capacitance probably provides some necessary phase correction at the lower frequencies. The necessary additions in circuit capacitance are easily handled through the

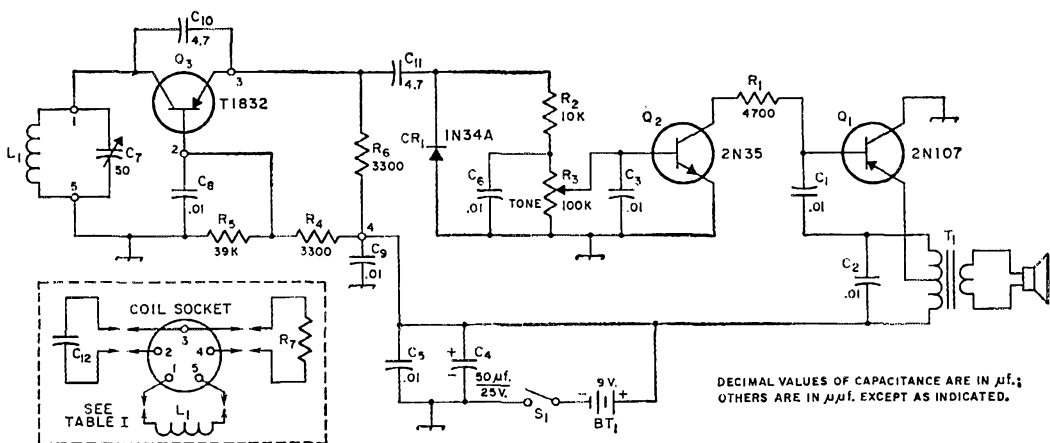


Fig. 1—Circuit diagram of the auditory grid-dip oscillator. Resistances are in ohms, resistors are $\frac{1}{2}$ -watt composition. Numbered terminals in r.f. oscillator circuit refer to pin numbers on coil socket.

- BT₁—9-volt transistor battery (RCA VS-323).
- C₁—Paper.
- C₂, C₃, C₅, C₆, C₈, C₉—Disk ceramic.
- C₄—Electrolytic.
- C₇—50- $\mu\text{f.}$ variable (Hammarlund HF-50).
- C₁₀, C₁₁, C₁₂—Tubular ceramic.

- L₁—See coil table.
- R₃—0.1-megohm control, linear taper.
- S₁—S.p.s.t. toggle, mounted on R₃.
- T₁—Transistor output transformer, 500 ohms c.t. to 3.2 ohms (Stancor TA-42 or Philmore ST-32).
- Loudspeaker is a $\frac{1}{2}$ -inch speaker (Lafayette Radio SK-61).

use of additional capacitors mounted inside the coil forms, so that simply plugging in the coil changes the capacitance to the desired value.

The output of the oscillator at the lower frequencies is quite high — so high that it provides too much excitation for the auditory part of the circuit. Therefore, a higher value of emitter resistance is used at these frequencies, with a smaller shunting resistance added at the higher frequencies (above 54 Mc.). This is also accomplished through the use of spare pins on the coil forms.

Coils are wound on Amphenol type 24-5H polystyrene coil forms. The socket for the coils (Amphenol 78-S5S) is used to support the components, including the high-frequency transistor. No. 14 solid wire leads run to the tuning capacitor, which is mounted on a slant to give very short connecting leads to the coil socket. Mount the socket so that Pins 1 and 5 face the inside (top) of the box. This results in the shortest lead lengths to the tuning capacitor.

The specifications for making the coils are given in Table I. If any difficulty is experienced in finding the small polystyrene coil forms, it may be necessary to make your own. This is very simple: Obtain a piece of $\frac{3}{4}$ -inch o.d. polystyrene tubing and cut it into 2-inch lengths. Use Amphenol 5-prong plugs, No. 91-MIPM-5L. Remove the metal cap and fit the bakelite plug into the tubing, fastening it with cement and the retaining screw used to hold the metal cap in place.

For frequencies above 54 Mc., the emitter resistance is too high and the circuit will not oscillate satisfactorily unless this value is reduced. Therefore, an emitter shunting resistor is used. If higher-frequency coil units are used, remember this shunting resistance.

After building this unit and playing with it for some time, our only regret is that we didn't take the trouble to build an instrument for the very-high frequencies, using high-frequency techniques. The long rotor tab and high minimum capacitance in the tuning capacitor precludes the use of the instrument at the high frequencies.

TABLE I
Coil Data

Coil No.	Freq. Range, Mc.	Wire* Size	Turns	Remarks
1	2.15-3.6	28	95	Close-wound. C_{12} —100- μ f. mica.
2	3.2-6.8	28	48	Close-wound. C_{12} —33- μ f. mica.
3	6.6-13.6	24	22	Close-wound. C_{12} —10- μ f. mica.
4	13.0-27.4	24	$9\frac{1}{4}$	Spaced over $\frac{1}{4}$ -inch length. C_{12} —4.7- μ f. mica.
5	25.0-54	24	$4\frac{1}{4}$	Spaced approximately wire diameter. C_{12} —10- μ f. mica.
6	45-90	24	$1\frac{1}{2}$	Spaced wire diameter. C_{12} —10- μ f. mica; R_7 —220 ohms.
7	90-220	14		Hairpin loop, sides spaced approx. $\frac{1}{8}$ inch, length $1\frac{3}{4}$ inch including coil pins. C_{12} —10- μ f. mica; R_7 —220 ohms.

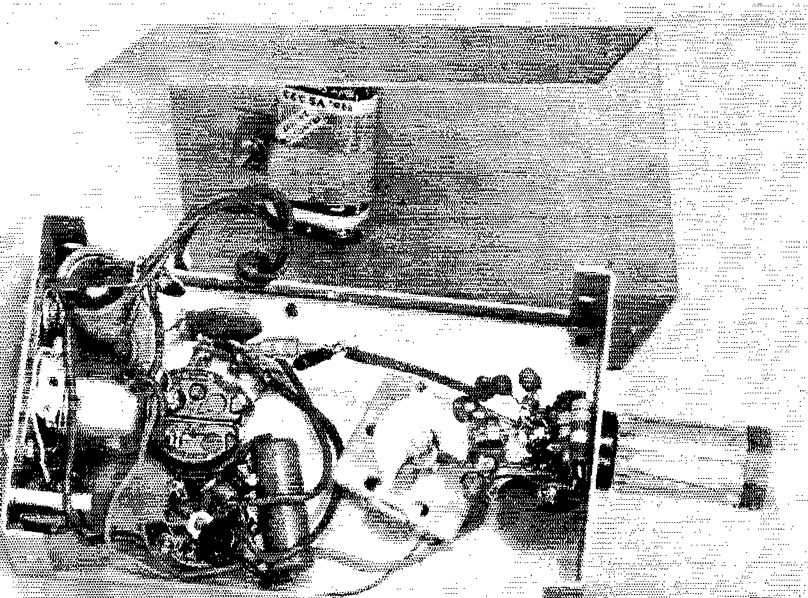
* Enameled wire. Coil forms $\frac{3}{4}$ -inch diameter; Amphenol 24-5H or equivalent. See text for alternative homemade forms. Coil socket is Amphenol 78-S5S.

Note: If the audio tone tends to jump at some point instead of varying smoothly in pitch as the tuning capacitance is varied, try changing the value of C_{12} .

However, perhaps someone can now take the time to investigate this circuit at frequencies up to 500-1000 Mc. or better.

Some time ago, T. V. Cranmer, K4MAB, of Frankfort, Kentucky (a *Braille Technical Press* reader) built an instrument of this type, although its construction was considerably different and its frequency range was only up to 50 Mc. Tim's experience with this circuit gave us the encouragement to build ours, and we wish to thank him here.

Q57



Inside the meter. Everything except the battery is mounted on one piece of the two-piece box. Most of the r.f. oscillator components are mounted on the coil socket. A 7-prong tube socket, lower left, is used as a multiple tie-point assembly for the small audio components.

Coaxial Switch

Performance

Design and Construction of Basic Types

BY HAROLD J. BRASCHWITZ,* W8YPT

With reasonable attention to the details discussed here, most of the simpler conventional coaxial-cable switches can be made to perform well over the range of 30 to 300 Mc. Included are tabulated results of measurements made on typical home-made and manufactured types.

COAXIAL-CABLE switches, manually or electrically operated, add much to the convenience and efficiency in operating today's modern amateur station. They facilitate band changing in this era of multiband operation. They can perform a change-over function allowing the use of one antenna for receiving as well as transmitting. Electrically actuated (relay) types can be used as remote switches to economize in the use of coaxial cable when several antennas are mounted on the same or adjacent supports. Coaxial switches also simplify station operation by providing a convenient means of switching final amplifiers, v.s.w.r. monitors, converters, and the like, in and out of a transmission line. In elaborate antenna systems they may also be used to control radiation patterns by switching phase-shifting cables in and out of a feeder system.

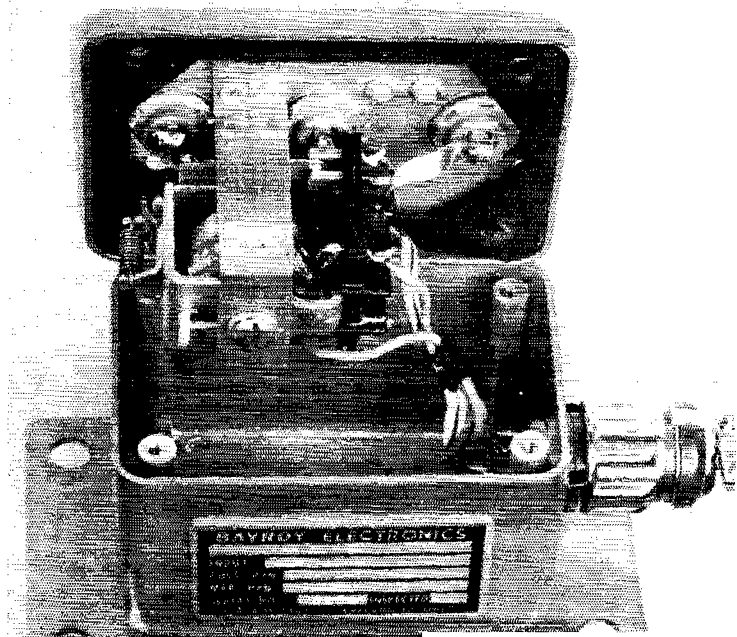
* Bay-Roy Electronics, Inc., P.O. Box 7503, Cleveland 30, Ohio.

Most hams seem reluctant to build their own coaxial switches and rely instead on the available commercial or surplus variety. This hesitancy apparently stems from the lack of familiarity with the factors and problems involved in the design and construction. Since the commercially-available units may not always be completely suited to a particular ham's requirements, this article will outline some of the considerations requiring attention. This information should enable the ham to design switches to meet his station requirements instead of altering or restricting the station complement to fit available switching units.

Representative Types

Coaxial transmission-line switches may run the gamut from the crudest type of toggle or knife switch, or relay, to designs of extreme mechanical and electrical sophistication. At frequencies up to 30 Mc., most simple switch de-

Photo of the relay switch sketched in Fig. 1 showing the copper-strip connections and weather-proof enclosure.



signs will perform adequately. Small relays, wafer switches or solenoid-actuated "flapper"-type switches perform well. At frequencies above 300 to 400 Mc., the performance of most simple switch designs, as well as of the UHF-type of cable connector commonly used by amateurs, becomes unsatisfactory for most requirements. Adequate disconnected-channel isolation becomes difficult to achieve and special techniques beyond the scope of this article must be employed to compensate for the effects of unavoidable dimensional changes. Between these two extremes lies the frequency range of 30 to 200 or 300 Mc., which includes the amateur v.h.f. bands. The material presented here is principally in reference to this region.

Design Considerations

In the v.h.f. range, most of the previously-mentioned basic types of coaxial switch will perform well if some attention is paid to insure that the characteristic impedance of the switch, considered as a short section of line, is reasonably

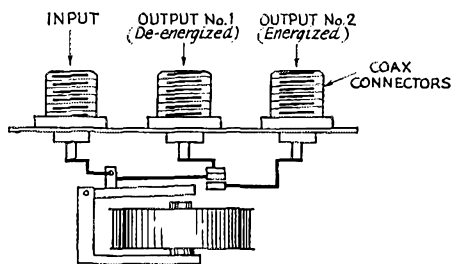


Fig. 1—Relay-type switch of the s.p.d.t. type for coaxial cables. The r.f. path is shown in heavy lines. The relay is a small general-purpose type.

close to the 50 or 70 ohms of the line used, and that gross line discontinuities are eliminated. (A "discontinuity" is an abrupt change in transmission-line dimensions or direction resulting in distortion of the electromagnetic-field configuration.)

Just how does one determine whether or not a given switch design is suitable? In answering this question, there are three important considerations. One of these is the characteristic impedance and/or physical discontinuity, just mentioned, which may result in an increase in the v.s.w.r. on the line connecting the switch to the transmitter. This is of consequence not only as it affects the losses in the section of line connecting the switch and transmitter, and the transformed load impedance presented to the transmitter output circuit, but also because it may result in higher voltage or current at the switch contacts. In a typical switch of good design connected to a perfectly matched antenna feed line, the switch may cause a v.s.w.r. of 1.2 to 1 on the line to the transmitter.

A second consideration is circuit isolation. This concerns the amount of r.f. energy or "cross-talk" coupled from an operating circuit to a cir-

Freq. (Mc.)	V.S.W.R.	Isolation (db.)	Insertion Loss (db.)
30	1.02	45	Less than 0.1
50	1.04	41	" " "
150	1.2	33	" " "
225	1.3	30	0.1

cuit disconnected by the switch. Isolation is usually expressed in terms of db. If the isolation is given as 60 db., it means that one millionth of the power in the operating circuit is being coupled into the disconnected circuit. For a given switch design, isolation will, of course, vary widely with frequency. An isolation of 30 db. is usually acceptable for amateur requirements.

The third consideration is insertion loss. This is the difference between the power fed to the switch and the power fed to the line from the switch. This loss is made up of dielectric loss in the switch insulating material and resistance loss at the switch contacts. Either one loss or the other will increase with an increase in v.s.w.r. A typical switch may have an insertion loss of 0.2 db. or less.

Unfortunately, measurement of all, or even one, of these vital characteristics is not possible with the test equipment available to most hams. Therefore test data on the switches described herein, as well as on some commercially available units, have been taken by the author, using specialized laboratory equipment, and the results are included in tabulated form. Data for operation at frequencies below 30 Mc. are not shown specifically because in all cases the performance is substantially the same, or better, than that shown for 30 Mc.

Constructional Details

A sketch of a relay-type switch is shown in Fig. 1. The switching element is a small general-

Freq. (Mc.)	V.S.W.R.	Isolation (db.)	Insertion Loss (db.)
30	1.04	53	Not measured
50	1.01	48	" "
150	1.19	32	" "
225	1.34	31	0.1

* Type UHF connectors.

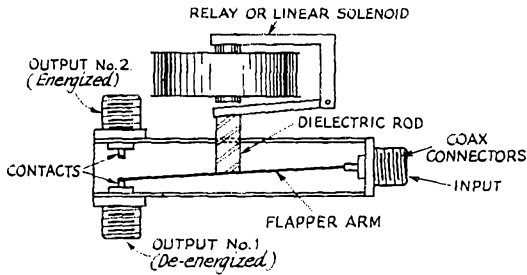


Fig. 2—Relay- or solenoid-actuated "flapper"-type switch. Note contacts mounted on coaxial connectors.

purpose relay. Additional design features can be seen in the photograph. One important item in the design of this unit is the wide copper strap joining the connector center-conductor and relay terminals. This increases capacitance to ground which helps to maintain a more constant characteristic impedance and thus decreases the switch v.s.w.r. The switching time measured is the same as that of the relay. In typical examples, a unit switched in 10 to 11 milliseconds.

The unit shown in the photo is designed for outdoor use and therefore it has been suitably sealed against the elements. A sealing gasket and special precautions regarding the UHF-type connector, to be discussed later, are necessary. The performance of this unit is given in Table I.

A somewhat different design is shown in Fig. 2. This is a "flapper" type, essentially like one designed by WIQVF and described in *QST* for July, 1956. Its characteristics are compiled in Table II.

Switches of the two preceding forms are of the single-pole double-throw variety. They find wide use in antenna change-over operations and in selecting one of two available antennas in both mobile and fixed-station use. They may also be used in multiple to accomplish more complicated switching functions.

A switch of the rotary multiposition type is sketched in Fig. 3. The switching element is a ceramic wafer switch. A switch of this type furnishes two or more output positions from a single input. Measurements on this switch are shown in Table III. A switch of similar construction, but with different circuit arrangement, is shown

in Fig. 4. This is basically a d.p.d.t. switch, the electrical configuration being shown to the right of the sketch. Such a switch is useful in switching any device such as a final amplifier, converter, or s.w.r. indicator, in or out of a transmission line. Still other varieties of wafer-switch design were described by W9ERU in an earlier issue of *QST*.¹

Table IV shows measured data on three typical manufactured switches.

Actuators

While manually-operated switches have many uses, relays or other types of electrically-actuated switches have the advantage that the actual switching operation can take place at the most appropriate point regardless of its remoteness from the operating position. Also, switching

TABLE III

Measurements on Rotary-type Switch of Fig. 3 *

Freq. (Mc.)	V.S.W.R.	Isolation (db.)	Insertion Loss (db.)
30	1.02	48	Not measured
50	1.03	45	" "
150	1.1	36	" "
225	1.14	33	" "
435	1.24	27	Approx. 0.5

*Maximum measured on any channel. Type UHF connectors; ceramic wafer.

is virtually instantaneous, which is a requirement in any break-in system. Relays and solenoids are available with actuating coils designed for a variety of standard a.c. and d.c. voltages, so that the most convenient source may be used. Rotary switches are also available with solenoid-operated ratchet mechanisms that permit remote control of the switch.² In his article,¹ W9ERU describes a motor-driven unit with an automatic position stop.

¹Hubbell, "Switching Coaxial Feed Lines," *QST*, October, 1960.

²Wellner, "Remotely-Controlled Coaxial Switch," *QST*, August, 1958, "Hints & Kinks."

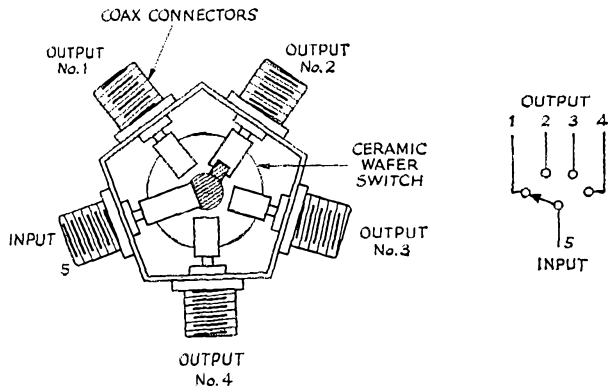


Fig. 3—A single-pole four-position rotary switch with mounting for five connectors. Switch is ceramic-wafer type. Equivalent circuit is shown at right.

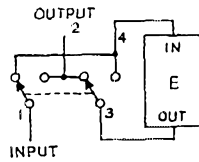
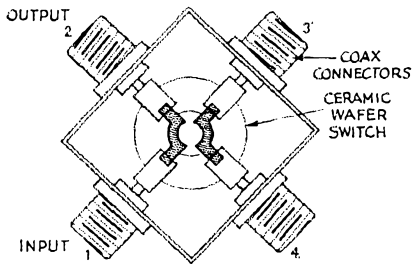


Fig. 4—Transfer-type switch. Equivalent circuit is shown at right. This arrangement is suitable for switching any device (E), such as an amplifier, converter or s.w.r. indicator, in series with a line connected at 1 and 2.

Coaxial Connectors

The coaxial connectors used in constructing switches are an important consideration. The type UHF connector in popular amateur use performs in a satisfactory manner at frequencies up to 300 or 400 Mc. if the switch is confined to an indoor environment. They may also be used un-

der mild outdoor conditions, as might be encountered where some protection against the elements is afforded. However, they have no specific provision for sealing against moisture and therefore they should be inspected periodically to see that moisture seepage has not taken place. When the switch must be exposed fully to

TABLE IV							
Measurements on Various Manufactured Switches							
B & W 550-A (Rotary)							
Freq. (Mc.)	V.S.W.R.					Isolation (db.)	Insertion Loss (db.)
	Ch. 1*	Ch. 2*	Ch. 3*	Ch. 4*	Ch. 5*		
30			1.02			48	
50			1.03			45	
150			1.1			36	
220	1.02	1.1	1.14	1.08	1	33	
435	1.08	1.2	1.24	1.16	1.04	27	Approx. 0.5
* Progressing clockwise from input connector, as viewed from shaft side.							
Bay-Roy Electronics CII-421 (S.P.D.T. Relay)							
Freq. (Mc.)	V.S.W.R.		Isolation (db.)	Insertion Loss (db.)			
	Pos. 1*	Pos. 2*					
30	1.02	1.02	45	Less than 0.1			
50	1.02	1.04	41	" " "			
100	1.04	1.19	35	" " "			
150	1.05	1.2	33	" " "			
200	1.1	1.32	30	" " "			
225	1.1	1.3	30	0.1			
* Position 1, relay unenergized; Position 2, relay energized.							
Advance CB/1C2C/115 VA (S.P.D.T. Flapper)							
Freq. (Mc.)	V.S.W.R. (Relay Energized)		Isolation (db.)	Insertion Loss (db.)			
30	1.04		53				
50	1.04		48				
100	1.12		42				
150	1.19		32				
230	1.34		31	0.1			

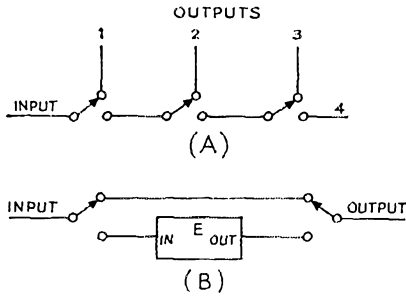


Fig. 5—Diagram showing how s.p.d.t. switches or relays may be combined to perform the functions of rotary switches. A shows a combination performing the functions of the switch of Fig. 3. The arrangement of B is essentially equivalent to the switching circuit of Fig. 4.

the effects of weather, special precautions should be taken. One technique is to coat the mating connector surfaces with silicone grease prior to assembly of the connector pair. Another procedure is to wrap the mated pair with plastic electrical tape. This is effective and makes use of a material commonly found in the ham shack. Both techniques may be applied simultaneously to advantage, of course. The type UHF chassis-mounting receptacle used in the construction of switches carries the military designation of SO-239, 49194 (Amphenol 83-1R). The mating cable plug is identified by the number PL-259, 49190 (Amphenol 83-1SP) for 1/2-inch coax cable, such as RG-8/U, or UG-111/U (Amphenol 83-750) for 1/4-inch cable, such as RG-58/U.

A superior series of connectors is the N series.

Mil. Type	Function
UG-21D/U	Plug (male, fits 1/2-inch coax cable (RG-8/U))
UG-23D/U	Connector (female), fits RG-8/U
UG-27C/U	Right-angle adapter (male to female)
UG-28A/U	Tee adapter (all female)
UG-29B/U	Straight adapter (female to female)
UG-57B/U	Straight adapter (male to male)
UG-58A/U	Chassis receptacle

These connectors have the following advantages:

1) They employ constant-impedance design and hence provide superior r.f. performance, especially at the higher frequencies.

2) They have moisture-sealing features as an integral part of the design and therefore no special measures are required in using them in severe outdoor environment.

3) They can be assembled to the coaxial cable without the need for soldering the outer braid to the connector body. This simplified procedure eliminates the danger of melting the cable dielectric while applying solder. Table IV lists several of the various fittings available in the N series, while Table V shows fittings that permit transition between type N and type UHF fittings.

Although new type N connectors are more expensive than corresponding UHF-type units,

Mil. Type	Function
UG-83A/U	Mates type N male and type UHF receptacle
UG-146/U	Mates type N female and type UHF plug
UG-318/U	Mates type N female and type UHF receptacle

they can often be found on the surplus market for less than the cost of new UHF-type connectors

The names and terms associated with the various connectors listed in Tables V and VI are those commonly used in the connector field. The "sex" of a connector is determined by the nature of the center of the center-conductor termination. For example, a plug-type connector is one that has a male center-conductor termination and a clamping mechanism to attach to a coaxial cable. A jack has a female center-conductor termination and a clamping device to attach a coaxial cable. An adapter is a device which mates with two connectors and does not have provision for attaching directly to a coaxial cable. A chassis receptacle is a connector with a female center-conductor termination and employs a flange to allow fastening to a chassis or plate.

QST

Strays

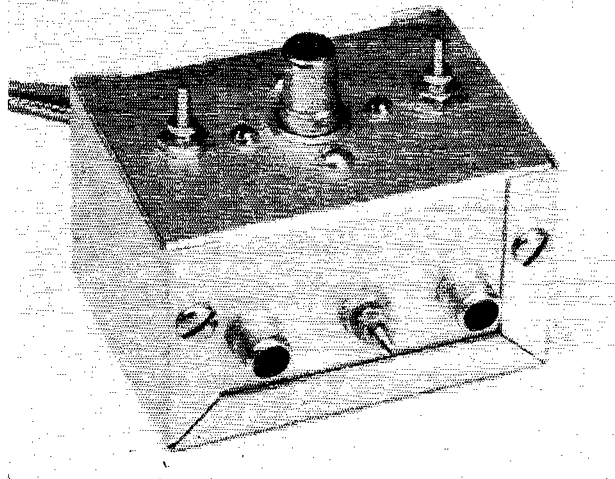
W0DNX is curator at the Eisenhower Museum.
— W0FNS

K4LVE (Steve Johnson, University School, Florida State U., Tallahassee, Fla.) wants to compile a directory of all industrial arts teachers who are also hams and all school stations sponsored by their industrial arts departments.

You like these coincidences, eh? Then check your Call Book for W6RGM and K6RGM.

We've seen an item lately that claims to give the derivation of the much-used "73." The story goes that in the old days a man needed three things to survive in the West — a good horse, a good wife, and a Winchester 73. Therefore, if you wish a man 73, you are wishing him the very best.

Have you seen a flying saucer? Do you believe in flying saucers? Then write to K9QEI, 126 Rock Island Avenue, Peoria, Ill. He wants letters only from the true believers.



Nuvistor Preamplifiers for 50 and 144 Mc.

The Nuvistor preamplifier provides plenty of performance in a small package. The one shown is for 50 Mc. The 144-Mc. model is similar in external appearance.

BY EDWARD P. TILTON,* WIHDQ

OUR evaluation of the Nuvistor in April *QST*¹ apparently stirred up quite a bit of interest and enthusiasm among v.h.f. men. Scores of letters tell of improvement in 50- and 144-Mc. reception, all the way from "noticeable" to "spectacular" when 6CW4 preamplifiers were added to existing receivers. Also in the mail were requests for specific construction details for Nuvistor stages. So here's how to build 'em.

The preamplifiers are built in the smallest size Minibox, $2\frac{3}{4}$ by $2\frac{1}{8}$ by $1\frac{5}{8}$ inches in size, and the layouts are very similar. The 50-Mc. amplifier uses slug-tuned coils, whereas the 144-Mc. model has air-wound coils, except for the neutralizing winding, L_2 . In the 144-Mc. amplifier, a variable capacitor tunes the input circuit, and no capacitor is used across the plate coil. Fixed 10- μ mf. capacitors are used across both coils in the 50-Mc. amplifier. The coupling in and out of the 50-Mc. stage is inductive, whereas a tapped input circuit is used for 144 Mc. The latter is advisable in the interest of lowest possible noise figure at 144 Mc. This is less important at 50 Mc. The noise figure at the lower frequency probably will be lower than you can use, so a system which allows the use of ready-made coils was favored.

The Nuvistor socket is mounted in the center of the largest surface of the box in both amplifiers. On one side are the two phono jacks used for antenna and output terminals. Use better-quality coaxial fittings here if you like, but the low-cost jacks will do. The neutralizing winding is centered between the two jacks. The 50-Mc. coils are mounted one inch either side of the Nuvistor socket. Similar points in the 144-Mc. amplifier are for the ground lug at the bottom of L_1 , left, and the screw for holding the button bypass, C_2 ,

in place at the right. A 3-lug terminal strip is near the back wall of each amplifier, and wires for the heater and plate voltages are brought through a grommetted hole in the rear wall to this strip, heater on the left, plate voltage on the right.

Adjustment and Operation

Because the preamplifier requires only 6.3 volts at 0.13 ampere, and around 50 to 70 volts at the plate, at a few milliamperes, power for it can be taken from the receiver or converter with which it is to be used, in most instances. The dropping resistor in the plate lead is shown as 10,000 ohms. This permits operation of the preamp on any available d.c. plate voltage between 150 and 250 volts. If the voltage is less than 150 at the source, the value of the dropping resistor can be lowered. The important point here is to keep the total input below the rated 1 watt, yet not so low as to have a bad effect on the noise figure.

The amplifier will work well down to about 40 volts or so, measured at the plate with a vacuum-tube voltmeter or high-resistance d.c. meter. Its overload characteristics and noise figure will be best if the input is allowed to run somewhere between $\frac{1}{2}$ watt and rated maximum of 1 watt. The noise figure is so much better than is actually needed at 50 Mc., that you can't lose on this band, but at 144 Mc. or higher frequencies, it may be well to check the operating conditions to see that the input does get up to around the $\frac{1}{2}$ -watt level, at least.

Adjustment is similar for the two amplifiers. Connect the amplifier to the converter or receiver by means of a length of coax between J_2 and the receiver antenna terminal. With the cover on the preamplifier, and the antenna connected normally, but with only heater voltage on the Nuvistor, pick a strong signal in the part of the band

* V.H.F. Editor, *QST*.

¹ "An Evaluation of the Nuvistor," *QST*, April, 1961, p. 33.

where you want the preamplifier to work best. (Any frequency in the 144-Mc. band will do, but the 50-Mc. model may not be uniform across the entire band.) Tune the grid circuit approximately for maximum signal. Adjust the turn spacing or the core position in L_3 also for maximum signal. Now adjust the core position in the neutralizing winding, L_2 , for *minimum* signal.

Now apply plate voltage and repeat the grid and plate circuits for maximum signal. This should be very close to the best that you can do, but optimum signal-to-noise ratio on weak signals may require more careful adjustment of the input circuit. The best way to do this is with a noise generator, but you can get results by adjusting the grid circuit for maximum change with respect to noise when a weak signal is tuned in. The position of the tap on L_1 in the 144-Mc. amplifier may require adjustment for absolute top performance, but any difference this might make will be difficult to observe unless you are set up to measure noise figure. The best noise figure will be obtained with L_1 tuned slightly lower in frequency than the setting that gives maximum gain, though it is unlikely that this will be enough to make any practical difference in weak-signal reception on 50 Mc.

When you have gone through the above procedure completely it is well to repeat the process, as there is some interaction between the neutralizing setting and the tuning of the other circuits. Here, again, you may not be able to tell the difference except with the aid of a good noise generator.

What To Expect

The gain of the Nuvistor preamplifier may be as much as 25 db. This means that your S meter will read 3 to 5 S units higher than without the amplifier. How much this means in terms of improved reception depends on how bad your receiver was before. Don't be misled by the higher meter reading — what counts is whether or not you can copy the weak ones better now than before. The S meter is misleading at best, and just being able to give everyone "30 db. over S9" reports doesn't mean that you have done yourself any real good. Try ignoring the S meter. Tune in the weakest signal you can find. Now take off the amplifier, and reconnect the antenna to the

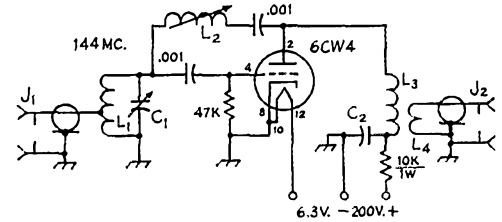
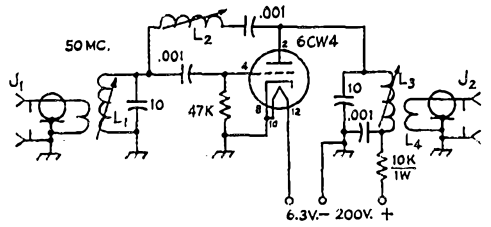


Fig. 1—Nuvistor preamplifiers for 50 and 144 Mc. Decimal values of capacitance are in $\mu\text{f.}$; others are in $\mu\text{f.}$. Except as listed below, capacitors are ceramic. Resistors are $\frac{1}{2}$ -watt composition except as indicated.

C_1 —1-7.5 $\mu\text{f.}$ tubular (Centralab 829-7).

C_2 —0.001- $\mu\text{f.}$ button mica (Centralab ZA-102).

J_1, J_2 —Phono connector.

L_1 —50 Mc.; Adjustable, 0.6-1.0 $\mu\text{h.}$, iron-slug tuned (Miller 20A827RB1), with 3-turn antenna coil wound at ground end.

144 Mc.; $6\frac{1}{4}$ turns No. 18, inside diameter $\frac{1}{4}$ inch, length $\frac{3}{8}$ inch, tapped $2\frac{1}{2}$ turns from ground end.

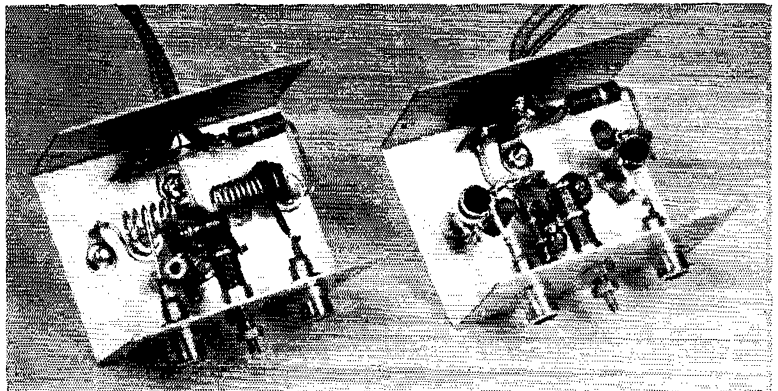
L_2 —50 Mc.; Adjustable, 5-10 $\mu\text{h.}$, iron-slug tuned (Miller 20A826RB1).

144 Mc.; Adjustable, 0.6-10 $\mu\text{h.}$, iron-slug tuned (Miller 20A827RB1).

L_3 —50 Mc.: Same as 50-Mc. L_1 , with 3-turn output link.
144 Mc.: 11 turns No. 18, inside diameter $\frac{1}{4}$ inch, length app. $\frac{3}{4}$ inch, adjusted as required (see text).

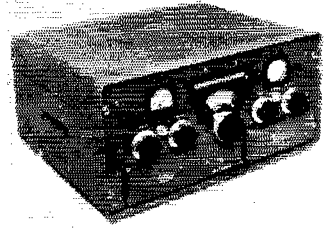
receiver in the way you formerly used it. If you can still read the fellow, you had a good receiver to start with, so don't feel too badly. The way to read him better now is to put up a bigger or higher antenna, or move to a better location. Or give e.w. a try. That will enable you to work stations that are far below readability on voice, and it is the ultimate weak-signal medium. Q57

Interior view of the Nuvistor preamplifiers. The 144-Mc. unit, at the left, uses air-wound grid and plate coils. Slug-tuned coils are used in the 50-Mc. model.



Recent Equipment —

200V Transmitter



It was just about 10 years ago that one of the first commercially built s.s.b. transmitters appeared on the ham scene. The transmitter was the famous Central Electronics 10A exciter. The most recent piece of equipment to appear from Central Electronics, the 200V, has come a long way from the original 10A and incorporates many new features, along with routine improvements that have been developed over the past 10 years.

Probably the most outstanding feature of the 200V is its one-control tuning, which allows for operation over an entire amateur band without the need for adjusting any control except the v.f.o. tuning. All circuits are either fixed frequency or broad-banded so that a single-knob band switch selects the various bands. The 200V as supplied by the manufacturer covers the amateur bands 80 through 10 meters, but has one spare position. (This permits installation of a choice of broad-band couplers for 160 meters, for any 1-Mc. section of the spectrum not covered by the amateur bands, or for a 2-Mc. range from 25.6 to 27.6 Mc.) There is plenty of overlap on the amateur bands so that MARS or CAP frequencies can be covered. The five amateur bands have the following frequency spreads: 3.5 to 4.5 Mc., 6.5 to 7.5 Mc., 13.5 to 14.5 Mc., 20.5 to 21.5 Mc., and 27.7 to 29.7 Mc.

Since the 200V uses the phasing method for s.s.b. generation, several different types of emissions are available: Selectable s.s.b. with carrier, selectable s.s.b. with suppressed carrier, d.s.b. with suppressed carrier, a.m., c.w., p.m. and f.s.k.

Power output, which is constant within 1 db. across all bands in a 50-ohm load, is rated at 100 watts p.e.p. single-tone s.s.b. and c.w., 25 watts on a.m., and 100 watts on p.m. and f.s.k. at a 50 per cent duty cycle. The instruction manual does not give any clue as to the length of the duty cycle. However, the times involved in normal transmitting and receiving are probably safe.

The 200V comes in a gray steel table-model cabinet. It may be removed and mounted in a standard 19-inch relay rack.

Circuit Details

A block diagram of the 200V is shown in Fig. 1. Audio from the microphone is amplified in the pentode section of a 6BL8 speech amplifier, V_{1B} . Output from this stage is coupled to a limiter stage, which is constructed as a separate plug-in module. This circuit maintains maximum speech levels yet prevents overloading in following stages.

A diagram of the limiter is shown in Fig. 2. Speech limiting is done in the triode section of the 6BL8 by two back-biased diodes, CR_1 and CR_2 , which are connected in a full-wave shunt circuit. The 1.4-volt mercury bias cells, BT_1 and BT_2 , are not under any load and so should last their shelf life. Output from the limiter is capacity-coupled to the next stage, an audio filter. The d.c. audio return for the diodes is through an audio transformer T_1 . The transformer primary is tapped on the grid circuit of V_{4A} to provide in-

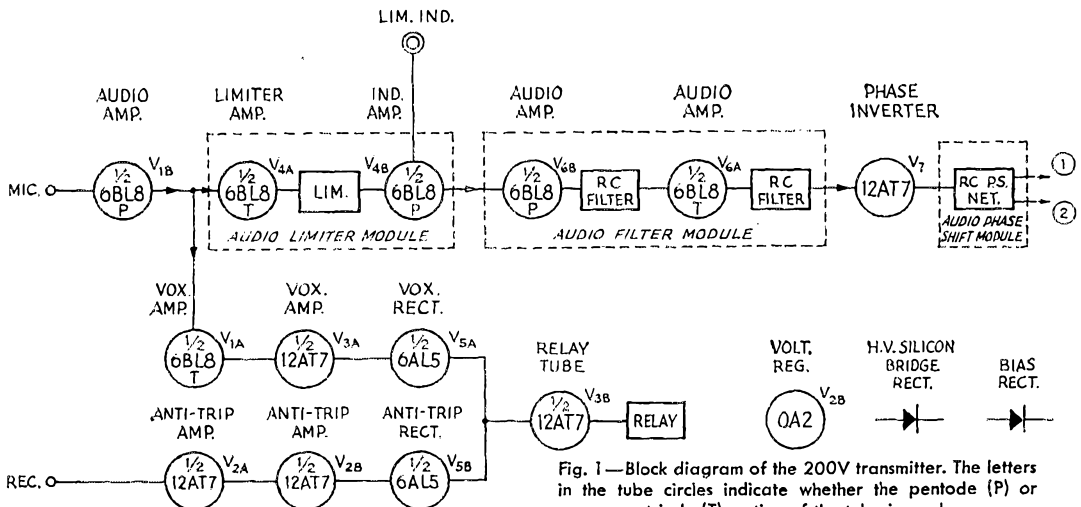


Fig. 1—Block diagram of the 200V transmitter. The letters in the tube circles indicate whether the pentode (P) or triode (T) section of the tube is used.

verse feedback to reduce distortion caused by the limiter diodes in the plate circuit.

Also part of the limiter module is an indicator circuit which controls a limiter neon-bulb indicator on the front panel. The signal at the secondary of T_1 is amplified by V_{4B} and some of the output is rectified by CR_3 to give a positive bias which is in turn applied to the grid of V_{1B} . When V_{4B} conducts, the plate voltage drops far enough below the screen voltage to fire the neon-lamp indicator and show where limiting begins.

Following the audio limiter circuits is another plug-in module containing the audio filter circuits which are made up of two bridged-T networks and six full-T networks. The filter attenuates those audio frequencies that fall outside the effective range of the audio phase-shift network, which appears later in the circuit. The filter is composed entirely of RC elements designed to provide a steep-sided bandpass between 200 and 3500 cycles. Two audio amplifiers, V_{6A} and V_{6B} , are also part of the filter circuit and compensate for losses in the filter.

Following the audio filter is an audio phase inverter, V_7 , for driving the plug-in audio phase-shift network. This network is designed to provide about 50 db. of sideband suppression. The two 90-degree phase-shifted voltages from the network are amplified in several stages (V_8 , V_9 , V_{10}) and fed into the balanced modulator. Extensive feedback is used in these audio amplifiers (about 35 db.) to minimize any phasing distortion.

R.f. for the balanced modulator is generated by an 8-Mc. crystal oscillator, V_{11B} . The pentode section, V_{11A} , of the same 6BL8 tube functions as a reactance modulator when in the f.s.k. mode. Frequency shifts of 100 to 900 cycles may be obtained from this circuit. Grid-block keying is used.

Audio output from V_{10} and r.f. output from the 8-Mc. crystal oscillator feed into the balanced modulator, which uses four semiconductor diodes. Carrier suppression is rated at 50 db. The modulator can be balanced for minimum carrier by two

carrier-null controls located behind a door on the front panel. From this point on, the basic 8-Mc. signal from the balanced modulator is converted to the desired amateur frequencies by the heterodyne method.

To insure maximum stability, all of the oscillators in the circuit operate continuously. A 16-section single-knob band switch connects the proper mixers, oscillators, and tuned circuits.

The v.f.o., with a tuning range of 5 to 6 Mc. uses both sections of a 6BL8, V_{17} , in a Class-A oscillator which resembles, in some respects, a Franklin oscillator. The v.f.o. circuit diagram is shown in Fig. 3. The NE2 neon lamp is used as a voltage stabilizer. Oscillator drift is rated to be less than 25 cycles in any ten-minute interval after a five-minute warm-up, and the manufacturer notes that the v.f.o. circuit will compensate for the effects of tube aging and line-voltage fluctuations. The circuit is permeability tuned by a precision steel lead-screw tuning assembly. A two-speed tuning knob connected to the drive mechanism allows for either rapid or fine tuning across the band. The fast tuning knob covers 100 kc. per revolution and the fine tuning about 5 kc. per turn. The indicating dial is a rotating drum slide rule calibrated every 100 kc. A circular vernier dial, just below the megacycle scale, is calibrated in 1-ke. increments. All of the amateur bands are read with the low-frequency end at the left-hand side of the scale.

Output from the v.f.o. is fed to the v.f.o. amplifier, V_{18} , a 6CB6. Regulated plate voltage is used on both the v.f.o. and the amplifier to insure good frequency stability. The 5- to 6-Mc. output from V_{18} is either amplified or multiplied in the v.f.o. doubler, V_{20} , to 10-12 Mc., depending upon the band in use. A crystal oscillator, V_{19} , provides the necessary r.f. energy at the proper frequency for heterodyning to the desired amateur band.

The first mixer, V_{12} , is a 6EH7, one of the new frame-grid tubes. Eight-megacycle output from the modulator is fed into its control grid. For all

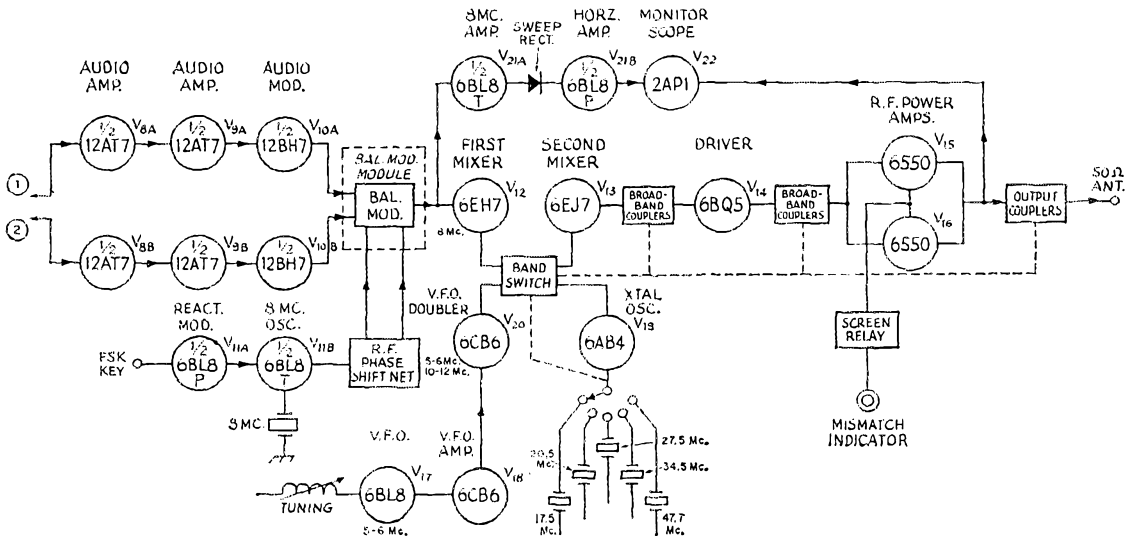
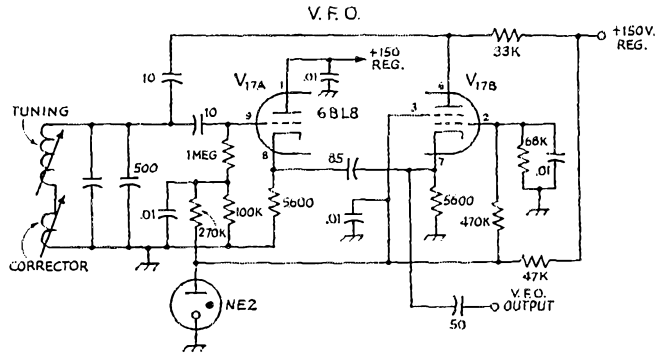


Fig. 3—A permeability-tuned Class-A oscillator is used as a v.f.o. in the 200V. All capacitances are in $\mu\text{f.}$, resistances are in ohms, resistors are $\frac{1}{2}$ watt.



amplifiers by measuring the voltage drop across a small cathode resistance in the 6550 r.f. amplifiers.

In the c.w. mode, keying is accomplished by blocked-grid keying of the first and second mixers, driver, and final r.f. amplifiers.

Also part of the 200V circuit is a monitoring oscilloscope composed of an 8-Mc. amplifier, V_{21A} , a horizontal amplifier, V_{21B} , and a 2-inch monitor scope, V_{22} . Some 8-Mc. signal is picked up just before the first mixer, V_{12} , and is amplified in the triode section of V_{21A} . Output from this amplifier is rectified by a semiconductor diode to furnish a horizontal sweep voltage for the oscilloscope. The pentode section of V_{21} amplifies the sweep voltage from V_{21A} and applies it to the horizontal plates of the 2-inch monitor scope, V_{22} . R.f. from the output of the final stage is coupled to the vertical plates of the scope to give a trapezoid pattern in all modes involving speech (except p.m.). On p.m., c.w. (and single-tone a.s.b.) the pattern is a single vertical line.

Power for the 200V is furnished by a full-wave bridge-rectifier power supply using silicon diodes. The voltages are 680 and 340. A negative 100 volts for bias is also delivered by the power-supply section, using a separate semiconductor rectifier. Since no vacuum tubes are used in the power supply, heat is kept at a minimum.

The usual VOX and anti-trip features are contained in the 200V. Audio from the microphone and receiver are amplified and rectified to control a relay tube, V_{3B} . A relay in the plate circuit of V_{3B} in turn controls the various circuits of the transmitter when going from standby to transmit.

Other Details

Usually, in an equipment description, a lengthy list of the operating controls is necessary. However, for the 200V with its single tuning control and band switch, this paragraph will be rather brief. Actually, there are five controls arranged along the front panel. The two just mentioned are the main ones. The other three are: the FUNCTION switch, which has seven positions; power OFF, STBY, VOX, VOICE CAL, CW CAL, PTT, and MAN.; the CALIBRATE LEVEL, which varies the amplitude of a sample of carrier output for zero-beating purposes; and the EMISSION selector for LSB, USB,

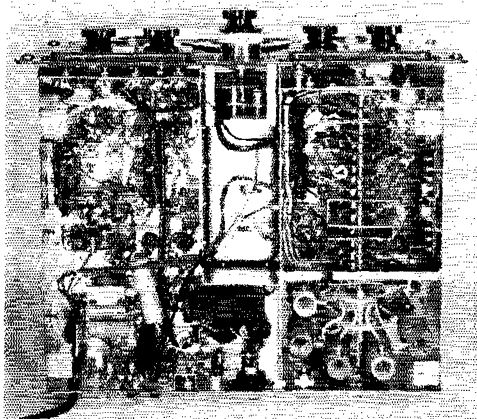
AM, PM, CW, and FSK. Also located on the front panel are the 2-inch monitoring scope, the mismatch and limiter lamp indicators, and the output meter.

Two front panel pop-open doors (held shut by magnetic catches) conceal several "set and forget" controls. They include controls such as the VOX level, anti-trip level, VOX relay release time, f.s.k. deviation, carrier null, a.m. carrier, c.w. carrier, power output (varies the power output for the exciter from maximum down to about 10 watts for driving amplifiers that require less power), crystal-v.f.o. switch and crystal socket, and a crystal corrector control.

Potentiometer controls arranged at various spots on top of the chassis include the a.f. ratio, a.f. balance, limiter indicator, hum balance, audio level, three scope adjustments, meter adjustment, and four mixer-adjusting resistors.

Rear-apron terminals are the antenna connector (coax), antenna relay (115 volts for an external antenna relay), internal relay (to contacts of the built-in relay), microphone jack, headphone jack (for monitoring the station receiver; it is muted when transmitting), and three keying jacks. Of the latter, the cw PTT jack is for keying the internal relay and an external antenna relay, for break-in operation. The cw STBY jack keys the grid blocking bias only; the station receiver will not mute and the antenna relay will not operate in this condition. In this case, a t.r. switch, manually-operated antenna switch, or separate receiving antenna must be used. The cw MAN-vox jack operates as follows: With the function switch in the vox position, the first keying pulse will close the internal relay and the external antenna relay and hold them in that position for a period of a few milli-seconds up to about 1 second. The time delay is adjustable and is set by the VOX relay release time potentiometer. This type of operation permits break-in similar to that of "Tattoo" or some of the other systems, where you can't be broken during a letter but only at the end of a word or sentence, depending upon your sending speed and the delay time in the VOX circuit. With the function switch in the MANUAL position, the relays remain closed and only the blocking bias is keyed.

There are also receiver and speaker connections, a bias jack (provides a negative bias for



The five r.f. amplifier broad-band output couplers are located in the rear compartment behind the 16-section band switch. Part of the chain drive that controls the band switch is visible between the front and subpanels at the right. Also, the v.f.o. drive gears can be seen at the center just behind the panel. Several cover plates have been removed in this photograph.

blocking an external linear amplifier), f.s.k. jacks, remote v.f.o. jacks, and an a.f. output jack which furnishes audio for use with an external oscilloscope or to drive external speech equipment.

The manufacturer is to be complimented on the excellent instruction manual furnished with the transmitter. In addition to the usual operating notes and general descriptions usually found in instruction manuals, the 200V manual goes into detail on theory of operation, maintenance,

repair, and television interference. It includes a schematic diagram which at first glance looks rather complicated — it should be, with a 16-section band switch! — but after some study is easier to read than many circuits that accompany far less-complicated equipment.

All of the leads on the diagram are coded and can thus be easily traced across the page. Several test points are located throughout the 200V circuit for convenient checking and are covered in the diagram and in the manual. One is located at the grid of V_{2a} , the v.f.o. doubler, to check the v.f.o. drive voltage. Two test points are provided to check first- and second-mixer operation, and two are available for measuring voltages at the grid and cathode of the r.f. driver, V_{14} . Grid voltages at the r.f. amplifiers may also be measured at a test point. The manual also discusses and codes the positions of the rotary switches so that the different conditions that exist in the various switch positions can be worked out without struggling over the circuit diagram. — *E.L.C.*

200V TRANSMITTER

Height: 9 inches.
 Width: 19¼ inches.
 Depth: 15 inches.
 Weight: 90 pounds.
 Power requirements: 600 watts (350 watts standby), 117 volts, 50/60 cycles.
 Price class: \$800.
 Manufacturer: Central Electronics, Inc., Chicago 13, Illinois.

Strays

The Voice of America amateur radio program continues each week. These English-language broadcasts are written and voiced by W2SKE, produced by W2BAK, and include propagation forecasts by W3ASK and W4ETT. Look for this program on the following schedule:

Time (GMT)	Kc.	Station	Beam
1345-1400 (Friday)	920	Malolos	Philippines
	5985	KNBH, USA	Hawaii/Australia
	7155	Okinawa	North East Asia
	9515	KNBH, USA	Far East
	9650	Honolulu	East Asia
	9710	Okinawa	Central East Asia
	9740	KNBH, USA	Hawaii/Australia
	11,730	KNBH, USA	Oceania
	11,775	Honolulu	East Asia
	11,785	Malolos	Central East Asia
	15,335	Philippines	South East Asia
2115-2130 (Friday)	1259	Courier, Rhodes	Middle East/S.E. Europe
	3980	Munich, Germany	Europe
	6040	Munich, Germany	Europe
	6185	Munich, Germany	Europe
	7120	Courier, Rhodes	Middle East/S.E. Europe
	7260	Thessaloniki	Middle East
	9520	Thessaloniki	Europe

9530	Courier, Rhodes	Middle East/S.E. Europe	
9615	Tangier, Morocco	Europe	
9630	Munich, Germany	Middle East/Europe	
11,900	WDSI, USA	Europe	
11,960	Munich, Germany	East Africa	
15,205	WDSI, USA	Europe	
15,440	Munich, Germany	West Africa	
17,710	WLWO, USA	West Africa	
21,610	WLWO, USA	West Africa	
6145	Okinawa	North East Asia	
7160	Okinawa	North East Asia	
9770	Malolos	North East Asia	
11,960	Malolos	North East Asia	
15,150	KCBR, USA	Far East	
17,770	KCBR, USA	Far East	
21,740	KCBR, USA	Far East	
0045-0100 (Saturday)	11,830	WBOU, USA	Caribbean/E. So. America
	11,895	WLWO, USA	Caribbean/W. So. America
	15,205	WDSI, USA	South America
	15,290	WLWO, USA	W. So. America/C. America
	15,330	WBOU, USA	Brazil West Indies

Send QSLs to Bill Leonard, Box 922, Washington 4, D.C.



Hamfest Calendar

Alabama—The North Alabama Hamfest will be held on August 20 in Florence, at Skypark Beach. A Saturday dinner is also being planned. For further information contact any member of the Muscle Shoals Amateur Radio Club or Milton Underwood, K4ZBX, Route #3, Florence, Alabama.

California—The third annual San Joaquin Valley Section Picnic will be held on Sunday, August 13, at Olive Arbor, Mooney's Grove, at Visalia, just east of Highway 99. Sponsored by the Tulare County Radio Club and SJV net, registration is \$1. For further details, check the SJV net, Monday through Saturday, 3915 kc, at 1830.

Illinois—The Hamfesters Radio Club will hold its annual picnic on August 13 at Santa Fe Park, near Chicago. For further details contact Thomas Hardek, K9IKL, 5340 S. Natoma Avenue, Chicago 38, Ill.

Indiana—The Tri-State Amateur Radio Society will hold a hamfest on August 20. Registrations in advance are \$2.00 per person, or \$2.50 at the gate. Food and drinks will be available. For further information contact the Tri-State ARS at P.O. Box 51, Evansville.

Indiana—The Kokomo Amateur Radio Club will hold its 9th annual hamfest at the Big Bull at Highland Park on Sunday, Aug. 13. Plenty of contests and prizes, plus activities for the XYL and kids. Registrations are \$1.50. Contact Jerry Smiley, W9DKR, 1019 N. Webster St., Kokomo, Ind.

Indiana—The Second Annual 6-Meter FM Picnic sponsored by the Tri-State College Amateur Radio Club will be held on Sunday, August 6, three miles northwest of Angola, Ind., at the 4-H Park on the east side of Crooked Lake starting at 10 A.M. There will be mobile check-ins on 52.525 and 52.640 Mc., using wide-band f.m. Food and cold drinks will be available at the refreshment counter for a nominal charge, or you can bring your own. Some of the activities include technical talks, swap and shop, ham-gear auction, and frequency measurements. There is a public beach available for the XYLS and children. Admission is by donation of \$1.00 in advance, or \$1.50 at the gate. XYLS and children free. If you are on 6 m. or interested in f.m., don't miss it. Bring the family. For advance registration or additional information write to Ward J. Taylor, W4CTU/9, Tri-State College Amateur Radio Club, Angola, Indiana.

Kansas—The annual picnic of the Ham Butchers Net will be held Sunday, August 20, at Emporia. Weather permitting, the place will be the City Park. In case of inclement weather, it will be the City Armory. Registration is \$1.00. Coffee and cold soft drinks will be furnished by the net, with a basket dinner at noon. For pre-registration or additional details contact K0RWZ, Willard E. Romer, 925 Commercial St., Emporia, Kansas.

Maine—There will be the annual hamfest/picnic at the home of W1BOK in Dexter on August 13. Registration fee is \$1.00 and advance registration would be appreciated. Mail to Elwood Stevens, W1BOK, 11 Beech St., Dexter, Maine. Bring a picnic lunch and the whole family. There will be a mobile hunt and prizes.

Manitoba—The Manitoba hamfest will be sponsored by the Brandon Amateur Radio Club on September 2 and 3 at Brandon. Saturday evening will be a social re-acquainted party, and Sunday will have the hamfest activities, ending with a banquet. Advance registration will be necessary if you plan to attend the banquet—\$6.00 per couple or \$3.00 single. For further information contact Fran Haddon, VE4KN, 715-7th St., Brandon, Manitoba, Canada.

Missouri—The annual picnic of the Southwest Missouri Amateur Radio Club will be held in Springfield on Sunday, August 27. The club will furnish baked ham and cold soft drinks, as usual. The rest of the meal will be furnished by each individual from his own picnic basket, also as usual. For further details contact K0JPP, Frank Gilmore, 560 Warren, Springfield, Missouri.

New Jersey—The East Coast V.H.F. Society will hold its 3rd Annual Old Style Picnic and Hamfest starting at 10 A.M. on Sunday, August 13, at Saddle Brook Park, Saddle Brook, N. J. (rain date Sunday, August 20). Free registration for all, combined with ample picnic, recreational, and free parking facilities, make this event ideal for the entire family to relax in pleasant surroundings. Radio facilities on

2, 6, and 10 meters will be available for general hamming and for "talking-in" those mobilcoers who may have difficulty finding this well-known location. Prize contests, games, displays of equipment, and other interesting events for all ages have been planned to make attendance at this hamfest both memorable and profitable. Food and soft drinks will be available at a nominal charge for those not bringing their own. For further information contact John W. Johnson, W2YIA, 51 Birch Rd., Dumont, N. J.

Ohio—The 4th annual hamfest and family picnic of the Warren Amateur Radio Association will be held on Saturday, August 26, at the Main Shelterhouse, Packard Park, Warren, from 12 noon to 5:00 P.M. Lunch time is 12 noon to 1:00 P.M., and a picnic area is available. Registration is \$1.50. The program will include an auction and swap & shop. There will be a talk-in station for mobiles. For further information contact Imogene Kalman, KN8VIQ, 112 Shirley Lane, N.W., Warren, Ohio.

Oklahoma—The third annual Beaver's Bend hamfest will be held at Beaver's Bend State Park, Oklahoma, on August 19 and 20. Write to Charles Free, K5DLO, 108 S. Central Avenue, Idabel, Oklahoma.

Pennsylvania—The Mt. Airy V.H.F. Radio Club will hold its sixth annual picnic and family day on Sunday, August 13 (rain date, August 20), at Fort Washington State Park, Flourtown, Pa. Registration (at the park only) \$1.00 per family. Talk-in frequencies 50.2 and 144.2 Mc. Fun, games, prizes, eyeball QSO's, free soda. Bring your own food. For further information contact Francis D. Brick, W3SAO, 829 V. Fishers Avenue, Philadelphia 41, Pa.

Pennsylvania—The sixth annual hamfest of the four York County amateur radio clubs (Pen-Mar Radio Club Inc., of Hanover; Hilltop Transmuting Society of Red Lion; York Amateur Radio Club of York; and the Keystone VHF Club of York) will be held rain or shine on August 27, at the Dover Fire Hall, one block north of the square of Dover (off Route 74). Registrations start at 10:00 A.M. Plenty of free parking. Auctions, free soda, games and activities for the entire family. Clown and movies for the kiddies. Talk-in rigs on 50.62 Mc., 28.65 Mc., 145.59 Mc., and 75 meters. Tickets \$1.00 in advance or \$1.25 at the gate, per ham, including family or guest. For tickets write John Zett, W3FLD, 2740 Grandview Avenue, York, Pa.

Virginia—The Shenandoah Valley Amateur Radio Club will hold its 11th annual Banquet and Hamfest on August 19 and 20 in Winchester, Va. The steak banquet will be held on August 19 at the Lee-Jackson Dining Room beginning at 6:30 P.M. EDST. Well-known speaker, top flight entertainment and good fellowship. Write SVARC, P.O. Box 139 for tickets at \$2.50 each. Sunday, August 20, the hamfest begins at 10 A.M. in the National Guard Armory. Admission is free. Equipment displays, free bingo, MARS gathering, and auction. For further information contact Richard E. Rusli, P.O. Box 139, Winchester, Virginia.



Strays

The Old Old Timers Club is making a survey to determine how many present-day amateurs were also listed in the first government call book, which was published in 1913. If you are one of these old old timers, please contact OOTC Secretary Earl C. Williams, 507 Wayside Road, Neptune, N. J. Give him your 1913 call, your present call, and any other pertinent personal details.

Here's a weirdy. K4WIQ had a telephone call from a gal who said his signals were interfering with a message she was getting from a space ship on her Ouija board!



Hints and Kinks

For the Experimenter



EMERGENCY EARPHONES

If the metal diaphragms in your earphone are damaged, cut two disks the size of the original diaphragm from a piece of cardboard. Next, cut two smaller disks, about the size of a dime, from a tin can and stick them to the center of the cardboard disks with a strip of masking tape. The new diaphragms are inserted in the phones with the cardboard sides toward the magnets. The earphones will have an entirely new sound which, in my opinion, is better than the original. I'm still using mine after three months and gone is the tiring, rasping, "tinney" sound usually associated with even high-priced earphones.

— Bob Sparks, W5YWD

OIL CAN SHIELDS

The economy minded experimenter will be interested in learning that Mobil Oil is using aluminum cans for packaging their oil. After a cleaning and with one end removed, an aluminum can makes a good shield for transmitter coils or

other components that are too large for the usual sized shields.

— Eugene Austin, W0LZL

BEARING OILER

To reactivate a noisy or sluggish electric clock, blower or other device with a sealed rotor or bearing, heat the unit in a moderate oven. Then, while it is cooling, place a few drops of oil around the output shaft or gear. The contracting air inside the sealed compartment will inhale the oil through the bearing and restore normal operation.

— Charles Kram, jr., W5TFZ

NO-TIP J-38 KEY

The popular J-38 key can be used on the operating table without fastening it down by simply removing the key from its base, turning it around 180 degrees, and remounting it on the same base. Use the same mounting holes for attaching the key to the base.

— Charles O. Alexander, W0KCG

HIGH-Z-TO-LOW-Z MICROPHONE ADAPTER

Many commercial and home-built mobile transmitters are designed for low-impedance carbon-microphone input. The input speech circuit is usually a grounded-grid arrangement as shown to the right in Fig. 1. However, it is sometimes desirable to use a high-impedance microphone with the equipment, since a crystal or dynamic microphone has better fidelity and freedom from the hiss and "blasting" sound familiar to the carbon type.

The circuit shown in Fig. 1 is a matching device which will allow a high-impedance microphone to be used with the original speech circuit in the transmitter without any changes in the equipment. It uses two transistors and doesn't need a power supply, since its operating voltage

is obtained from the voltage developed at the cathode of the speech-amplifier tubes. It probably could be built small enough to be installed in the microphone case or under its base. By throwing switch S_1 , the microphone feeds straight through so that it can be used with equipment designed for high-impedance input.

Transistor Q_1 is used in a common-collector circuit to step down the impedance of the microphone to match the emitter-follower transistor Q_2 , which feeds the signal into the low-impedance jack of the speech amplifier. The output voltage from the unit is comparable to that of a carbon microphone but is free from its characteristic hiss sound and nasal quality.

— E. S. Millman, W3WNE

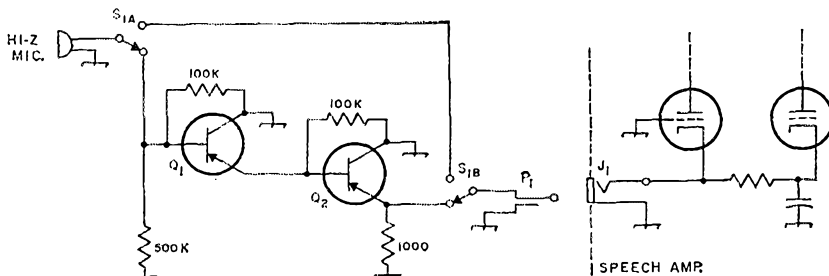
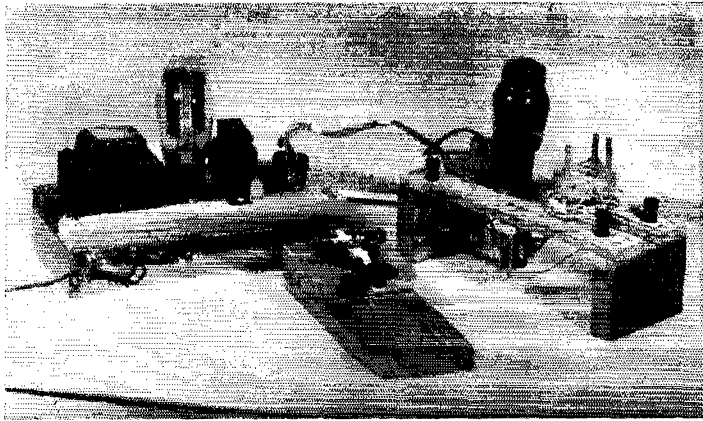


Fig. 1—Microphone impedance step-down adapter. Jack J_1 is the microphone jack on the transmitter's speech amplifier. All resistors are $\frac{1}{2}$ watt.

P_1 —Plug to mate with J_1 .
 Q_1, Q_2 —2N107 transistors.
 S_1 —D.p.d.t. switch.



My First Transmitter

BY MASON CARGILL,* K4VGO

I GUESS I got the radio bug from my brother Slade, K4HBI, when he showed me his rig when I was about eight years old. Then I kept on him 'til he taught me the code. After that, my dad (who is now K4VGP) taught me the theory, which was very hard.

When I was a Novice I used my brother's old transmitter. Then when I got my General ticket (age 10) I used a DX-40 and a DX-100B. But I wanted to build a transmitter of my own. I dug up an old copy of *How to Become a Radio Amateur* and saw the simple one-tube transmitter.

That was the beginning. I asked my brother if he had any of the parts. In a couple of days he finally looked, and we found all of them except four binding posts (which we substituted for Fahnestock clips because of former experience with them on crystal radios), two condensers, one resistor, bell wire, hook-up wire, and a dowel rod. I got the parts from a local wholesale house for \$1.85.

Then I started. My dad built the wooden chassis and then I started to wire it. I used a 6L6


instead of a 6V6 and a 5U4 instead of a 5Y3, because that's what I had.

I had to solder some hook-up wire onto one resistor and two condensers (which were not exactly the values the book said to use) because the leads were too short. Then I wound the forty-meter coils. My brother said they were the funniest coils he had ever seen. They looked that way to me, too.

But I still had a problem. The bell wire which I wound the coils with wouldn't take solder. My brother thought it was just my soldering, but he tried and it still wouldn't,¹ so I just wrapped them good and taped them.

When I got it wired, I let my brother check the wiring and he found three cold-solder joints and two wires which had been left out.

After I fixed these we tried to test it out but it wouldn't oscillate. We thought it was the crystal so I borrowed a 7018-kc. crystal from Bobby Carroll, K4LSV. Then it would oscillate.

I've worked fourteen states and two countries in seven days with this transmitter. 

¹ Much of today's bell wire is made of an aluminum alloy, which explains why Mason had trouble soldering it. — Ed.

*309 Winburn Drive, East point, Georgia

Stays

Two Hundred Meters and Down, by the late Clinton B. DeSoto, is a 184-page history of early amateur radio (to 1936) which has been out of print for about ten years. The League arranged for reproduction, through a photographic process, of a limited number of copies of this book and has a few still in stock at a price of \$2.00, approximately our cost. Address ARRL Hq., West Hartford, Conn.

— . . . —

HS1R (W5OZI) suggests that an easy way to keep track of GMT is to take a cheap wind-up

clock and solder an extra hour hand (which could be "manufactured" from a piece of tin cut from a can) to the regular hour hand of the clock. In the Eastern time zone, for example, you would have the new GMT hand reading 5 hours ahead of EST. That is, when the EST hand showed 1200, the GMT hand would be pointing to 5 o'clock, and it would be up to you to interpret whether this was 0500 or 1700 GMT. This is certainly an inexpensive way out, although we hasten to point out that some of our QST advertisers would love to sell you a much fancier 24-hour version, in which the GMT hand is adjustable.



These are the living quarters on Kure Island. Good duty, if you like sand and solitude.

DXpedition to Kure Island

BY GARY D. ELLIOTT,* KM6CB ex-CN8FH, -WZUXP

MIDWAY ISLAND, the home of the notorious gooney bird and KM6s, is happily situated almost centrally in the Pacific Ocean. The number of active amateurs is relatively few, QRN is negligible, and reception from all parts of the globe appears to be equally excellent. It would seem unnecessary to attempt to improve this situation, but the thought did occur to several Midway amateurs. After official Navy clearance had been obtained, enthusiastic plans were made for a DXpedition to Kure Island and arrangements made for the DXpedition to coincide with the dates of the 27th ARRL DX contest in February and March.

Kure, occasionally known as Green Island, lies about 65 miles west of Midway Island. This small dab of coral, whose surface area is less than one square mile, is covered with scaevola bushes and is heavily populated with gooney birds, frigate birds, bos'n birds, moaning birds, noddies, and two species of terns. The bos'n, like their military counterpart, are endowed with an unusually raucous and penetrating voice, and it is actually a fact that these birds are able to fly backwards for short distances. The moaning bird, not to be outdone, digs holes in the sand like a dog, groaning and complaining in the manner of one in great pain. Kure is completely surrounded by a coral reef, making it impossible for ships to anchor or dock within the lagoon, and as a result all supplies to support the small detachment of Coast Guard personnel stationed there must be flown from Midway.

While administratively a part of the Hawaiian Islands and physiographically the western tip of the Hawaiian chain, Kure lies so far to the west of the major Islands (almost 1200 miles) that reasonably it should be considered an "orphan". Accordingly, the FCC was petitioned with the optimistic plan of using the call KK6USN. Evidently less imaginative and less DX-conscious than the petitioners, the FCC ruled that although Kure was beyond Midway and outside of its confines, it was still a portion of the Hawaiian

group, and issued the uninspiring call KH6ECD. Our spirits were considerably deflated, but were shortly thereafter bolstered by word from ARRL that Kure was to be granted new-country status.

Two teams, phone and c.w., were organized. The phone group, sparked by LCDR K. H. Tribou, KM6BU, a gentleman of considerable endurance on the end of a microphone and originator of the phrase "on the *fabulous* island of Midway", included R. T. Tyrer, KM6CC, and Ted Woods, KM6BJ. The c.w. team, selected by LCDR Wm. M. M. Robinson, KM6BQ, included C. "Red" Evans, K3HWI, and G. Elliott, KM6CB. CWO G. F. Wilson, KM6BZ, was initially scheduled to be a member of the team, but at the last moment was unable to participate.

After a preliminary "scouting trip" had been accomplished, the phone group departed Midway on Thursday, February 2, hitch-hiking a flight on a privately owned Beechcraft, bulging with a 100-V, 75A-4, HT-32A, a Hornet TB750 and a Hy-Gain vertical. Much courtesy and cooperation were rendered by Lt. Muldoon and the men of his Coast Guard detachment, who made space and bunks available and assisted in the erection of the antennas. The antennas were up and the gear operating within five hours, and Kure went on the air for the first time at 4:00 P.M. local time, or 0300 GMT, handling phone messages and traffic for the men who had been isolated there for several months. KH6ECD returned to the air at 8:00 A.M. and remained on the air for the following first section of the contest. Activity was brisk, and thanks to earlier announcements from W1AW and a blurb in QST, a multitude of sidebanders were waiting for KH6ECD to open up. Fifteen meters proved to be the most productive band, and during the first section approximately 600 QSOs were completed, of which 540 were with continental U. S. hams.

Leaving the antennas on Kure, the group returned to Midway, to be replaced in two weeks by the c.w. team. This team thumbed a ride on a passing Coast Guard C-130 turbojet cargo plane, which, in addition to several tons of

* U. S. Naval Station, Navy #3080, Box 23, % F.P.O., San Francisco, Cal.



KM6CB doesn't have to worry about trampling all over the grass as he assembles the beam.



Kure Island from the air. That's the air strip off to the left at the center of the photo.

cement, also carried a KWM-1 and a DX-100. Arriving on Thursday, February 16, the antennas were re-erected and pre-contest warm-up commenced. The c.w. stations were equally alerted, and the initial CQ produced W6AFI, followed by 183 more prior to the start of the contest on the following day.

Fifteen meters again proved to be the best selection. Pileups were most stimulating and surprised even the "seasoned" KM6 operators, who are fairly accustomed to such things. Variations in skip produced strings of contacts in individual states, sometimes ten in a row. Propagation conditions were disappointing, and ten meters was particularly weak. Night-time conditions were not good, and activity on forty, while frantic for a few hours, died out about midnight and left us in the company of non-scoring JAs, UAs, ZLs and VKs, not a few of whom asked "Since when has KH6 been DX?"

On the second day fifteen was a delight and twenty ran a close second. Night-time operation on forty improved after the addition of an LPA-1 linear. High power is not essential -- it's just the difference between pounding and tapping. All districts were quickly worked on this band.

The phone team returned to Kure on March 3, remaining there until March 5. Band conditions proved more to their liking, and the operators, assisted this trip by CDR Wm. Krause, KH6DEL, racked up approximately 700 contacts in the United States and Canada plus an additional 100 DX stations. Europeans had received the word via channels not entirely understood by us, and the sidebanders sandwiched these stations plus Africans and South Americans in between contest contacts.

KM6BQ, a member of the c.w. team and one of the prime movers of the DXpedition, knocks them off at a good clip.



The remaining c.w. section on March 17-20 encountered a new and unexpected competitor in the form of the recently completed loran transmitter on Kure, with its nine channel, 30 c.p.s. pulses to a final running a modest 20 amps at 16,000 volts. Reception on all bands was frustratingly difficult until the engineer of the loran station, because of excessive arcing of strain insulators, was obliged to QRP to 220 kw. Contest business subsequently picked up, including a fling on eighty meters with a dipole, resulting in 22 contacts in five districts.

The four week ends of operation netted approximately 4000 phone and c.w. contacts, a vigorous work-out for the operators, and a new country QSL for those that wish them. Undoubtedly several stations passed up KH6ECD, believing it to be another Hawaiian call. U.S. hams will have a future opportunity to acquire Kure in their worked column when the Coast Guard detachment there receives its recently requested station license. They will be looking for stateside contacts to handle phone traffic.

The mails have brought a deluge of QSL cards as well as variety of letters. We have had compliments on our operative procedures, and some rather strong criticisms. We have been alternatively commended and cursed for permitting tail-ending, for listening up, down or zero-beating, for organizing and not organizing. We have observed that the favorable comments tended to be received from stations that we worked! A QSL card has been laid out and is in the hands of the printer; we will respond to all requests for cards as promptly as possible. Phone contacts will be confirmed by KM6BU and c.w. contacts by KM6BQ.

QST

KM6CC and KM6BU knock 'em dead on phone.



Operation Alert, 1961

Including an Analysis of Amateur Participation in the Conelrad Alert

BY GEORGE HART, * WINJIM

AMATEUR participation in Operation Alert this year seems to have been confined mostly to the conelrad test, about which more later. First, let's paraphrase some of the reports on general amateur participation in the operational drill itself.

Fourteen reports were received from ten states this year; last year, we received reports from 28 states. The reason for this seeming decrease on the part of amateur activity is probably that OCDM requested this year that only amateurs involved in RACES take part, and many of these did not report to us for the record. After this report appears in *QST*, we'll no doubt get several others, which can be run in a subsequent issue in supplementary form; but it goes almost without saying that we'll never get the same amount of amateur participation without getting the AREC into the act, with or without a formal RACES organization. Here is a summary of the reports received:

California

RACES Radio Officer W6CIS advises that operation began at 1100 (PST?) on April 28, on 7090 kc. (not a RACES frequency) with most of the regional communications centers and their alternates represented. At 1800, operation was shifted to the RACES segment of the 80-meter band. Activity ceased at 2300, but resumed again at 0900 on 7090 kc., with smooth going for the rest of the exercise. W6CIS reports in more detail the doings at the Region 1 Con-Center at Saugus, Calif., where he was stationed. In addition to CCDN (long haul c.w.), this center did much operating on six meters over difficult terrain, assisted by a temporary repeater on Saddle Peak. Areas putting signals into the

* National Emergency Coordinator, ARRL.



W8DTZ poses for a striking piece of publicity while the Genesee County control station operates full blast in the background. Photo courtesy the Flint (Mich.) Journal.

Saddle Peak repeater on two meters were repeated on six meters to communicate with regional headquarters at Saugus. The repeater also enabled contact with the relay point in Santa Barbara. Approximately 17% of the entire traffic load at Saugus was handled by RACES operators.

Connecticut

W1WX and his crew operated the control station at Fairfield on six meters, maintaining contact with Area 1 control at Ridgefield. They also had four mobile units in operation for local work, and an operator at the Red Cross headquarters station.

W1DXT led the operation in Newington, principally for contact with Area 3 headquarters in Rocky Hill. This work was accomplished on ten meters as a backup to telephone communication.

Florida

As usual, much activity in Florida. SEC W4MLE reports for Western Florida that several important cities were absent from the state RACES net, and great difficulty was experienced in getting traffic into Thomasville, the regional OCDM headquarters.

In Okaloosa County, Radio Officer W4RKH reports that approximately 20 amateurs furnished communications for the county c.d. director. Control was located at the Eglin Air Force Base Command Post to facilitate air force participation, with other fixed stations at Crestview, Fort Walton, Destin and Valparaiso. Mobile units covered smaller towns as necessary. Ten meters was the primary band used, with some use of two meters and, for greater distances, 75 meters. Two fixed stations operated on two or more frequencies to provide liaison. Area control was at Panama City. Participation was from 0900 (CST?) to 2000 Apr. 28 and 0830 to 1000 Apr. 29.

In Hillsborough County (Tampa), all c.d. communications posts were manned on an around-the-clock basis by 41 amateurs of the Hillsborough Amateur Radio Society, providing "the best communication accomplishment this county and area have experienced," according to c.d. officials. The alert was preceded by a field check-out of equipment from the alternate NCS location at Plant City and tests with fixed stations in Tampa.

Louisiana

The Lafayette AREC manned the local RACES station, operated the Area 6 Net and checked Area 6 into the state net on 75 meters. They also handled the entire communications center, furnishing typist, couriers and the comms chief himself.

Massachusetts

Arlington C.D. installed three new control booths just in time to be used on OPAL 1961. These reduced background noise from auxiliary police and other services to a polite hush, while radiomen carried on their traffic load. In addition, three new antennas were erected and helped provide the much needed link with Sector IC.

Michigan

A memo from W8DTZ, EC for Genesee County, states that 26 stations and 64 operators took part in the local version of OPAL (see photo at left).

Missouri

The state RACES net experienced considerable interference from adjacent state nets, according to SCM W9BUL, indicating that state RACES frequencies were not well chosen.

New Jersey

All we have from New Jersey is a message from W21MJ indicating that the Wood-Ridge Civil Defense Net was in operation.

Oregon

Twelve stations of the RACES group of Portland took part in OPAL. A letter was received from the c.d. director commending the amateurs for their services.

West Virginia

State RO K8CSG submits a comprehensive report on results statewide, almost worth a feature article in itself. During the exercise, RACES had good support from the AREC. Virtually continuous contact was maintained with Huntington, Wheeling, Elkins and Princeton, and an additional sixteen cities were contacted at various times. State NCS K8CSG/8 operated continuously for 13½ hours, alternate NCS K8JZX/8 for 20 hours. Over 50 messages were handled. Eleven operators were used to staff these two stations.

The Huntington-Cabell County group utilized RACES facilities on 80 and 6 meters under the call W8FUM/8, handled twelve messages. W8KXD in Glendale established contact with the Marshall County c.d. director and transmitted traffic to state headquarters in Charleston. He then contacted the Ohio County c.d. director and provided contact with Charleston for the remainder of the exercise, the only communication between these counties and state c.d. headquarters. Mercer County relayed traffic via W8DFC. K8VNQ at Elkins used emergency power throughout the exercise and had excellent routing facilities, but no official traffic was forthcoming. K8BUC, EC for Summers County, provided contact with state headquarters, while other stations established a 6-meter net in Hinton. Altogether, an estimated 75 operators participated from West Virginia.

In a report to his SEC, W8GIU, EC for Randolph County (Elkins), indicates that all was not peaches and cream in his area, as far as OPAL was concerned, mostly because of a bad political situation in non-amateur circles. In his diatribe, however, he does not spare the amateurs either; they should have been more active and there should have been more of them.

Wyoming

W7BHII, RACES chief for Wyoming, says: "OPAL-61 was a joint RACES-AREC undertaking in Wyoming. The test was a success as far as amateur radio was concerned, and we received some very good cooperation from the state c.d. and from most of the county and city c.d. directors. We still have a lot of work to be done in getting the RACES program fully organized."

Miscellaneous Comments

W6CIS makes the following pertinent observations: (1) You cannot get qualified volunteers out for an exercise on a work day. (2) Using just any operators in a pinch can be worse than no operators at all. (3) More training is needed; circuit discipline was sadly lacking. (4) Equipment could be greatly improved. (5) Long-haul channels available are grossly inadequate for the job; v.h.f. channels are not practical, generally speaking, for long-haul work.

"OPAL-61 was a big success in W. Fla. — for the AREC. I'm afraid RACES didn't look too good." — W4MLE. "The area c.d. director (in Panama City, Fla.) apparently does not wish to make use of amateur facilities. Messages dispatched to him by amateur radio were not recognized." — W4RKH. "C.D. officials were pleased with us, but we have a lot to learn." — K5DPH. "Suggest use of numbered texts for routine messages." — W0BUL. "There is room for considerable improvement, especially from the amateur groups in the larger cities." — W8GTU.

K8CSG, West Va. state RO, makes these recommendations: (1) County c.d. directors should become more familiar with the services that can be provided by amateurs. (2) Greater coverage of the state by the RACES organization is needed. (3) Communications efficiency will be increased by greater use of s.s.b. (4) Receiving equipment at state NCS is not adequate; receivers belonging to K8CSG and W8IIZA have been loaned for using during OPAL the last four years. (5) A linear amplifier is needed to increase power output on six meters.

Conelrad Alert

In previous years, when FCC scheduled a conelrad drill concurrent with OPAL, the amateurs were not required to take part. This year, FCC requested a *voluntary* observance by amateurs, and the League spread the word via *QST*, an



Members of the Volusia County (Fla.) RACES group work one of the operating positions at the control center during OPAL 61. Seated, left to right, are K4TUH, W4QR, K4RNR; standing, W4MSP (Communications Officer) and two couriers. Official Civil Defense Photo.

Official Bulletin through the OBS system and the CD Bulletin. Official Observer appointees were requested to monitor, send OO cards to amateurs heard on the air during the alert, and report to headquarters the calls of such stations.

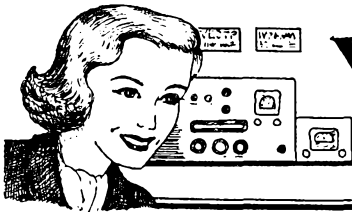
An analysis of returns indicates that 91 OOs logged 355 "violators" of the conelrad alert on 12 amateur bands (phone and c.w. segments of the same bands counted as separate bands for this purpose). Observers were hampered by generally poor propagation conditions, QRN, inconvenience caused by the scheduling of the alert, and unfavorable local conditions for monitoring. The best hunting ground for alert "violators" was 40-meter c.w., where 166 different calls were logged, 93 of them Novices. Here's the breakdown:

Band (meters)	Stations	Novices
160	2	—
80 c.w.	11	3
75 phone	31	—
40 c.w.	166	93
20 c.w.	55	—
20 phone	30	—
15 c.w.	7	5
15 phone	11	—
10	2	—
6	2	—
2	3	—
Total	355	101

A great many reporting observers loudly decried the practice of well-intentioned stations themselves violating the alert to "pipe down" other stations. This type of activity was indeed widespread. Self-appointed monitors unable to stay off the air after the alert had started were more guilty of violating the alert than the ones they were trying to silence, most of whom were doing it unknowingly.

Some of the stations who received OO cards complained that they had committed no violation (because the observance was voluntary) and therefore the OOs should not have sent out cards.

(Continued on page 158)

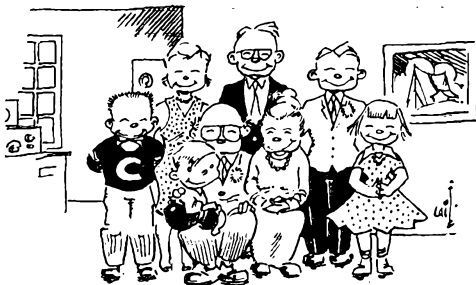


YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

One Big Happy Family

There are all kinds of ham family relationships — i.e., members of one family who hold amateur licenses. Husband and wife, parents and children, children and in-laws, aunts and uncles, grandparents and grandchildren, kissin' cousins — they come in about any combination biologically and legally possible these days.



CHEERS FOR THE ALL-HAM FAMILY

Newly licensed Dorothy Rector KØPHV, (955 Waverly, Wichita 18, Kansas) inquires about the number of mother-and-son combinations. (Her son is KØPIX.) Obviously to keep count of ham family relationships would be next to impossible, but any mother-and-son ham team interested in registering with KØPIIV is welcome to do so.

Don't get us wrong — we think the family tie-in with ham radio is great — one of the best things that could happen to our happy hobby. News and photographs of family teams in any combination whatever are always interesting, we think, and are hereby respectfully solicited. It's just the family-tree record keeping that we couldn't keep up with.

YL Author — Plus

In the photo below Helen Cloutier, W8GJX, of Chicago is shown holding a copy of her latest book, *The Many*

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



Helen Cloutier, W8GJX

Names of Lee Lu, published recently by Albert Whitman & Co., Chicago. A fine story for young children, the book has received nationwide publicity. Two of Helen's earlier books, written primarily for teenagers (or younger) are woven around amateur radio. *Sim Barton, Girl Radio Operator* is the story of a young girl's determination to achieve success as a first-class ship's radio operator. *Isle Royale Calling*, the tale of a forest ranger and his three sons, one of whom is a ham, was listed in the *Best Books for 1957* by the *Library Journal*.

Presently, Helen is working on several books — a children's art book, a love story, a collection of short stories, and an electronics book for teen-agers. This writing is in addition to Helen's regular job as a technical librarian for Motorola, Inc., and "spare time" editing work in her own literary agency. She is also a qualified beautician and has worked as a photographer, organist, secretary, radio script writer and disk jockey. With energy to do still more, Helen has been studying oil painting with a well-known midwest artist and is preparing a one-woman exhibition of some of the 54 oils she has done.

Marking 25 years as a ham in 1955, Helen became the first woman member of the Quarter Century Wireless Association. During World War II she taught radio for the Air Force for three years.

Through the years Helen has maintained that her many amateur experiences have directly stimulated her other pursuits and interests. As quoted in a photo caption in our March 1955 column, W8GJX surely "gives credence to the conclusion drawn many times that a busy YL always finds time to do still more."

First YL VHF Contest Results

Results of the first YLRL-sponsored YL V.H.F. Contest, conducted April 12 and 13 on frequencies from 50 Mc. up, are released by YLRL Vice President Onie Woodward, W1ZEN. Certificates were awarded to the top three winners. A special award donated by the Women Radio Operators of New England was given to highest scorer Belle Bunney, K1EAV (see photo). Certificates were also given to the high scorer in an ARRL section. W1ZEN hopes that participation next year will be heavier, for all who entered this year's contest indicated a good time was enjoyed.

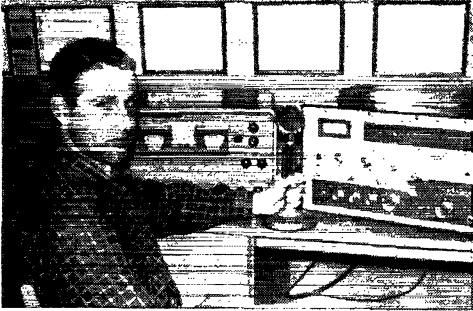
* Indicates low power multiplier used.

High Scores

First.....	Belle Bunney, K1EAV	143*
Second.....	Lu Timkham, K1KYB	105*
Third.....	Genie Weaver, W4ERX/1	101*

Call	Contacts	Sections Worked	Score	WA6AOE.....	WA6BH.....	WA6KG/6..	W6GQZ.....	W6HRM.....	(WA6EWW)
K1EAV.....	38	3	143*	34	30	1	2	5	6
K1KYB.....	28	3	105*	30	30	1	2	1	
W4ERX, 1.....	27	3	101*	3	3	2	2	1	
W1ZEN.....	19	3	71*	14	14	2	2	1	
W1RLQ.....	15	3	56*	13	13	2	2	1	
K1RPI.....	11	3	41*	10	10	1	1	1	
W1HOY.....	17	2	34	10	10	1	1	1	
K1HZT.....	13	2	33*	10	10	1	1	1	
K1JX.....	11	2	22	3	3	1	1	1	
K3JTH.....	18	3	68*	2	2	2	2	2	
K3NBS.....	11	2	22	2	2	2	2	2	

Logs for confirmation only: K1EKO, W6DXI, K6QQD.



These photos of Dick Brandt, W4SVJ, and Geri Nichols, KL7ALZ, arrived too late to be included last month with the YL-OM contest results. KL7ALZ was highest YL scorer in the c.w. contest, and W4SVJ captured second place OM phone honors. A past president of the Polar Amateur Radio Klub of Alaska and current custodian of the club's Lucky Seven award, Geri and her OM, KL7MZ, and their four children live in Spenard, Alaska. Using his former call K2HRX, W4SVJ participated in the YL-OM contest in 1955, 56, and 57. Dick is in electronics warfare stationed at Robbins Air Force Base, Georgia.



When K9HCY, Anita Ruckman, of Streator, Illinois, contacted ZL2QZ, Sylvia Kirkland of Pahiatua, New Zealand, on 75-meter phone last Dec. 13, a bit of YL single side-band history was made. The contact marked the first time a New Zealand YL station worked an overseas YL station with both stations using s.s.b.

New YLRL Directory

Jean Kincheloc, K6QOD, YLRL treasurer, is preparing a second edition of the *YLRL Directory* for publication sometime this summer (first edition issued in summer 1957). The directory, which lists all YLRL members and pertinent information about each, will be for sale to non-YLRLers at 50¢ each. A copy will be furnished free to each YLRL member.

Ohio YL Award

OM W8AJW sends word of a new award, the Ohio YL Award, issued by the Ohio Council of Amateur Radio Clubs. To qualify one must have received QSLs confirming contacts with 25 Ohio YLs since the end of World War II. Send a list of QSLs held and attested to by a notary or radio club officer to Awards Manager, Hamlin C. King, W8EQN, 353 S. Arlington Ave., Springfield, Ohio.



K2SHE, Kitty Gabel, has DXCC phone certificate #2066 issued Feb. 13, 1961 (all contacts made on 10 meters). A General-Class amateur for just two years, Kitty also works c.w. on 40 meters. Proud OM W2RGU sent along the photo.



For YLs the three-day program of the Oregon Amateur Radio Association convention in May ended with a crab-feed on the beach at Coos Bay. YLs who attended the OARA convention, the 24th annual, are, reading zizzag l. to r.: K7DLS, KN7NJX, K7LFO, W7RIC, KN7OHT, K7AJB, W7IGY, W7IRF, W7DIF, W7GNC, K7BII, K7BED, W7SBS, W7DIC, KN7OEM, W7NTT, K7HKX, W7GLK, W7HHH, and K7COA. (photo via W7IGY)



W8 YLs all! YLRL 8th District Chairman Maxine Hill, K8DTD, forwarded this photo of the licensed YLs who attended the convention at Bay City, Michigan in March. Reading left to right, seated on floor: W8FJU, KN8-YGO, K8OMH, KN8-YBF; 2nd row: W8RIR, W8VRH, K8IOP, W8-ATB, K8DTB, K8BPQ, KN8ZLK, K8LHF; 3rd row: K8PYN, K8RKZ, K8QEI, W8SNB, W8-EIR, K8CKE, W8QOM, W8KLZ, K8HWC, K8-MKG; top row: K8NGR, K8SRO, K8PNA, W8-JXJ, W8HAV, K8KCD, unlicensed (one got into the picture after all) and W8WQE.

BUT HE'S A YL!

WA6NOW has passed along the following letter she received after a recent QSO. Leona says there's nothing like c.w. for a good time now and again.

Dear WV6NOW:

Thanks to your excellent sense of humor we really had this place buzzing last night. Just for kicks I'll give you the background of the QSO.

I had just finished teaching the radio class and we had shut down the Navy training circuits on 2320 kc. I then told the radiomen that we would now tune in on the Novice band on 3.7 Mc. I explained to them that it was not necessary to give a Novice a long call, "just to give 'em a short call — that's all that's necessary."

In order to demonstrate this superior attitude I gave you a short call when you finished CQing, and, lucky for me, you picked it up right away. All of the bored radiomen began copying (there were five typewriters copying you). Suddenly, one of them said, "Say, that's funny, this guy's name is Leona".

"Naw! You must be wrong — probably Leonard."

"Naw, look! We'll have the same thing — it's Leona!"

By this time all feet came down off desks and the place was electrified. If a mermaid had suddenly showed up off our port quarter, it couldn't have created a greater sensation. For some strange reason none of the radiomen had ever worked a YL before. In a few minutes rumors were flying around the building that we had reached into the barrel

and had hooked a mermaid. Comments went like this: "Boy, imagine a female that can copy code. Yeah, women are just like people — they can learn all sorts of things. Is she beautiful? Sure, an intelligent woman is always beautiful." By this time word had reached the back room that you were a movie star. "Ask her how old she is. I bet she's about 15. Probably closer to 60. If she's 30 she's mine." When you came back with 29 there was a moment of silence while they all looked at each other. "Boy, that's perfect. I bet she is 29 like Jack Benny is 39!"

Nobody thought to ask if you were married. There was so much excitement that even the Commanding Officer came in and said, "Well, well! I'm glad to see you men taking such interest in your work." (This included all of those who were not radiomen but who swore they would start learning the code tomorrow!)

The reaction of this gang was such that I thought you might enjoy it if I passed it on to you. 73.

W. G. Simpson, Chief Radioman
Naval Reserve Center
San Francisco

[WA6NOW did reveal that she was 29 years old but she felt that telling the eager radiomen that she also had five children, with the oldest one only six, might have been too much for them to fathom (nautical pun) in one contact. — Ed.]



WA6NOW



Ontario YL VE3DNW, Doris Mendham, operates primarily on 75 and 20 meters, phone and c.w. Confined to a wheel chair with multiple sclerosis, Doris became a ham about a year ago and now feels there could be no better hobby for her. Doris and her OM, who is not a ham but is her "devoted antenna man," live in Georgetown, 3.5 miles from Toronto. (Photo courtesy VE3AWL)



Winner of the WRONE Week contest conducted in February, Belle Bunney, K1EAV, (r.) receives a gift of 100 Miss WRONE QSLs from Helen Harris, W1HOY, at the annual Spring luncheon of WRONE May 6, at Sturbridge, Mass. K1EAV was also presented with a silver Paul Revere bowl by Onie Woodward, W1ZEN, V.P. of the YLRL, at the same luncheon, for running up the highest score in the first YLRL YL V.H.F. contest.

YL in Space?

Burnette Boyett, K5JGC, vice president of GAYLARK, (Gulf Area YL ARKlub) passes along the interesting information that Rhea Hurlie, K5RDY, of Houston, Texas, a member of GAYLARK, has been chosen as one of six women to be tested for astronaut training. Rhea is employed by a Houston aviation firm as a flying secretary, and she has participated in the All-Woman Transcontinental Air Race for the past several years. We haven't had a chance to ask her about it yet, but think of the possibilities if Rhea could pack her KWM-1 along with her space gear!

Coming Events

ARRL N. Y. State Convention — The first annual ARRL New York State Amateur Radio Convention will be presented by the Niagara Radio Club, Inc. at the Hotel Niagara, Niagara Falls, Sept. 15-17, 1961. Gary G. Young, K2AJY, is convention chairman. Clara Reger, W2RUF, is planning special YL and XYL programs, including a YLRL breakfast and luncheon, fashion show, demonstrations, shopping parties, tours, tea and other surprises. All YLs and XYLs everywhere are cordially invited. For pre-registration information write Convention Committee, Niagara Radio Club, Inc., P.O. Box 682, Main Post Office, Niagara Falls, N. Y.

Hurry, Doctor — I Feel Some Code Coming On

W6WDL continues interest in the subject of YL hams who have resumed on-the-air operations within hours after giving birth to a child (see May 1961 column). Babs Hargis is one of such, and she would like to hear from others who have been back on the air within 12 to 24 hours after giving birth. Could be there's another club, or certificate at least, brewing! W6WDL's address is N. 6019 Stevens, Spokane 19, Washington.



Montana YL Bertha Roylance, K7CHA, of Harlowton, decided to become a ham in 1954 when her OM, W7RZY, took her to a hamfest on their honeymoon. (This is one way of being introduced to ham radio!—Ed.) Bertha operates all bands 80 through 10 with primary interest in DX and certificate hunting. Currently president of the Harlo Radio Club of Harlowton, Bertha is also custodian of the Treasure State Award sponsored by the Old Faithful Radio Club (non-Montana hams contact 20 counties for this award—write K7CHA, Box 621, Harlowton, Mont.).



Massachusetts YL Alice Perry, W1DQF, operates primarily 80 c.w. or 10- and 2-meter phone. Active in the Winthrop RACES net, Alice has received a commendation for her CD efforts. There's also heavy activity on 160 meters at the Perry QTH, for Alice's OM is W1BB, long famous on the 160-meter band.



Carol Witte, W6WSV, has DXCC certificate #5009 issued April 29, 1960. (Her call should have appeared in our YL DXCC roster published in the April column.) Carol worked all of her contacts on 14-Mc. c.w. only, and for 54% of the contacts she ran only 50-80 watts with a doublet antenna. (W6WSV was the first licensed woman amateur on the staff of the ARRL Communications Dept. 1942-1944).

(More YL news on page 148)

Happenings of the Month

Election Notice

"Slow Scan TV," MM Filings Amateur Radio Week

ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1962-1963 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the recently-revised Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

Executive Committee

The American Radio Relay League
West Hartford 7, Conn.

We, the undersigned Full Members of the ARRL residing in the Division, hereby nominate of as a candidate for director; and we also nominate of as a candidate for vice-director; from this division for the 1962-1963 term.
(Signatures and addresses)

The signers must be Full Members in good standing. The nominee must be a Full Member and the holder of at least a General Class amateur license, and must have been a member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office

of the League in West Hartford, Conn., by noon EDST of the 20th day of September, 1961. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 1 and November 20, except that if on September 20 only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are *Atlantic*: Gilbert L. Crossley, W3YA, and Edwin S. Van Deusen, W3ECP. *Canadian*: Noel B. Eaton, VE3CJ (vice-directorship vacant). *Dakota*: Charles G. Compton, W0BUO, and Martha J. Shirley, W0ZWL. *Delta*: Sanford B. DeHart, W4RRV, and Victor Canfield, W5BSR. *Great Lakes*: Dana E. Cartwright, W8UPB, and Robert B. Cooper, W8AQA. *Midwest*: Robert W. Dennison, W0NWX, and Sumner H. Foster, W8CQ. *Pacific*: Harry M. Engwicht W6HC, and Ronald G. Martin, W6ZF. *Southeastern*: James P. Born, W4ZD, and Thomas M. Moss, W4HYW.

Full Members are urged to take the initiative and to file nominating petitions immediately.

For the Board of Directors:

JOHN HUNTOON
Secretary

July 1, 1961

CANADIAN "CITIZEN'S BAND"

The Department of Transport has announced the creation of a "General Radio Service," roughly similar to the Class D Citizen's Band in the U. S., effective April 1, 1962. The 11-meter band will be used for the new service, but at the request of ARRL's Canadian Director Eaton, 40 kc. will be retained for continued use by Canadian amateurs. After April 1 next year, the amateurs will have 26.96-27.00 Mc.; the General Radio Service, 27.00-27.23 Mc.

The ARRL Board of Directors urges all U. S. amateurs to avoid transmitting in the frequencies 14,335-14,350 kc. to give the DX stations on s.s.b. a better chance to work us and each other. See page 9 of July QST for a full explanation of the request.

AMATEUR RADIO WEEKS

The bill in Congress to establish a National Amateur Radio Week (p. 68, April *QST*) apparently has died in committee. However, several states have honored amateur radio with designation of the third week in June (ending in ARRL Field Day) as a time for public recognition of the amateur service.

Oklahoma Governor J. Howard Edmondson paid tribute to amateur performance in the preamble to his proclamation:

"WHEREAS, the Amateur Radio Operators throughout the State of Oklahoma have for many years provided outstanding radio service to the Citizens of the State, through the voluntary transmission, receipt, and delivery of messages, as a public service; and

"WHEREAS, the Amateur Radio Operators of this State have during periods of severe weather conditions provided service in the field of communications, by transmitting advance storm warning information for the benefit of the people of Oklahoma, as the storm moved across the State, in such a commendable manner that many lives have been saved because of their dedicated service; and

"WHEREAS, after natural disasters have occurred, the Amateur Operators have transmitted information to others concerned about their relatives and friends, who might have been in the vicinity of said natural disaster, through the Amateur Radio Emergency Corps (AREC), and American Radio Relay League (ARRL); and

"WHEREAS, during periods of national emergency, the Radio Amateurs will be depended upon to provide the facilities and personnel necessary to the Radio Amateur Civil Emergency Service (RACES), a National Communications Function, established by the FCC, for operation during national emergency periods, in cooperation with the Civil Defense Operations. . . ."

Led by ARRL Vice Director Ray K. Bryan, W5UYQ, Oklahoma amateurs set up an excellent public-relations program including radio and TV interviews, demonstrations of amateur operation, and public visits to FD activities.

California Assemblymen James L. Holmes, W6REK, and Bert DeLotto, W6FGY, sparked a legislative resolution requesting Governor Brown to issue a similar proclamation. Again the "whereas" clauses tell the story best:

"WHEREAS, The amateur radio operators in the State of California have always been ready and willing to assist in any way possible in times of emergency and catastrophe in this State; and

"WHEREAS, During the disastrous floods of 1955, the untiring activities of amateur radio operators in many of the communities of the State constituted the only means of communications to and from said communities; and

"WHEREAS, The amateur radio operators in the State of California have been in the past and are presently of great assistance to cities and counties and to the State of California; and

"WHEREAS, It is fitting and proper that public recognition should be given to the many services performed by amateur radio operators in this State. . . ."

LEAGUE SEEKS "SLOW-SCAN TV"

Under special temporary authorization by FCC, a number of experiments with narrow-band transmissions of pictures have been carried out in recent years on the amateur bands below 30 Mc. These investigations have proved the feasibility and relative simplicity of amateur "slow-scan" visual communication with no more than normal A-3 bandwidth. Therefore, the Board of Directors at its meeting in May voted to ask FCC for a change in the amateur rules to permit narrow-



After signing a proclamation declaring Amateur Radio Week in Texas, Governor Price Daniel tries the mike of gear being demonstrated by Frank Cox, W5TRY, communications officer for the state's Division of Defense and Disaster Relief, and Dr. R. O. Best, W5QKF, ARRL West Gulf Division Director. No stranger to amateur radio (he used it the day before to talk with his brother, Bill, who is governor of Guam), Governor Daniel noted in his proclamation that "radio amateurs have rendered outstanding service in the fields of communication to Civil Defense, the Red Cross and the military and civil authorities during times of emergency and disaster."

band picture transmissions in the phone portions of the 10- and 15-meter bands. The League's petition, below, explains why those particular band-segments were chosen, what it feels the standards should be, the benefits to be gained by the rules change, and other details in full:

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

In the Matter of

Amendment of Sections 12.111 and 12.114 of the Commission's Rules, Amateur Radio Service, to Authorize Picture Transmission in Voice Sub-bands of 21.25-21.45 Mc. and 28.50-29.70 Mc.

PETITION FOR INSTITUTION OF RULE MAKING PROCEEDING

Pursuant to Section 4(d) of the Administration Procedure Act and Section 1.202 of the Commission's Rules and Regulations, The American Radio Relay League, Inc., requests that the Commission institute a rule making proceeding to amend Sections 12.111(e) and (g) and 12.114(d) of the Commission's Rules and Regulations to authorize picture transmission in the voice sub-bands of 21.25-21.45 Mc. and 28.50-29.70 Mc., subject to the condition that the bandwidth be no greater than that required for normal radiotelephony emission.

The proposed text of the said Rules, as amended, is as follows:

Section 12.111(e): 21.00 to 21.45 Mc., using type A1 emission; 21.00 to 21.25 Mc., using F1 emission; 21.25 to 21.45 Mc., using type A3 emission and narrow-band fre-

quency or phase modulation for radiotelephony, and narrow-band modulation techniques for the transmission of pictures. (New language in italics.)

Section 12.111(g); 28.0 to 29.7 Mc., using type A1 emission; 28.5 to 29.7 Mc., using type A3 emission and narrow-band frequency or phase modulation for radiotelephony, and narrow-band modulation techniques for the transmission of pictures; 29.0 to 29.7 Mc., using special emission for frequency modulation (radiotelephone transmissions and radiotelegraph transmissions employing carrier shift or other frequency modulation techniques). (New language in italics.)

Section 12.114(d): (New Provision) The use of narrow-band modulation techniques for the transmission of pictures is subject to the conditions that the bandwidth of emissions shall not exceed the bandwidth occupied by an amplitude-modulated carrier having audio-frequency characteristics adequate for voice communication, and that the purity and stability of such emissions shall be maintained in accordance with the requirements of Section 12.133. Simultaneous voice and picture using the same carrier is permitted subject to the further condition that the total bandwidth of both voice and picture components does not exceed the bandwidth as specified above.

1. This request is filed pursuant to a decision of the Board of Directors of The American Radio Relay League at its meeting of May 5, 1961. As the Commission is aware, the ARRL Board of Directors is composed of sixteen amateurs nominated and elected by more than 75,000 FCC-licensed amateur radio operators to represent them in the formulation of League policy.

2. The amateur rules do not currently authorize picture transmission on frequencies below 50 Mc. The omission, an intentional one, is based on the assumption that the bandwidth required for picture transmission is much greater than is needed for voice or telegraphic-code communication. The assumption is true if the picture information is transmitted at high speed. However, a picture signal can be confined within any arbitrary band by suitably adjusting the information rate. Recent experiments by amateurs have demonstrated that pictures of useful quality can be transmitted in the same frequency spectrum as that used for communications-type voice transmission — i.e., a maximum bandwidth of approximately 3000 cycles. (QST, Vol. XLII, No. 8, Page 11, August, 1958; QST, Vol. XLII, No. 9, page, 31, September, 1958.)

3. This narrow bandwidth has been achieved in two steps. First, the picture detail is limited to the equivalent of a 120-line television picture having a 1-to-1 aspect ratio. This detail is adequate for pictures of the type amateurs would be interested in sending — close-up views of equipment, circuits, faces, and so on. Second, the scanning is at a slow rate. Rates as low as 6 to 8 seconds per frame are used. Reproducing the image visually by cathode-ray tube places a maximum limit on the scanning time. The 6 to 8 second frame-rate coincides with the usable decay time of long-persistence tubes of the type used for radar display; thus the complete image will be visible when displayed on such a tube.

4. Since the video band lies within the speech-frequency range, a "slow-scan" (as it is popularly called) signal may be transmitted over any normal radiotelephone transmitter. It can also be received by communications-type receivers having bandwidth adequate for voice signals. The only special equipment needed is that associated with the picture-scanning process at the transmitter, and that needed for translating the demodulated video signal into an image on a cathode-ray tube screen at the receiver. This equipment is accessory to the ordinary amateur radiotelephone transmitter and receiver. As an alternative to simultaneous display at the receiving point the video signal can be recorded on magnetic tape using any typical home recording equipment.

5. In the system presently in use, the video signal occupies a band of approximately 1500 cycles. This band is superimposed on an audio-frequency subcarrier so that the lowest audio frequency actually modulating the radio frequency carrier is in the order of 1000 to 1200 cycles. Both amplitude and frequency modulation of the subcarrier have been tested. Frequency modulation has been found to give better results in the presence of fading, and probably will be favored in practice. (QST, Vol. XLV, No. 1, page 28, January, 1961; QST, Vol. XLV, No. 2, page 32, February, 1961.) It is believed the system can best be developed by permitting the maximum freedom in choice of methods and standards, and that these can safely be left to evolve on an informal basis.

6. The video signal can be transmitted and received using single-sideband techniques. This opens the possibility of simultaneous voice and picture transmission with no more bandwidth than is occupied by an A3 signal, by using one sideband for the video information and the other for voice. This would be an optimum form of communication because voice comment and explanation could accompany the picture transmission.

7. The proposed changes in the rules are desirable in the public interest for the following reasons:

(a) The amateur is offered the opportunity to experiment with a new art in a part of the radio-frequency spectrum where long-distance communication is regularly possible. At present, picture transmission of any type is permitted only on v.l.f. and u.h.f. bands where ionospheric propagation occurs only very sporadically and international communication is rare.

(b) The slow-scan method is particularly suited to use on the long-distance bands because of the narrow bandwidth. Equipment now common on those bands can be used intact, simply by adding appropriate accessories. Ionospheric propagation characteristics favor successful transmission of pictures over long distances at slow scanning rates. This has been demonstrated in special tests authorized by the Commission in the 28-Mc. band during 1959-60. (QST, Vol. XLIV, No. 4, Page 36, April, 1960)

(c) Technical methods and informal standards have been developed and tested experimentally. The system is practical and is ready for immediate use.

(d) Picture transmission is a natural supplement to voice communication. Thus, frequencies assigned for this mode should coincide with those available for radiotelephone operation.

(e) There would be no increase in interference with other modes of communication. The operator of a radiotelephone transmitter would merely use part of his normal transmitting time to send pictures, with no increase in bandwidth. In practical use, the greater part of the transmitting time of a station equipped for picture transmission no doubt would be used for telephony.

(f) Simultaneous aural and visual transmission should be permitted, under the conditions specified, because it is a logical and compatible combination of the two modes.

(g) Authorizing the use of slow-scan techniques as described above will provide an incentive for amateurs to develop technical skills. As has been demonstrated in similar cases in the past, this self-training represents a national asset.

(h) Present rules governing identification are adequate since the means for voice identification are necessarily available.

WHEREFORE, The American Radio Relay League, Inc., requests that the Commission institute a rule making proceeding to amend Sections 12.111(e) and (g) and 12.114(d) of the Commission's Rules and Regulations in the manner hereinabove first set forth.

Respectfully submitted,

THE AMERICAN RADIO RELAY LEAGUE, INC.
By PAUL M. SEGAL
Its General Counsel

JOHN HUNTOON
General Manager
June 8, 1961

LEAGUE FILES ON CONDITIONAL CLASS OVERSEAS

Responsive to a Board of Directors decision, the ARRL has filed a statement with FCC in support of Docket 14025 which, if adopted, will permit the taking of Conditional Class examinations by civilians overseas, regardless of the distance of their permanent residence from the nearest FCC examining point. (Military personnel already have the privilege of taking Conditional Class license exams wherever they may be stationed, if their duties prevent them traveling to an FCC examining point.) The docket originated with a petition by the League. The text of the filing follows:

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

In the Matter of

Sections 12.21(d) and 12.44(a) of Part 12, Rules governing amateur radio regarding eligibility for Conditional Class licenses } Docket No. 14025

COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to paragraph 6 of the notice of proposed rule-making in Docket 14025, The American Radio Relay League, Inc., files these comments on behalf of some 75,000 FCC-licensed amateurs who are members of the League.

The League urges the Commission to adopt the amendment to the amateur rules as proposed, so as to permit an applicant living temporarily outside the United States to take an examination for a Conditional Class license even if his residence in the United States is less than 75 miles from a Commission quarterly examination point.

1. Adoption of the proposed change in the Rules appears desirable because of the existing interpretation of the present Rules. As constructed, the present rules preclude both the dependents of members of the Armed Forces, and other civilians whose work or studies takes them out of the country, from taking the Conditional Class license examination, unless their permanent U.S. residences are more than 75 miles airline distant from the nearest location at which examinations are held at intervals of not more than three months for a General Class operator license.

2. While the Commission has recognized the problem and has for some time as a matter of policy permitted civilians located in foreign countries (whose legal residence in the United States was less than 75 miles from a Commission examination point) to obtain Conditional Class operator licenses only, the holding of a station license as well as an operator's license is a condition prerequisite to obtaining permission from some foreign governments to operate on amateur frequencies while temporarily residing in that country. Additionally, as the Commission is aware, an FCC license is a requisite for an American citizen to obtain a license issued by some United States Military Jurisdictions.

3. While a relatively small number of persons are involved, the proposed amendments will permit the Commission to handle applicants on an equal basis regardless of the location of their legal residence.

4. The League concurs with the Commission's proposed specification of "a period of at least twelve months" in lieu of the broader phrase "for a reasonable period."

THE AMERICAN RADIO RELAY LEAGUE, INC.

By PAUL M. SEGAL
Its General Counsel

JOHN HUNTOON
General Manager
June 1, 1961

CANADIAN GROWTH

The Department of Transport has advised Director Eaton of the number of amateur station licenses in force in Canada as of March 31, 1961. Below are the figures for that date, together with the figures for the last two years for comparison.

Regional Office	1959	1960	1961
Vancouver	1135	1127	1280
Edmonton	802	863	912
Winnipeg	977	1026	1087
Toronto	2811	3035	3192
Montreal	1373	1478	1586
Moncton	870	900	953
Total	7968	8429	9010

In addition to the above figures for this year, there were 21 licenses granted for shipboard use (VEØ).



AFCEA'S PRESIDENT, W2ALS

Frank A. Gunther, W2ALS, was elected president of the Armed Forces Communications and Electronics Association during its June convention in Washington, D.C. In the business world, Frank is president of Radio Engineering Laboratories, Inc., of Long Island City, N.Y. He is also an active member of many voluntary organizations in the communications field: past president and director, Radio Club of America; honorary director, Single Sideband Amateur Radio Association; QCWA and VWOA member; senior member, IRE; and, of course, a long-time member of the League. Frank is a pioneer in advanced communications engineering and is noted for being instrumental in the development of the world's first two-way mobile radio, very-high-frequency two-way aircraft installation, v.h.f. radioteletype, f.m. broadcast equipment, mass-produced f.m. receivers for professional use, Loran transmitters, and in recent years, tropospheric-scatter equipment.

14-Mc. MARITIME MOBILE

The League has filed a statement with FCC urging the adoption of the proposal, contained in Docket 14026, that maritime-mobile operation by American amateurs on the high seas be permitted on the frequencies 14.0-14.35 Mc. MM stations presently may operate world wide only in the 15- and 10-meter bands. Docket 14026 originated with a petition by the Maritime Mobile Amateur Radio Club. The text of ARRL's comment, authorized by Minute 12 of the Board meeting, follows:

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

In the Matter of

Amendment of Section 12.90(b) }
In the Matter of } Docket No. 14026

Amendment of Section 12.90(b) (2) of the Commission's Rules to permit Maritime Mobile operation on a World-wide Basis in the 14.00-14.35 Mc. Band

COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to paragraph 5 of the notice of proposed rule-making in Docket 14026, the American Radio Relay League, Inc., files these comments on behalf of some 75,000 FCC-licensed amateurs who are members of the League.

The League urges adoption of the amendment to the amateur rules as proposed, to permit "high seas" maritime mobile operation in the frequency band 14.00-14.35 Mc.

In earlier Commission proceedings (Docket 10501 and 12037) dealing with maritime-mobile privileges for the ama-

(Continued on page 144)

The World Above 50 Mc.

1215-1500

2300-2450

3300-3500

5650-5925

10,000-10,500

21,000-22,000

30,000-9

CONDUCTED BY SAM HARRIS,* W1FZJ

THE end of the 1961 sporadic-E season is fast approaching and it has certainly been the most active session ever witnessed on 50 Mc. Not that the openings were any great amount better than those in past sunspot cycles but never was there such a tremendous spread of activity available. Day or night, if the band was open to anywhere, you could tell by listening because there was sure to be someone on. Alaska, Puerto Rico, California, Yellowknife, Hawaii, Japan, Mexico or you name it. All kinds of double hop and even some cases of enough hops to bring Hawaii as far as the east coast.

The best indicator of the terrific combination of conditions and activity will be chronicled in the scores from the VHF QSO Party. Undreamed-of scores were piled up by all participants. W1MHL, perennial winner of the June "do," almost broke the 100,000 mark, with 582 contacts in 50 sections on 50 Mc. and a new record of over 1000 contacts on all bands. W1UIZ turned in a single-operator score of 29,325. George worked 385 stations on five bands and his section multiplier was a whoppin' 69. It is pretty hard to believe that only six years ago there was some doubt as to the value of six-meter gear on a portable contest operation. And do not be misled. This gain in 50-Mc. contacts was not at the expense of 144 Mc. W1MHL/1, for instance, turned in a little over 400 contacts for 144, which is on a par with the best they ever made during the so called "peak" of two-meter activity. The truth about the matter is that the v.h.f. bands are enjoying the greatest boom in activity since the beginning of ham radio.

—*—*—

Helen and I were present at the Greater Pittsburgh VHF Hamorama in June. This was a

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

v.h.f.-only convention and was run in competition with at least two other very popular local ham-fests. Attendance was a little over 1300 registered (not counting yard chilluns and babes in arms). The Pittsburgh boys, led by convention chairman Sid Lippman, K3CJY, had a terrific program which included everyone and covered everything from go-karts to hairdressing. If you missed it this year, do not despair as there will be another one next year. See you there?

Here and There on 6 and 2

Let's start off this month with the s.s.b. reports and comments: Bob Heil, K9EID, in Marissa, Illinois, comes through almost monthly with his s.s.b. report concerning 50 Mc. Bob and Jack, K4OCK, have maintained skeds for ten consecutive weeks and had 100% contacts on 50.10 Mc. Jack was running 150 watts p.e.p. and Bob was running 1500 watts p.e.p. on s.s.b. Both of the boys are using 11-element Spiralways. Jack's up 50 feet and Bob's up 90 feet. Bob's rig is a 20A-PTII600A-Johnson 6 & 2 Thunderbolt. Receiver is an NC303 with a 6 & 2 meter Filter King. Bob also has a Seneca with a pair of 6146s Class AB, plate modulating; with a 24-element collinear for two meters and a 4-element wide-spaced yagi, 35 feet up, for catching low-angle skip. Sounds like Bob just might be serious about v.h.f. The following stations are a few of the s.s.b. gang that Bob has been working: W0KMY, K9HAE, K9TFP, K9PED and K0DGE. These boys all try faithfully to operate at 50.10, although they admit to a small amount of difficulty when the band is acting up as it has been so frequently. Bob gets home from work between 0100 and 0130 CST (starts work at 2000). Anyone interested in trying skeds is requested to write K9EID.

Ken, K6HCP, would like to remind us that he is on 220-Mc. s.s.b. every Saturday and Sunday at 0830 PST; and he is also on 50.010 Mc. every Saturday and Sunday on 50.010 Mc. looking for "scatter" signals. Anyone interested please contact Ken. He also has two "requests" — he would like to hear from somebody who has a strip-type chart recorder he could use; and can anyone tell him where he can get late information on sunspot activity and meteor-shower predictions? A sideband report from Birmingham, Alabama, via Gerney, W4ICN, sez that during the evening (and opening) of May 30 he had s.s.b. roundtables with W5HVP, Texas, and K6QXY in California; later had another roundtable, s.s.b., (of course) with California and Arizona,



Left to right: Helen, W1HOY; Agnes, K8CHL; Johnny, W8HRV; Ted, W3RUE; and Jack, W8LIO, at the Greater Pittsburgh VHF Hamorama.

K7JTG, W6QMN, K6QQN, K6ODV, WA6DBA, K6VLM and K6HHJ. Gerney is almost ready (will be by the time this appears in print) with 432-Mc. gear and will be running tests with K4MBM, Huntsville, Alabama, and K4FQA in Shelbyville, Tennessee, this summer. K4MBM, Emmett, is something of a pioneer in v.h.f. sideband, having been on 50- and 141-Mc. s.s.b. for several years and for a long time the only 50-Mc. s.s.b. station in the Southeast. Bob, W4UCH, well-known v.h.f.-er, is developing an all-transistor v.h.f. s.s.b. exciter with output on both 6 and 2 meters. That's the s.s.b. for this month and most of it really looks interesting.

During the recent openings I'm positive that many of you have heard XE10E giving out with many contacts from Mexico. John, XE10E/W8NRM, moved to Mexico in December, 1960, and since that time has 20 states confirmed on 50 Mc. and has recently received his "Worked All Continents" award with 50-Mc. endorsement. Congratulations, John, and move over! New England just might be moving in on you!

VE5GI reports the first band-opening to the East heard from his QTH. It happened on May 27 when he first noticed signs of a band opening on TV at approximately 1400 CST. On May 28, VE3CJW was heard Q5-S7 working VE4CP. W2??? was heard at 2218 calling CQ on c.w. at 50.01. Many weak carriers were heard but none were read because of poor modulation. VE6DB sez that six-meter activity is much better in his area and W1s, W2s and W3s are being worked. Bob also sez: "Tell the boys to spread out, if possible up to 51 Mc., to reduce the QRM." According to many reports received here, Bob, the band is "loaded" up to 51.5.

Toronto, Canada, report comes from Al, VE3DUU, who worked fourteen states from Florida to Texas between May 9 and May 27. He also worked VE4KF and heard several more VE4s, and one CO. Al says that all of his multiple stages are inductive coupled and it sure helps to eliminate TVI, which was a big help during the openings.

Ole Faithful, Pete Radcliffe, VE8BY, once again had his efforts repaid when he worked a W6 and a VE7 during the contest week end — both new ones for Pete. When he worked the VE7 it made his total for one year all Canadian call areas except VE1 plus 7 U.S. call areas. Pete also mentioned that he had trouble during the contest because most stations are on phone and when he goes to phone it means he loses power. 150 watts on c.w., 50 watts on phone.

VE3DUX reports hearing several New York State stations during the contest, but they were very difficult to raise. No beams to the north! (Apparently.) According to Mike the local two-meter boys get together every night at 10:00 p.m., EDST.

Brice Anderson, W9PNE, was stranded in a hotel in Princeton, Indiana, and being the right type of fellow spent his time in writing a long letter and informing us of activity in his home area. We're most grateful to the Wabash River for being 24 inches deep in a fast running stream across Highway 64; it paid off for us. Although Brice has not been active for the past few months, he has certainly kept up with activity. K9LMQ is getting ready for lots of activity on both 2 and 6 meters, with a pair of yagis. K9DCF (Bric's son) is building a new low-noise 6-meter converter, and is presently using a BC-224B receiver for use as the i.f. Riel is also planning on an 829B final. Brice himself is planning a higher-powered rig for six using an 813 final to replace the present 2E26.

From California we hear that Jayne, K6GMX, has worked her big #50 for 50-Mc. "WAS" (Congratulations, Jayne!);

50 Mc. Explodes July 4

Using a form of long-distance auroral propagation only recently discovered, VE8BY, Yellowknife, Northwest Territory, provided 6-meter men plenty of fireworks for the night of July 4. Running 50 watts input and using a 5-element beam, Pete worked scores of W1s, 2s, 3s, VE2s and VE3s on phone and c.w. beginning about 0300 GMT, July 5. He was knocking off W8s when this writer gave up around 0630 GMT.

The familiar form of auroral propagation was in evidence throughout, though the stations customarily heard at such times were not exceptionally strong. The signal of VE8BY showed some fast flutter, but not enough to distort voice severely. He peaked S9, though was S3 to 5 most of the time.

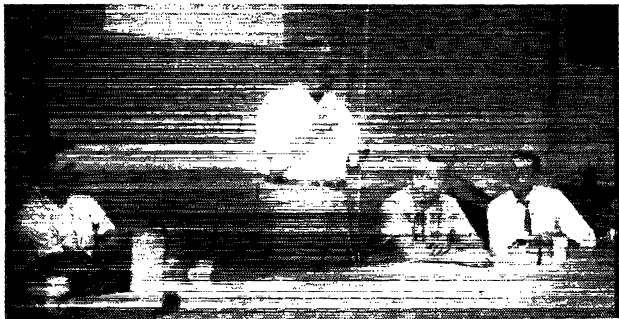
That this mode of propagation can provide such DX this far after a sunspot cycle peak is of more than ordinary interest to 50-state 50-Mc. WAS aspirants. Question: Where were the KL7s? — W1HDQ

and that Gib, W6BJI worked KP4AAN during the contest — a new country for him (Trouble with this month's column is that it's mostly exclamation marks)

Gib sez: "Speaking of E_s , it would appear that we have a mixed-up medium here, for E_s is taking on some of the characteristics of F_2 this summer. With a few exceptions, the band has been opening regularly most every day and usually before noon — stays in for 1 to as much as 10 hours; and if there aren't a flock of people who haven't worked the 48 continental states in the past 20 days, it's just that they're not interested! I have noticed a strong A1 signal on 50.0 Mc. on June 9 and again today, June 12, for a short time, but no identification." We've heard the same signal, Gib, and have had several others throughout the country mention it.

A quickie — K9JSB, Illinois, and K4WOD, North Carolina, father and son (both Stan) worked each other on 50 Mc. for twenty minutes on June 2. See, fellas, the openings can "pay off" in many ways. Another quickie — W3BWU, Ed Lips, worked all call areas in one evening, during the v.h.f. QSO Party. Many across the country have been working new countries, mainly Puerto Rico, Cuba and Canada and Newfoundland. Steve, K4HGK, was one of the lucky ones to pick up KP4AAN and KP4AWL; he also worked VE3ETO with a Heath "Sixer" on his mobile rig. On May 29 Steve worked Oregon and Washington for two new states and on May 30 worked Arizona and California and heard Nevada. K5EFT wonders how many can equal his contacts of June 3 — 26 completed contacts in 60 minutes! I certainly don't want to throw cold water, Al, but who believes in six-meter records of any kind anymore! K9TRG is also interested in records "of some kind". On Memorial Day

V.h.f. forum at the Hamorama. The boys are getting a few words on the 432-Mc. power limit from Gil Crossley, ARRL Director (W3YA). On the left is Forum Chairman, Tom LaSlavic, W3GXL. Ed Clegg, W2LOY, and Bob Richardson, W4UCH, are on the right.



in 1960 Art contacted K5YUG of Victoria, Texas, and handled phone traffic to his mother-in-law in Arlington Heights, Illinois. The contact lasted twenty minutes. This year, on Memorial Day, and again on 50 Mc., more phone traffic was handled for K5YUG to Arlington Heights. "After some discussion it was suggested that they come to our QTH, which they did; this time the total contact lasted for three hours and twenty-nine minutes. It would have lasted longer but the YLs ran out of gas. THAT IN ITSELF IS A RECORD!" (I don't believe it! — Helen.)

Typical report of the dozens received might be taken from the one received by K5ZMS, Duncanville, Texas. Ray says that he has been on 50 Mc. since August, 1960, with a total of 9 states worked. "IT" began for Ray on May 18th when he worked K5SVL, and from that time until the end of May it was like "swinging on a star". His score now stands at 30 states worked, 19 confirmed, and he has also worked VE3CIK, VE3AIIH and XE1OE. Ray has heard that some 4's worked into VO2 land and wonders if "tis so". He had no such reports, Ray, as yet, but W1HOY did hear a portable VO2 station — no dice, she didn't get him! K4JPD gives us his score for the recent openings. He has worked VE1, VE2, VE3, VE4, VO1, KP4, CO2, VP5, and 46 states! I just can't help those exclamation points, I think that way after the past four weeks! Steve (K4JPD) uses a Conset G-50 exciting a 6n2 T-bolt running 700 watts into an 8-element beam 70 feet high. K4FHU reports from Birmingham, Alabama, that conditions are like those everywhere else in the country — "Unbelievable!" George says that K4NWW has only been on 50 Mc. for a short time but has worked 19 states; K4EDS is very active and has 53 states to his credit, with Louisiana giving him a new one. W4LHG in Vincent, Alabama, is very active on both c.w. and a.m. George also mentions the beacon (?) on 50,000, brought to his attention by KICKO in North Reading, Mass. Russ, K8SUJ, in Springfield, Ohio mentions hearing XE1OE, VE1BC, WA6JOJ and VE4KF and VE4IW, during recent days. Russ is moving his QTH to the Boston area this month (June) and apparently isn't set up (at the moment) for working the skip.

In North Carolina Steve, K4H GK, worked KP4AAN, VP5CH, TI2MEF and TI2NA on June 3; Steve had heard 39 states and seven countries in the two weeks previous to that date, but was unable to work all of it as he was on his honeymoon — MOBILE, of course! His XYL is K4VAP, we hope that she too likes six-meter skip DX! A very nice letter received from "Doc" Varner, W3TIF, whose advice is "Don't give up just because of a poor v.h.f. location!" Doc started on 50 Mc. back in 1949 after he got tired of working 20-meter DX. It was just too easy to be fun! He didn't realize what he was getting into (besides 50-Mc. fever), with hills surrounding his QTH, all at least 1000 feet higher than he. Doc stuck though, and on June 17, this year, he worked W7JRG via c.w. to make his "48". Doc thinks that it could be that his could be the first Pennsylvania station to have worked all the "Continental U.S." on 50 Mc. We're checking. Doc sent up his cards (QSLs) as proof, and we agree with him that many are irreplaceable.

It is impossible to enumerate in this column the numerous reports received concerning skip; however, reports were received from all call areas (and most states) saying the same thing — "today there occurred the best 50-Mc. opening ever observed in this area. I worked all call areas and one (or two) new countries." We'll end this portion of the column with excerpts from three letters. Credit to W3JYL — "Everything at a standstill with 50 Mc. being open!" Credit to K4JPD — "Have worked VE1, VE2, VE3, VE4, VO1, KP4, CO2, VP5 and 46 states." Credit to K6TVC — "6 Meters — Nothing worth mentioning." (No exclamation point.)

2-METER STANDINGS

W1REZ	22	8	1300	W6WSQ	15	5	1390
W1AZK	38	8	1205	W6NLZ	12	5	2540
W1KCS	24	7	1150	W6NCG	12	5	1600
W1RFU	24	7	1120	W6AJF	6	3	800
W1ARJ	23	7	1130	W6ZL	5	3	1400
W1HDO	22	6	1020	K6HMS	4	3	850
W1MMN	21	7	1090	K6CTG	4	2	800
W11ZY	20	7	1180	W6VMU	3	2	950
K2ORL	19	6	800				
W1AFO	19	6	920	W7JRG	12	4	1040
K1AFR	17	5	450	K7HKD	11	5	950
				W7CJM	5	2	670
W2NLY	37	8	1390	W7LHL	4	2	1050
W2CXY	37	8	1360	W7JIP	4	2	900
W2KSI	37	8	1320	W7UJ	4	2	253
W2GQJ	33	8	1200				
W2BLV	30	8	1020	W8KAY	38	8	1245
W2AZL	29	8	1050	W8SDJ	37	8	1220
K2IEJ	27	8	1060	W8PT	37	9	980
K2LMG	25	8	1160	W81FX	35	8	960
W2AMJ	25	6	960	W8SFO	34	8	1040
K2CEH	23	8	1200	W8LOF	33	8	1060
K2DWJ	23	6	860	W8RMH	32	6	910
K2HOD	23	7	950	W8GGH	32	8	1180
W2PAU	23	6	753	W8BAK	32	8	960
W2ALR	23	7	960	W8NOH	31	8	1090
W2RXC	23	8	1200	W8LCC	31	8	1080
W2SAX	23	8	1090	W8HW	30	8	860
W2LWI	21	6	700	K8AXU	29	8	1050
K2KIB	21	5	900	W8LFD	29	8	850
W2ESX	20	6	750	W8WRN	28	8	680
W2WZL	19	7	1040	W8DX	26	8	720
W2LTH	19	7	880	W8LCC	25	8	800
W2RCV	19	8	720	W8JWV	25	8	940
K2RLG	17	6	980	W8WNM	25	8	900
				W8GFN	23	8	540
W3RUE	33	8	1100	W8LCY	22	7	680
W3GFP	31	8	1180	W8BLN	21	7	610
W3SFA	31	8	1070	W8GTR	17	7	550
W3DFP	30	8	1125	W8NRM	17	7	550
W3KCA	28	8	1110				
W3BYF	28	8	1070	W9KLR	41	9	1160
W3EPH	22	8	1000	W9WOL	40	9	1170
W3LNA	21	7	720	W9GAB	34	9	1075
W3NKM	20	7	730	W9AAG	33	8	1050
W3LZD	20	7	650	W9REB	31	8	950
				W9ZIH	30	8	830
W4ELQ	38	8	1150	K9AJJ	29	8	1070
W4HHK	37	9	1280	W9BPB	28	8	820
W4ZNI	34	8	950	W9LVC	27	8	950
W4LTU	34	8	1160	W9EQC	27	8	820
W4MKJ	33	8	1149	W9OJL	27	8	910
W4AO	30	8	1120	W9ZHL	25	8	700
W4VLA	26	8	1000	W9BFV	25	7	1030
W4EQM	25	8	1040	K9AQF	24	7	900
W4AIB	25	8	900	W91FL	22	7	825
W4WNH	24	8	850	W9KPS	22	7	690
K4EUS	24	6	765	W9CUX	21	7	800
W4JCY	23	6	725	W9PMN	19	6	870
W4VVE	22	6	720	W9ALU	18	7	800
W4RMU	21	7	1080	W9BFB	37	9	1350
W4TLV	20	7	1000	W9IHD	31	8	1030
W4IKV	20	6	720	W9SMJ	29	9	1075
W4OLK	20	6	720	W91FL	28	7	1050
K4YUX	18	8	830	W9QDH	27	9	1300
W4LNG	18	7	1080	W9RUF	23	7	900
W4RFR	18	9	820	W9INI	21	6	830
W4CPZ	18	6	650	W9TGC	21	7	870
W4MDA	17	6	750	W9RYG	20	8	925
				W9IC	19	7	1245
W5RJC	35	9	1215	W9MOX	19	6	1150
W5AJJ	30	9	1360	W9JAS	18	6	1130
W5JWL	29	7	1150	W9AZT	17	6	1100
W5DFU	28	9	1300	K9AQJ	16	6	1120
W5PZ	27	8	1300	W91FS	16	6	1100
W5LPG	25	7	1000				
W5LPZ	26	9	1160	VE3DIR	30	8	1330
W5KTD	23	8	1200	VE3AIB	28	8	1340
W5ML	16	5	700	VE3PQN	19	7	790
W5FSC	12	5	1390	VE3DER	17	8	1340
W5HEZ	12	5	1250	VE3AQG	18	8	1300
W5CVW	11	5	1180	VE3HW	15	7	1350
W5NDE	11	5	625	VE3BPB	14	6	715
W5VY	10	3	1200	VE2ABE	10	4	580
W5SWV	10	3	600	VE7FJ	2	1	365
W5YYO	7	4	1330				
W5UNH	6	3	1200	KH6UK	1	2	2540

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

Talk-in station at the Greater Pittsburgh VHF Hamorama.
(It worked, too. They talked Helen and me in.)

QST for

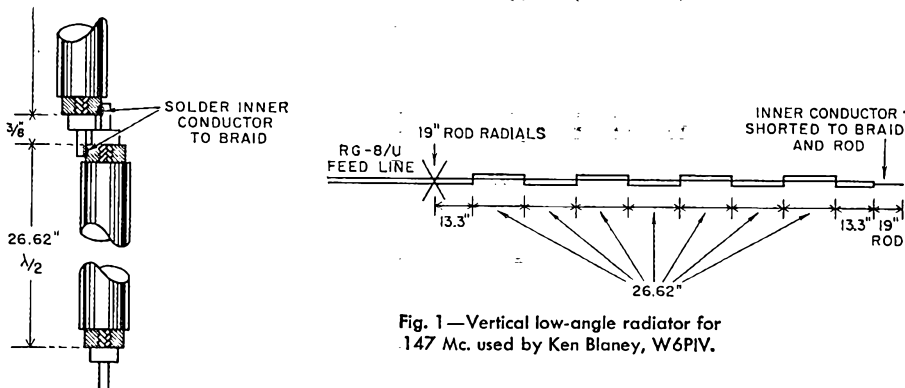


Fig. 1—Vertical low-angle radiator for 147 Mc. used by Ken Blaney, W6PIV.

144 Mc.

W6PIV has come up with an antenna idea for use in non-directional applications. If nothing else, it makes use of the odd pieces of coax you have laying around and gives a nice low-angle signal for working in all directions without benefit of a rotator. The assembled antenna can be hung from a halyard or taped to a self-supporting wooden mast. Dimensions given are for 147 Mc. center frequency. A change of 0.2 inches per Mc. is about par for moving the center frequency (per half-wave section, that is). Ken reports the 144-Mc. activity in the Sacramento Valley is confined to low power local and mobile activity.

Jack, W8LIO, of Dorset, Ohio, gave us a demonstration of the Cleveland area 145.260-Mc. mobile net when we were visiting there last week. It seems that literally dozens of the local boys (and girls) have latched on to some v.h.f. f.m. mobile gear which can easily be converted to 145.260. With the aid of a relay station located on a high point south of Cleveland the entire area can be covered mobile to mobile. W8LIO, located 100 miles east of Cleveland, can talk to mobile stations (by use of the relay) anywhere in the area. We are not talking about eking out a contact but real solid signals both ways. An interesting note is that they are all using vertical polarization. If your vacation plans take you near the area, do not fail to get a demonstration of this amazing system.

A note from Jim Fall, W5BEP, tells of increased activity in the East Texas area. Seems that Jim has 100 watts going into a 10-element beam and has collected five states and 800 miles in the last couple of months. Meanwhile, Mike, W5KFU, has a pair of 4X150s going at 500 watts and is open for schedules on c.w. or s.s.b. Frequency is 144.175. W5AJG is on 144.155 and W5FYZ is on 144.150, in the Dallas area. VE2ABE, "Pag," will be operating as FP8BG on 144.340 during the month of September. Pag also sends info on "Project Alto", organized by VE2EA CEAVIIF Club. August 10 a repeater transmitter will be launched aboard a big helium balloon over the region of Montreal. The receiver is crystal-controlled at 144.180, and will be retransmitted at 147.080 Mc. Operation will be on a.m. and reports will be appreciated.

W5UKQ has his kw. s.s.b. going on 144.120 Mc. and would appreciate schedules with anyone interested in LA. Incidentally, John is using a home-brew exciter designed around a Tapeton crystal filter. Drop him a line if you are interested. We regret to inform you that the powerful 144-Mc. station from Elkins, West Virginia, will be heard no more. Al, K8AXU, has changed his QTH to Sistersville, West Virginia (40 miles south of Wheeling on the Ohio river). New location is at 1000 feet above sea level and Al should still be able to supply West Virginia on 144.182 and 220.150 for interested parties. (One advantage of the move is that he needs all those states again.) Al heard a W5 coming in on what appeared to be E skip on May 30 at 2:30 EST on 144.100. The identification was not complete and anyone who thinks he knows who it might have been is requested to contact K8AXU, pronto.

Skip, K6HMS, managed a contact with W0AZT in Denver via the m.s. route. This makes four states and three call areas for Skip. Contact was accomplished on June 8. If you are looking for m.s. schedules for the Persiecs, now is the time to write. We have it on good authority (VE3AA1) that VE3HC, Guelph, Ontario, has caused quite a stir on

144 Mc. He has been operating aeronautical mobile using a Gonsset III and a halo antenna in a Cessna 172 aircraft. Gordon also reports that although activity is low on 144 Mc., there are a number of new calls on the band, and that the Heath Two-er transceiver is a popular unit. W9IFA, Carrollton, Illinois got in on a short two-meter opening on May 11 when he worked W8KAY and K8DXH in Ohio. W8PBA reports two meters much above average all nights during May, mostly to the south and southeast. Bob also mentions ten new stations in his area operating 144 Mc. Reading, Pennsylvania, reports six days of good tropo conditions starting around the fourth of May. Signals were very strong from New England with New Hampshire, Massachusetts, Rhode Island and Connecticut coming through; west to Ohio, and south to the border of Virginia and North Carolina. Thanks to K3BFA for this information and the fact that they (Berks County VHF Society) were using a Seneca and worked 8 states in a very short time. The antenna was a 10-element close spaced on 144 Mc.

(Continued on page 146)

220- and 420-Mc. STANDINGS

220 Mc.

W1AJR	11	4	480	W9JCS	5	2	340
W1AZK	9	3	412	W9JEP	9	4	540
W1BDQ	11	5	450	W9OVL	6	3	475
W1OOP	12	4	400	W9UED	4	4	605
W1RFU	15	5	480	W9ZIH	10	5	500
W1UHE	11	4	385	K0DGU	5	3	425
W2AOC	13	5	450	K0TTF	6	3	515
K2AXQ	8	3	230	KH0UK	1	1	2540
K2CBA	10	4	325	VE3ATB	7	4	450
K2DIG	4	3	140				
W2DWJ	15	6	740				
W2DZA	12	5	410				
K2KIB	12	4	300				
W2LRJ	10	4	250	W1AJR	8	3	230
W2LWI	12	4	400	W1HDQ	8	3	210
W2NTY	12	5	300	W1MFT	8	3	170
K2PPZ	11	4	190	W1OOP	11	3	390
K2QJQ	13	5	540	W1RFU	7	4	410
W2SEU	4	2	150	W1UHE	6	4	430
K2UR	4	3	105	W2AOD	6	4	290
W3AHQ	4	3	180	W2BLV	12	5	360
W3FEY	10	5	350	K2CBA	5	3	225
W3JYL	8	4	295	W2DWJ	10	4	196
W3JZL	4	3	250	W2DZA	5	3	130
W3KKN	10	4	255	K2KIB	4	2	100
W3LCC	8	5	300	W2NTY	3	2	100
W3LZD	15	5	425	W2OTA	9	3	200
W3RFB	9	5	450	K2UR	7	3	175
W3UJG	13	5	400	K3E0F	6	3	250
W3ZRF	5	4	112	W3FEY	7	3	296
K4TFU	8	4	400	W3RUE	2	2	96
W4TLC	4	1	165	W4HHK	5	4	550
W4UYB	7	5	320	W4VVE	7	4	430
W5AJG	3	2	1050	W5HTZ	3	2	400
W5BJC	3	5	700	W5RCT	9	3	600
K6GTG	2	1	740	W6CTG	1	1	180
W6MMU	2	2	225	W7LHL	2	1	180
W6NLZ	3	2	2540	W8HCC	3	2	355
K7ICW	1	1	250	W8HRC	3	2	250
K8AXU	10	5	1050	W8JLO	3	2	275
W8JG	9	5	475	W8NRM	3	2	390
W8LFD	8	4	480	W8QTF	4	3	310
W8NRM	8	4	390	W8PEY	1	2	270
W8PT	10	5	660	W8RQI	4	4	580
W8SVI	6	4	520	W8TYJ	7	4	580
W9AAG	9	4	600	W8UST	3	2	255
W9EQC	11	5	740	W9GAB	9	4	608
				W9AAG	5	3	375
				W9OJL	6	3	330

420 Mc.

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

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Wherein:

We're fortunate to include W8KX in our mail-sack clientele. An alert observer of the DX scene, a discerning reader, and an articulate correspondent, Walt's frequent contributions of DX-type photography have graced the DX pages of *twelve* issues of *QST* over the past three years. W7s DJU and PHO have been nearly that prolific with nine acceptable offerings apiece. Generous W1s VG and WPO similarly have decorated seven DX columns; Ws 1BB and 9WHM, six; Ws 1ICP 3ICQ and K2UYG, five; W6YY and K6LAE, four; W5PQA, K3CUI and DU7SV, three; Ws 1PH 1TS 1TUW, K2POO, Ws 3KVQ 4PLL 6NXP 6ZEN 9WNV, K9VRV, W0VFM and KL7PI, two each. The following guys, gals and groups also rated "How's" picture credits since June, 1958:

W1s DGJ FH FZ OAK PNR QPN RST SVR ZDP, K1LVW, W2s EQS GBC KUW RDD UMB ZGB, K2s OAH RYP YFE, W3s FWD HCO INH, KN3JLP, W4s CXQ CYY GXB IYT LJV, K4KYB, W5s NW UX, K5KBH, W6s AM BSY CHY DA ITH JU ONK PIIF, K6s DV LAS SXA, W7s GYR RCN TVF, W8s KML NYG, K8IXZ, W9s AC CMQ DRF VVU JFT MES NLJ NZZ UVV VVJ YFV YSX, K9PRI, W0s CLC MLY, CX2AM, LL4A, FB8BC, K3NPF, G13s HXV KYP, IIK5SC, HM1AJ, KH6OR, KL7DKG, KP1RK, MP4QAO, PY0NA, SM5AHHK, VQ2RG, VU2RG, ZE5JU, Rev. Dr. Wiltgen, E. Collins, A. Fallert, Florida Skip, Korea Amateur Radio League, Malayan Radio Amateur of MARTS, No. Ireland *Gcc-Eye*, Radio Club of Uruguay, companies Halli-crafters and Raytheon.

In the August number of every third volume of *QST* we provide an index of "How's DX?" photography appearing in the preceding 36 issues. This happily gives us an opportunity to say "Thanks again!" to those among the readership who took the time and trouble to forward such material for your pleasure. Here's the score:

1958

July: UR2BU, FK8AT, ZS5NZ/ZS7, CR6AU. August: 9G1BQ, DL3TC, VQ4KPB, CE8AG, UB5TV, UB5KDK, CE3DZ's DXCC². September: VP2LB, VS9AP, CN8CC, GC3AAE, VP8CZ. October: K6SAG, VQ2JB, VK9AA, VS1BB/VS9, XW8AL, 4X1JO. November: KN4RID, ZD7SA, ZD3G, 9K2AQ, UI8KBA, SUI1M. December: EA1GH, ZD6JL, UA0KAR, LA2JE/p, UR2AR, UA1FE, JT1YL, VS1FJ and CT2BO.

1959

January: HL9KS, KG4AO, ZL3DA, FF8AC, DXCC²s of HB9J and W5KC, ZL1ABZ. February: KR6BP & friends, KG1DT, XW8AI, XW8AJ, W7ENW's DXCC², HS1JN. March: YO2BU, W6QD & Co., HK7AB, 5A1FF, KC6JC, VU2CQ & guests. April: DL1BA, TF3PI, UB5DW, UC2AA, HB9CN, UA6UF, VS9MA, E16X. May: OD5LX, VK2FR, VK9AD, FE8AP, VS6AE, ZL3RB, W9KXK's DXCC². June: CP3CD, P08AC, 9G1CO, UA3FM, EA6AW, KR6MI. July: VP8DS, XZ2AD, HKARTS group, DXCC²s of OH3RA W6TFJ W2YTH TI2HP, 9K2AN, KM6BL, ZK2AB. August: UR2BU, VP8DT, ZD7SA, ZP5CF, VS1 conclave, RAEM, UA3DQ, F2CB/FC. September: SM5WN/LA/p, HA5DH, FE8AI, FR7ZD, YA1PB, CE4AD, CE3DZ. October: HL9TA staff, PX1DE,

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

VP5GM, CR6CN, VS4JT, CT2AI, 4X4BX and G3IUL with their influential friends. November: PJ2CK, VS4BA, LA2TD/p, K6QPG/KW6, HB1TC/R, VO2AZ, DU6RG, ZL3RB's 1.8-Mc. QSLs, FP8BF. December: JZ0DA, FK8AC, KP4 DXers, a page of JA photos, DL1BO & DXCC².

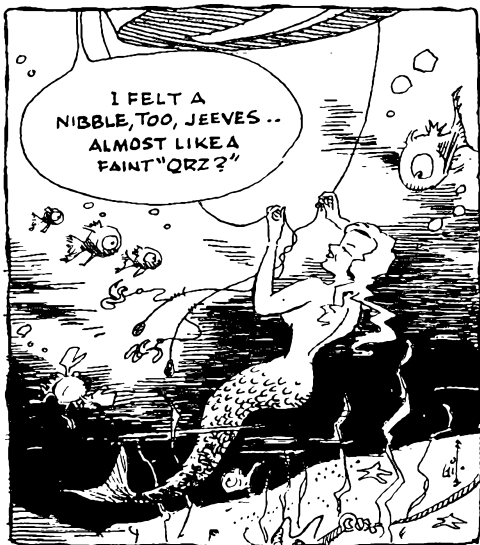
1960

January: NCDXC QSL display, YO3GK, HL9TA, HZ1AB, K8JXK, SU1MS, WA6DMD/mm. February: KH6LT, EL4A, VR2s AP AS BC, VS9OM, GB2SM, HC5CN, GM3BQA. March: spread of SM DXers, SP6FZ, G8JR's DXCC², VE8MX, FA9UO, VU2ANI crew. April: grouped ZEs VQ2s Pys KR6s, GB3RI, VP2KH, OH3ND. May: HC8IU, ZE8JP, VP8BN, 9M2FR, ZS3X, VP4WD, FQ8AE. June: ZS6IF/8, ZM7DA, UA4FE, JT1AB, VU2ANI, I5GN. July: FB8BX, CR7CO, SV1AI, ZL1AH, VS6DJ, HL9KS, 9M2FX, 9M2DW. August: 9N1s CJ GW MD, SV0WT, ZS8I, HV1CN, ZL3VH/3, SV1JG. September: skywires of YV5EU W4AZK ZM7DA, YO3VI, KG6ICD, CP3CN, VK2AXK. October: ZS2U, ZS7P, KA7AX, VP3AD at W1BB, VP3YG, YU1AG, YU3EL, GB3LAS. November: I5TUF QSL series, VK0TF, VQ4ERR, ZS3s DM FF, IS1ZUL. December: HK3TZ, AC5CQ, EP5X with OD5CT, HB1TU/R, PX1PF, VR6AC at W6RO, 3A2AV, DL1QT's WAS-DXCC.

1961

January: FF4AB, IH2V, 9M2EB, ZS1s OU RAI. February: CT3AV, UA6LI, DJ/DL spread, W2GT's "GT" QSL set, UA3GM's QSL. March: ZB2AD, CR7CI, CT2BO, CT2AK, UA0FG, OK7HZ/YI, JAls at Waseda U. April: 5N2PJB, HL9KT, Ws 1EFN 2EQS 8ANO and K2BWR, CE7BN, VP9EP. May: MF4BBW, 9Q5FD, ZL4JF, HM9A/p, UA3KND. June: KG6IJ, UL7FA, PY7LJ and W8GDQ.

Another "DXCC"-plus for your "How's" picture gallery. Should you encounter photography you feel can assist us to document DX history in these annals of amateur radio we'll appreciate the loan. One picture is still worth ten thousand words, you know.



What:

Wonderful openings — but all too brief and infrequent. This seems to be the consensus of DXers in this summer season of 1961. Ten is on the ropes, 15 is gasping, 20 is spotty, 40 is noisy, 80 is worse, and 160 — well, we won't say it. This period is known as the DX Doldrums and rightly so up our way. Surprisingly enough the mail bag still holds a few pages worth of DX data. Perhaps the readership has more time to correspond, conditions being what they are. Anyway, let's give the old Bandwagon a shove and see what's doing on

20 phone where W1BGJ, K1JFF, K2s TDI (172 worked on voice, 155 sideband), UYG, WA2LXC, K3LJZ, W4s IUO LJV (121/101 on phone), K4DWU, K5s ALU LLJ, K8JCB, W9VMZ (fresh DXCC on phone), K9QMJ and K25TD rustle up such s.s.b. specimens as CE2s AK (14,332 kc.) 2200 GMT, CC (319) 0, CN8FS (346) 22, CP5EA (340) 5-6, CR9AH, CT1s BS (296) 22, IP, CX2CO, DU7SV (306) 11, EL2G (342) 20, FS7RT (330) 11-12, HA9OZ (285), HC2AL (343) 3, HHs 2JK 9DR (326) 0, HK3VV (287) 23, HP3DA (294) 4, HR3HH (338) 3, HV1CN (330) 20, HZ1AB, JA8AA (336) 9, K6CQV/KS6, KAs 2BW (305), 2YA (324), 5AS (291) 11, 7TB (306), KGs 1AA (290), 1CQ IFR 4AP (323) 13, 6AAV (292) 11, 61J (297) 11 of Iwo Jima, KH16EDY (337) 7 of Kure, KL7DNE (290) 0 in the Pribilofs, KR6s GH (305), GP (330), MH (3' 2), KW6DB (280) 5-6, KX6s AC BQ (293) 2, BU (290) 12, DB (345) 0, MP4s BBJ (300) 22, BCC, OAs 6AB (328) 4-5, 7Q (346) 5, OD5s CL (342) 22, CN, PI1S (305), PZ1AP 1, SVs 1AE (297) 22, 1AP (318) 22, 1AR (302), 8WL (330) 23, 8VN (320) 0, 8WT (283) 23, TG9AL (336) 9, TI2CHV (319) 7, UAs 1CC (280) 5, 2AC (90) 9, 4IF (291) 4, UB5VF (324) 23, UC2AA (281) 5-6, UQ2AN (299) 22, VE8MC, VK9NT (302) 11, VP2s 2AB (283) 0, 6WD (312) 21, 9FR (316) 17, 9V05FS (295) 17, VRs 2BJ (310) 11, 6AC (276) 5-6, XEs 1FB (310) 4, 2DO (283) 7, YN1AT (343) 22, YO3ZA (268) 4, YS1s JM (284) 23, MS (305) 0, YV1EE (312) 0, ZD1Es (348) 22, ZK1BS (298) 3-4, 3V8CA (305) 19, 4X4s FA (304) 0, IX (300) 22-23, LC (304) 21, 9G1s BF CY (304) 22, 9K2AM (309) 19, 9M2DB (281) 16 and 9Q5US (327) 22. HI12CB (210) 16, HK3YR, HPIAJ, KG4AK (210) 20, KX6AB (220) 13, TG9NO, VE8DV, VP2s 1CG 5BL 9BN 9WB, VRs IG 4CB, a bunch of XEs, YO2BN (165), some YVs, ZC4GT and 4X4DK (285) 19 are reported holding out on a.m.c., mostly on the low edge.

20 c.w.'s normal heavy attendance is swelled by refugees from 10, 15 and 40 at this time of year. We find K1s JFF (92/80 worked/confirmed), KSG (76/52), K2s JUA QXG TDI UYG, WA2s BQK (113), EFN EGK (124/85), KSD (78/51), KW6 LXC, K3s CUI KHK (98/81), LJZ MNJ, W4IUO, K4s DWU ZRA (74), ZYI (181/156), K5s ALU CWR LLJ WSE, W6s JOB MDK (147/141), RCY, K6s CJF QPG ROY TZX, WA6s CVT IVM, W7s DJU LZP POU, K8s JCB (156/133), PFY (78/40), LNL TJW, W9CLH, K9s SRR UCG UHH (140/112), K8s OSV OSW UTX, VE2YA, KV4CI, KZ5TD and s.w.l. A. Rugg well entertained by BVIUSA (65) 9, CNs 2AQ (66), 8JF (22), COs 2AP 2WU 7RV, CPs 1DA 3CN 6FJ (30), CR6CA (22), CTs 2BO 3AV, plenty of DMs, DUs, 1OR 9-10, 7ED (70), 7SV (35) 8, 9JO 12, FB8s XX YV ZZ 8, FF8AP, FG7XC (20) 20-21, FK8s AT AW, FR7ZD (53) 3, FY7s AA (85), YE (67) 1, YI, GD3s FBS UV, IAs galore, HCs 1JU 1KA 2CB 2MG, HHs 2R GR JV VT, HK0AI (76), HL9KT (15) 7, HMIAP (40) 9-11, HP1s IE (10) 23, SB, HR2FG (60), HS1F, IS1s ZEI ZUI, IT1s AGA (50) 1, AQ, JAs en mass, JZ0PH 13, KAs 2AB 2AO (60), 2CN (30), 2FC 2JL (65) 6, 2JM (50), 2RT 12-13, 5MC 11, KC4s USN USV, KGs 1AA (80), 1BA ICX 23, 4AB (78) 2, 4AH 4AN (30) 4, 6AIG 17, KH16DFQ/KG6 (50), KM6s BI (89) 5, BQ 3, KR6s AF DO (70) 7, LD LY 10, KV4s AA (81) 21-22, CI (10) 21-22, KW6DG (18) 3, KX6s AC 23-0, BU (40) 5, LUXBI, many LZs, OAs BW (10) 23, JO, OD5LX 4, OYs 7ML 8RJ (20) 22, PJs 2CK 3AD (55), 3AJ 3AK, PYs 4ZG 7LJ of Fernando De Noronha, PZ1s AY BF (30) 0, BH, RAEM (2) 4 of Moscow, SM5BUG/9Q5 23, SVs 1AA 8VM 8WN 23, 8WT (52) 23, TI2s CMF DLM PZ WR, TU2s AE (48) 9, AL 22, UA1s KAE (32) 4-5 of Pt. Mirny, KED of F.J.L., UA2s AG AO (60), AW BD (55), KAK, UA9s AK BZ CM DJ FI FN JH (76) 3, KAS KCC KCE KOA KXA (90), OB OM YJ (62), UAs BD CA EW FE JU KAE KDE KFM KID KJA KKS KQB OM RV UU (80), UB5s in number, UC2s AZ (19) 3, BB (64), BW CS (84), KAG WP 20, UD6s AM CF (50) 19-20, KAA (60), UF6s FN KPA, UH8s BA (64), BI, UI8AG, UL7s LE (59) 3, XX, UM8KAUB (62), UNIAZ, UO8s PK TI (30) 20, UP2s KBC KNP (90) 19, NV, UO2s AS BP DB DO KAR, UR2s AT KAN, UT5GL (80), UWs 3ME 8FC 7, UPOL-8 adrift up north, VEs 8MC 8NJ 23, VKs 1JE of



BVIUS, with operator Bob keying here, dispenses rare contacts with a BC-610, R-388 receiver and various antennas, usually near 14,050 kc. around 0600 GMT. (Photo via Ws 5CXU and 7LZF)

Canberra, 3ARX of Howe, 9DII 9GP 9PC 6JB 8RT, VP2s 3YG 5BH/mm 5BK 5CD 6PJ 7BP 7NO 7NQ (30) 14, 7NY, ten VP9s, VQs 2IE (68) 3HL 8BL, VRs 2DK 3L 6TC (165) 4, VSs 1FH 1FZ (70), 1KQ 13, 1KT 6AE 10, 6DV 15, 9MB 23, W80LJ/PK (69) 13, XEs 1PJ 1PZC 2AC 2FJ 2FZ, XZ2TH, YN1OC, YS1FA (20) 3, lots of YOs and YVs, ZAIKFF (33) 14-15, ZC4s AB AK (15) 0-4, CP FD 23, SS WD, ZC5CC (76), ZDs 1CM 7SA 7SE 1, ZE7JG (25), ZK1s AK (30), AR 5, ZM6AB (80), ZP5s AY CF LS (30) 2, ZS2MI (160) 19 of Marion island, 4X4s BS (10) 23, BT HA NJ, 5As 3TQ 22, 3TR 23, 5TA 22, 5N2JS, 5U7AC (20) 23, 6O1LB (24) 18-19, 6W8BQ, 9G1DT (4), 9K2AS (60) 2, 9M2s ES FK 17, FQ 12 and 9U5MC.

15 phone still rewards K2s TDI YFE, WA2KWB, W4LJV, K4DWU, W5EHY, K5s ALU UMC VTA WSE, K8s JCB LNL TJW, K8QH/FK/P, KZ5TD and listener Rugg with stuff like CO2XM, CR4AX, CX2RE, EA8BL, EL2V, FF7AG, HCs 1FO (230) 1, 2CB, HHs 2RB (300) 20, 5DM 5MV, HKs 3VV 4KZ 8KT, HIPs AC (310) 0, SB, KG4s AN (290), AO BN (405 s.s.b.) 23, OAs 4HF 6AGI, OE3CL, OX3KM (240) 18, PZ1s AR (280), AZ BK (230), BW, TG9s NO BR, TI2s CHV CMF PT RFT, TL8AB, VKs and ZLs a-plenty, VK9PJ (220), VP2s 2LD 2LS (300) 20, 3FM 5CD 5CH (280) 1, 8FV (200), 9L, VQ4HX, VRs 2BC 3L, VS9MB of the Maldives, XEs CW EV POP, YNs 1WW 3LBV (260) 16, YS1RM, a dozen YVs, 4X4s AU HI JU, 5As 2TC 2TD, 5N2ATU and 9Q5DQ. Slim pickin's!

15 c.w.'s status declines likewise but K1KSG, K2YFE, WA2s BQK CLQ EGK KSD KWB, K3KHK, K4s LRX ZYL, W5EHY, K5s ALU (61/40), CWR LLJ UMC VTA, W6JQB, K6CJF, W6A8OH, W7POU, K8s JCB PFY TJW, W9CLH, K9QMJ, K8s OSV OSW UTX and Mr. Rugg dragged in a half dozen CE colleagues, CMs 2WS 8RM (90) 17, GR5AR, CT1ID, CX1FB, DM2AEB, FA9VN, HA1KSA, HKs 1AAK 7YB 13, 7YC (85) 21, HPs 1AP 5AC, HZ1HZ, sundry JAs, KM6BI, KV4CI, LU1ZO, LZ1s CW (30) 19, KSP (40) 19, OAs 3D 4JO, PY7LJ (20) 21, SM1AHD, SP9WZ (58) 22, UC2AD, Papua's VK9PC, VP2s 3FM 3RW (167), 6AM, scads of VP9s, VQs 3HL 5IG, VR6AC, VS9MB (22) 22, XE1s AO PJ, YVs 3EC 4BH, ZB2AD, ZC4s, ZP5s CC CF (52) 2, LS, ZS3AH, 4X4NJ, 5As 3TQ 5TF, 5N2ATU and 9G1DT.

15 Novice developments are concerned more with WAS-completing short-skip sessions than with overseas delicacies during these hot months but WV2NXP, KN5s FPU JBW, WV6ORS and KN8Y2K specify success with CE1E1, CO2WU, F3 3SM 8VN, a few Gs, HC2VT, HK7YB, KX6BU, OAs GR IW JH, PYs 2BQA 2BTJ 5MX, VE8BC, VP6AM, WH6ECZ, WP4s AYM BAF, XE1s AAA VB, YV5AR, ZLs 1CA and 2GH, KN5JBW, by the way, is our former s.w.l. contributor, D. Edger.

10 phone is real kooky, spasmodic long skip clashing with the Sporadic E. WA2EFN, W4LJV, K4ZYI, K5ALU, K6CJF, K8LNL and K9SRR glean stray items like CXs 2IY (450), 4BI, HI7CY, HK1XX (500) 21, KP4s BY LV, KZ5CD, LU1s IDAB 2HAC 4DM (470) 21, TI2CMF, VKs 2FU 3VL, YN3DG, YV5ATX, ZL2RC and ZS1AB (550) . . . Ten c.w. enables K2YFE, K4ZYI, K5WSE and WA6IVM to get together with a G or two, KV4AQ, OX3DL, VQ2WR and XE1I now and then.

40 c.w.'s gallant K1KSH, W2APH, WA2s BQK EFN KBE KSD KWB, K3KHK, K4s DWU ZRA ZYI, W5EHY, K5VTA, W6MDK, K6CJF, WA6IVM, W7DJU, K8PFY and K9SRR defy hot-season atmospherics for the sake of CM2s AE HFZ, CN8s BP MB, CO2s NR (40), QR (11), UV, EL4A, FG7XF (9), HC2AC, HKs 2YO 7ZT,

HP1s JE HL SB (20) 8, one JY1XY, KC4USV, KV4CI, LU1ZF of Ellsworth, OA1FAI, PV7LJ (5), UB5s KCF KIV (10), KID VV, UW01B, VKs 7SM, 0D3 (10) of Davis, VBs 2AH (4), 3VN 6AG 7NQ 8FD 9BO 9BY (70), 9EP 9L, YO2BB (2), ten YVs in five Venezuela call areas, ZD7SA, a passel of VK/ZL chappies, 9G1DT and the following breakfasting Japanese 7-Mc. enthusiasts: JA1s ACF ALU CIV CJU GWM CZE DCL EJP EZZ FCG PCY FDU PHK FHX FNR GIV GNX GUF ILR IIZN WM JA2s AIH AUU BQS, JA3s CAF CGY IL JA4s ABB ADE BA DZ, JA5s LG MCG MAM MZ, JA6s ACZ AKU BFF BGY OK, JA7s ADD AKC KX LX, JA8s AAG ABE AHL NB YZ, JA9PI, JA6s ADY MV and RC.

On forty phone W1AFA get together with KC4USH (205) 11, KH6BB (205) and Adak's WA6IED/KL7 (205), all sideband. Our lone 7-Mc. Novice dispatch comes from KN7MRO/4 who used only 35 watts and a vertical to grab KH6s CLL DUM, KV4BY, VKs 3XB 5NQ and WP4AYM.

80 c.w. is rocked by itinerant thunderstorms but K4ZYI caught up with KV4CI (3) 4 and OE1RZ; KV4CI bagged DL9DX, Gs 6ZO 8JR, E19J, OKs 1ADM 2KBA, LZ1KPZ and SP5SM; and A. Rugg logged VP9L. The latter also noticed VPs 5BL and 9L squeaking through upband on 75 phone. . . . Not much 160-meter sport in the face of summer static except that K1KSH has been hearing marker DHJ quite well around 0100 GMT. Take heart, gang — autumn's on its way! . . .

Where:

Oceania — KR6LY's QSL agent, K5PSO, enumerates some clerical pet peeves: (1) no self-addressed stamped envelopes accompanying requests for QSLs, (2) use of time reference other than GMT, (3) oddball-type QSLs hard to figure for data, and (4) generally illegible penmanship. Some of the cards sent but by W/Ks certainly lead one to wonder if the guys really expect replies or are just fooling around. . . . W7LZF mentions the address 157 Crary Ave., Binghamton, N. Y., in conjunction with VK6JB QSLs. . . . VERON of Holland understands that VE7ZM may be able to assist in KC6CG QSL matters for QSOs dating after May 15, 1961. . . . According to NCDXC, KM6s BQ and BU handle KH6ECD c.w. and phone QSL duties, respectively. All cards for KH6ECD's Kure action should be sent via KM6BI nevertheless. . . . Sven Elfving, Solgardsgatan 15, Ornskoldsvik, Sweden, may be able to expedite your QSL from operator Fred of KI6BV. . . . "I have quite a pile of unclaimed VR2BC QSLs on hand," says Greg's U. S. rep, K4LRX. S.a.s.e. of course. . . . "QSL sure!" promises WV6PGA for his current kee-thumping career at KX6BU. . . . According to WGDXC, two International Reply Coupons plus QSL will produce airmail reply from Norfolk's VK9GP.

Europe — Polar Bears Radio Club, at Mr. Elfving's address preceding, offers to expedite your QSL exchange with U.S.S.R. stations. "We have all ninety mailing addresses for the local Russian QSL bureaus normally used only within that country." . . . Operator Bob of SV0WT/Crete tells K4ZKI that no money, postage or IRCs should be forwarded with QSLs to that station. The OIC takes a very dim view of cash transmittals in particular, and so do we. In addition to petitions direct and via ISWL, you might get SV0WT QSL results through Box 388, San Marcos, Texas — hint from W9CLH. . . . WGDXC learns that

UAIKED Franz Josef Land operators return home this month, QSL output to follow.

Asia — MP4BBE writes W8KX: "Mail service is excellent here, both by sea and air. I don't need a QSL manager but would recommend W2CTN to anyone who does. Jack does an excellent job. By the way, we can use IRCs on Bahrein." . . . K2EUJ clarifies, "I am only a mail drop for 1L9KT and have nothing to do with outgoing QSLs. Skip asserts that all contacts will be confirmed from Korea by air, so s.a.s.e.s have no function at K2EUJ." . . . VERON has it that W/K/VE QSLs for 9K3TL-9K1A can go via W2JXII, others via OD3CT (W3ZA). . . . Via JDXXRC: VU2AX states there were no bona-fide AC4AX QSOs after March, 1959. He's still stationed at Lhasa.

Africa — K4TJL, Southeastern DX Club president, tells ARRL DXCC Deskman W1WPO that QSLs to ZD9AL for the April 3rd-7th single-sideband splurge of ZS5SG should go via the address in the listing to follow. . . . "W2CTN handles my QSLs," writes 5A2TG (ex-VQ1SC-VQ4GQ), "but I will gladly QSL from here on receipt of IRCs. Ended VQ4GQ work in February for which I QSLD 100 per cent. If anyone still requires a deserved VQ4GQ or VQ1SC QSL I'll recheck the log on request." . . . VERON's DXpress lists VQ5s AU BU DB DES EK FS GF GJ GY IB IF IG and IH as Ugandans now licensed. . . . PBRC learns that VQ8AD holds VQ8BB's St. Brandon logs and will respond to the usual s.a.e.-IRC approach. . . . "QSL and s.w.l. acknowledgment guaranteed 100 per cent," assures VE3BQL, planning renewed VE3BQL/SU activity from 80 through 100 meters. . . . "My tour of duty will keep me in Ghana for two years," states 9G1DT (W30VU). "Those who are persistent and patient can be confident of 9G1 contacts and QSLs."

Hereabouts — "I still have a few VP7BM QSLs left for those who sent me cards and failed to receive reply," writes K8IMV/6. Lowell did his best to keep even while in the Bahamas but you know how that postal ball bounces. . . . VO2WW, through E. D. Collins of ARRL HQ., states that a flock of his QSLs headed Statesward via bureaus in early May. "Must use the bureau route; otherwise it would cost me a fortune to keep up with W/K QSL exchange. At present I think I'm the only VO2 on 28 Mc." . . . "YN4AB has moved to Colombia but I'll be handling QSLs for him as usual," informs K4ASU. "I have his logs for the past two years, including contest work, so QSO data plus s.a.s.e. will be appreciated for prompt returns — after I receive the pertinent logs." . . . VP8FV of Halley Bay tells K2YFE that his QSLs won't be getting around until next year when the staff changes. . . . KQ6HF vows thorough QSLing and should have his own KP4 call by the time this gets around. . . . KZ5TD uncorked some 250 QSLs in late May with more to follow. "Was very QRL moving quarters, so I fell behind somewhat. Also found that about forty incoming cards had slipped behind my desk. They have now been taken care of. Say, I'd like a list of countries in which IRCs cannot be used." That last is a tall order; we've received conflicting opinions from hams in the same country, plus a third variant verdict from the U.S.P.O. They're worth a try, anyway, if you really want that QSL. . . . Re nominations for "QSLer of the Month!" W6MDK commends VU2KV for nine-day service, and 9U5MC was equally prompt after contact with W7LZF. . . . "I've used 'How's DX?'" addresses a great number of times with fine success," declares K1KSG. "The

GD6UW amassed 550 c.w. and s.s.b. contacts with 200 W/Ks and 55 countries over April 5-12 when G3s MDR NHL OBT OSU and s.w.l. Sykes unfurled the Cambridge U. Wireless Society DXpeditionary banner with 150 watts, an Eddystone receiver and Mosley multiband vertical. Shown here in the thick of it at left, below, are G3s OBT (left) and MDR who, with G3NHL, will be visiting the U. S. and Canada from June through September of this year. . . . HB1KU/fl (800 single-sideband QSOs) and HB1DX/fl (2100 c.w. contacts) fed a refreshing Liechtenstein DX diet to the hungry faithful during the first two weeks of April. HB9DX writes, "We were handicapped by a period of bad conditions and surrounding high mountains. The bands were completely dead for many hours, some openings lasting only a few minutes." The group shown at right, below, are (l. to r.) HB9s KU DX and PT.





Iran's amateur radio renaissance still is big news on the DX scene. Some of those responsible for this development are (rear, left to right) EPs 2AT 2AG 2AJ 3HS 5X 3RO 2SWL and 2BB; (front) 2AF 2AQ 1AD and 2AP. (Photo via K4ORQ/EP1AD)

accompanying bits of information also are interesting and helpful." Glad to hear it, OM. Your thank-you is hereby relayed to the lads who supply that material. For example, this month's QTH rundown comes through the mail from benevolent W1s UED WPO YYM, K1KSG himself, K2s XQG TDI YFE, WA2s EGG KSD, K3s KIK MNJ, W4HUO, K4s DWU ZRA, W5EHY, K5s ALU UMC VTA, W7s LZF UVR, W8s IBX KX, K8PFY, W9s CLH QGR, K9s SRR UHH, K9UTX, VE2YA, A. Rugg, Far East Auxiliary Radio League, International Short Wave League, Japan DX Radio Club, Kanawha Radio Club, Newark News Radio Club, Northern California DX Club, Novice Amateur Radio Association, Polar Bears Radio Club, VERON of Holland and West Gulf DX Club. . . .

CP1DA (via K6PFF)
 CT3AV (via W3KVQ)
 DL5CR (via DARC)
 FB8CH, G. Picquette, Service de Securite, Majunge, Madagascar
 FB8YY (via FB8BC)
 FK8AW (via W2CTN)
 FM7WY, G. Marie-N., Dir. Population, Fort-de-France, Martinique
 FY7YE (via W5JLU)
 FY7YI (via W3AYD)
 H18MAR (via RCD)
 HK2WO, F. Abualara, Aptdo. 52, Mompes, Colombia
 HK2YO, Box 1041, Cueuk, Colombia
 HK4BO, J. C. Lega, P.O. Box 728, Medellin, Colombia
 HK7YB, Aptdo. Aereo 222, Bucaramanga, Colombia
 HK7YC, Box 222, Bucaramanga, Colombia
 HL9KT, Lt. R. Theisen (K2JEK), 8th U. S. Army Sig. Sect., APO 301, San Francisco, Calif.
 I1YBA, F. Tenaglia, via Crispi 19, Varese, Italy
 JY1XY (via W21EK)
 JY2NZK, P.O. Box 35, Geneva 15, Switzerland
 K7HIF/KH6, M. Fernberg, 45/650 Pua Alowalo St., Kaneohe, Oahu, Hawaii
 K0QHF/KP4, SP1 B. Nielsen, USA Gar. & Tech. Svc., Antilles, APO 851, New York, N. Y.
 ex-KA2DE, Box 571, Shaw AFB, S. C.
 KA2SC, P.O. Box 2, Cointrin, Switzerland
 KC6CG (see preceding text)
 KH6EDY, USCG Lorain Stn. Navy 3080, FPO, San Francisco, Calif.
 KP6AO, W. Wolff (KH6DGL), 104 Lei Ln., APO 953, San Francisco, Calif.
 KR6LY (via K5PSO)
 LUIXB1, Almirante Zar 1241, Puerto Deseado, Patagonia, Argentina
 LU9VD, Institute of Physics, Bariloche, Argentina
 LX3MA (via DL4US)
 LZ1UA, E. Karmarob, 26b, 6 September St., Sofia C., Bulgaria
 MP4s BBA BDH (via MP1BBW)
 MP4BDG, Zebemah Rd., Manama, Bahrain, Persian Gulf
 OA4DS, F. Keimard, Box 1141, Lima, Peru
 OA4KU, M. Marcias, Box 375, Lima, Peru
 OHBA (via SRAL)
 OY7MI (W/K/VE/VOs via W6NJU, Europeans via DL6EQ)
 PY9GO, M. Frietas R. Don Aquino, Vila Cruziero do Sul, Corumba, M.G., Brazil
 PZ1BE, E. Robles, P.O. Box 981, Paramaribo, Surinam
 PZ1BF, G. Lichtevoeld, Box 184, Paramaribo, Surinam
 SM7XA, Stenkil, Lundensis DX Club, PR Dept., L:a Fiskaragatan 1, Lund, Sweden

SV0WF, G. ISWL, 12 Gladwell Rd., London N. 8, England
 TA3IP, Box 105, Cares, Turkey
 TL2GMF (via W2CTN)
 TL8AB, P.O. Box 171, Bangui, C.A.R.
 TU2AF, Box 571, Abidjan, Ivory Coast
 TU2AH, Box 100, Agboville, Ivory Coast
 TU2AK, Box 1813, Abidjan, Ivory Coast
 TU2AL (via W3KVQ)
 UA2AO, A. Moskalenko, Main P.O. Box 77, Kaliningradsk Oblast, U.S.S.R.
 VP1CG, P.O. Box 1, El Cayo, British Honduras
 VP5BH mmm (via W2QMW)
 VP5LT, E. Glascock, P.O. Box 264, Montego Bay, Jamaica
 VP6WR (via W9JFJ)
 ex-VP7BM, L. Busching, 605 S. Broadway, Santa Maria, Calif.
 VP7BV, RCA, Grand Bahama AAFB via Patrick AFB, Cocoa, Fla.
 VP7NY, L. Albury, Box 1007, Nassau, Bahamas
 VP8FV (via RSCB)
 VP9QQ, G. Herringshaw, Headmaster's Residence, Friendship Vale School, Devonshire, Bermuda
 VP9WB (via RSB)
 ex-VO1SC-VO4GO (to 5A2TG or via W2CTN)
 VO2JC, P.O. Box 17, Choma, No. Rhodesia
 VO8AFB (to VO8AD)
 VO8BL (to VO8AD)
 VO8HBC (to VO9ITB)
 VR1G (via W6BSV)
 VR2DK (via W2CTN)
 VR4CB (via W7PHO)
 VS1JL, L. Peck, P.O. Box 1575, Singapore
 VS6AE (via W6DIX)
 W6RHI/mm, USS *Rehobath*, FPO, San Francisco, Calif.
 W7HMP/KB6, H. Barth, USPO 04/50000, Canton Island
 XE1EV, A. Dib, Box 314, Toluca, Mex., Mexico
 YV3BF, N. Vasquez, Box 348, Barquisimeto, Venezuela
 YV6AV/YV2, J. Hernandez, Box 32, Barinas, Venezuela
 ZA1s KFF KFJ, Radio Club, Box 888, Tirana, Albania
 ZB1AQB, BFPO 51, Malta
 ZB1PM (via RSCB)
 ZD6GA, N. Armstrong, Box 10, Lilongwe, Nyasaland
 ZD7s SA SE (via W9FJY)
 ZD9AL, c/o Southeastern DX Club, P.O. Box 749, Atlanta 1, Ga.
 ZK1AK (via W3GJY)
 ZK1AR (via K4LRA)
 ZK1BS (via W7ZAS)
 ZK2AB (via W6ZEN)
 ZS3LW, P.O. Box 2773, Windhoek, Southwest Africa
 ZS9C, Mrs. P. Ellor, Box 23, Francistown, Bechuanaland
 4S7EC, P.O. Box 907, Colombo, Ceylon
 5A2TG, S. Crabtree, No. 1 Forces Bdstg. Stn., BFPO 57, Libya (or via W2CTN)
 5A3TR, R. Crowther, P.O. Box 263, Benghazi, Libya
 5A3TR (via W3ZZE)
 5A5TZ, Maj. L. Beaumont, Royal Sigs., Army Apprentice School, Harrogate, Yorks., England
 5N2RSB, R. Briggs, 1st Brig. Sig. Trp., Kaduna, Nigeria
 5U7AMS (via RSCB)
 6O1LB, Box 136, Mogadiscio, Somalia
 6O1MT, M. Tessieri, Box 397, Mogadiscio, Somalia
 9K3TL-9K4A (see preceding text)

NOTE: No assurance of accuracy or legitimacy goes with the preceding directory. Might click for you, though.

Whence:

Asia—The 2nd All-Asian DX Contest—a c.w.-only single-operator affair—takes off at 1000 GMT, August 26th, and runs to 1600 on the 27th. Sponsor JARL (Japan) invites Asian and non-Asian DXers to work each other on 3.5 through 28 Mc, using the general call "CQAA". Serial exchange consists of RST plus your age in years; YLs, however, cagily substitute two zeroes for the age digits. For final score multiply total different Asian stations worked per band by the total number of Asian band-countries worked. (Working JA1AA on three bands, for example, would net nine points.) High single-band scorers also can earn certificate recognition. To be eligible for possible diplomas of merit rewarding top performers, your log transcript entry must be slipped to JARI, Contest Committee, P.O. Box 377, Tokyo Central, Japan, postmarked no later than September 30, 1961. In last year's AA slindig top U.S.A. multiband scores by call area were turned in by Ws 1BIII 2AIW 3DBX 4KVK 5KC, Ks 6EVR 7DVT, W8DWP, K9JEL, W0BTD, KH6DLF and KL7DEM, VE7EH led Canadian entries, while UB5EF, ST2AR, K6EVR, KH6DLF and CE3AG paced their respective continents. Homeland high-scoring honors went to JAs 2JWV 3AF 7AD and 6MW in that order. Single-band U. S. excellence was posted by KH6DVG on 21 Mc., W4KFC, 14 Mc., and K6JBP, 7 Mc. K6CJF, W6Gs HRS IVM and JA8ZZ call our attention to recent modifications in operating regulations for JAs. Second-class (100-watt) privileges are expanded to allow 14- and 21-Mc. usage, and Japanese Novices (10 watts) now can use 21 and 28 Mc. W6GIVM notes that JA1BNK and a few others are permitted potent power maximums of 1400 watts, also that JA3AIS needs but 21 countries to hit the 40-meter 100-watt mark. K6CJF collected the third 100-Tokyo certificate awarded to Yanks plus- Worked-JA1 diploma No. 27. W6GIVM's WAT tapestry is the 16th issued to non-JAs W4OSG of TARC (Taiwan) announces VK5FY as recipient of BV Award No. 1. "I operate HL9KT mainly on week ends, also during the week on a limited basis," writes K2JEK. "So far results haven't been too good. We're rockbound on 14,015 kc. and I usually tune plus or minus five kc. for callers. I'm attempting to carry on here where W9QPI left off and will be glad to arrange schedules for contacts with HL9KT." K5CDA/mm, aboard *Penn Shipper* near BV-land last month, reports erratic conditions affecting daily skeeds with W9WNB on 21,057 kc. Via W4ANE, VU2NR mentions further lowlights of the Marell Laccadives DXpedition by VU2s BY RM and himself as VU2NRM: "Separation from our luggage . . . poor shipboard accommodations . . . water shortages and irregular food . . . narrowly averted disaster in a small boat . . . language barriers on the islands . . . failure of our motor generator . . . inadequate BC-348 selectivity . . . and the menace of those with terrific signals who insisted on QSOs twice or thrice a day." Cyprus report by K2UYG: Most of the two dozen ZC4s now licensed are active on the air. Cyprus Amateur Radio Society was recently formed with ZC4IP president and QSL chief, ZC4PW secy-treas., ZC4s AB JB and PB directors. Military-club stations ZC4s AK, Akrotiri, and PC, Pergamos, continue quite active DXwise. MP4BBE gives us the Bahrain DX picture through W8XK: MP4s BCP BDB and BDG are fairly active on phone and c.w.; BBW BCI BDC and BDH use phone mainly; BBL prefers c.w.; DAB MAH QAK TAC TAJ, 9K2s AD and AX also are active in the area. MP4s BCV and BBF headed for Australia and Turkey, respectively. Our informant, MP4BBE, is a 33-year-old petroleum engineer from England, has DXCC and many other DX diplomas, and is expecting his third harmonic. John's favorite bands are 14 and 21 Mc. but he goes for the long haul on 3.5 and 7 Mc. when conditions are interesting. His usual operating times are 1600-1800 GMT with occasional appearances at 1000-1300 and 0200-0400 using 60 watts c.w. or 40 phone to two 807s and dipoles, receiving with an Eddystone. Asian addenda courtesy WGDXC's *DX Bulletin*: JY2NZK panicked the 11-Mc. sidebar pack for a spell in June. Onc XU6AL, 14,278-kc. s.s.b., hopes to shake loose from the ITU-FCC Ban List for W/K contacts soon. AC5PN again appears spasmodically around 1330 GMT, 14,080 kc.

Africa—VE3BQL expects to be signing VE3BQL/SU this month or next on 10 through 75 meters with a Valiant, GPR-90 and KWS-1 using s.s.b., a.m. and c.w. Elvin worked

VU2NRM, operated by VU2s NR (left) and RM in the Laccadive Islands, rocked DX bands for a 52-hour period in late March. Raju, VU2NR, handled phone festivities while Rao worked c.w. Groundwork for this DXpedition began last August with encouragement by YA1IW and others. More than the usual crises in authorization, transportation and installation were surmounted before the lads finally fired up VU2RM's 50-watter, VU2NR's 100-watt s.s.b. outfit and a Cage radiator for some 1200 eagerly awaited VU2NRM QSOs. (Photo via W4ANE)

August 1961

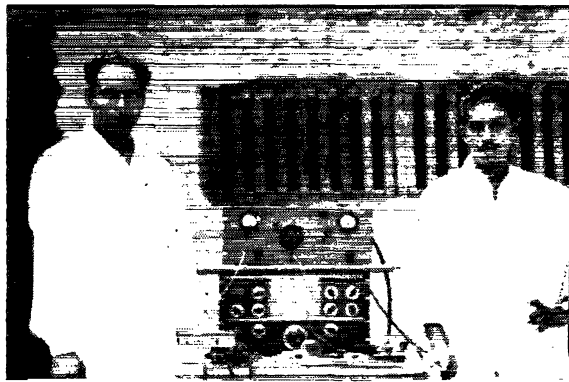


VU2EZ and comely XYL enjoyed a visit by K5CDA/mm when USS *Penn Shipper* recently put into Calcutta. VU2EZ runs 100 watts to a homelyrigged rig, receives with an SX-28, and formerly signed DL3FH.

well over 100 countries and 46 states on his previous VE3BQL/SU stint. "I'll have much more time available for hamming on this tour. My main concern, of course, will be keeping fellows in the Canadian contingent of UNEF in touch with home." "I correspond regularly with Yves and Pierre of PB8YY and will do my best to intensify their DX activity," writes FB8BC concerning that Terre Adelie station's reactivation. ZL4IH, KH6WW, W4WDI and PY1GJ welcomed FB8YY back to 20 c.w. in late February. S.w.I. J. Porter urges a check with Lion's Head Radio Club via ZS1ACD for details on the LHRC certificate based on contact with any three of ZS1s AB ACC BF JD MW NE OA RJ RZ TP TZ VK and VM since October 1, 1960. The gear of 5A2TG arrived in sad shape from his previous Kenya diggings so it may be a while till ex-VQ4GQ raises full DX sail in Libya. "I'm itching to find out what DX conditions are like here, especially on 40 and 80 meters. Might even build a rig for 160. There are about eight licensed amateurs here and I'm eager to join them with my c.w. 50-watter." W3OVU fired up as 9C1DT in early May with a folded dipole and two crystals. "Already have been in tremendous pile-ups. Most operators are cooperative but others have been added to my blacklist. No definite plans to visit Volta, Dahomey, etc., as yet. My working day ends at 1700 GMT and our power goes off at 2130; between those hours I'm often available with c.w. on 14,001 and 14,050 kc." Africa notes through PBRC, VERON and WGDXC: 5N2AMS notes to follow his 517 success with Dahomey and Ivory Coast operation. VQ9IIB enjoyed a brief Chagos stop as VQ8HBC this spring. 7G1A anticipates early return to Mali as 7G1A/FP7. TL8AB, 21,230-kc. phone, is said to be ex-FQ8HN. VQ8AP's VQ8APB target date is right about now.

Oceania—KH6EDY, Kure Island's permanent DX factory, got rolling in June with a B&W 5100, linear amp, 11Q-170 and HRO-60. K6TZX says that operator WA6PUC prefers c.w. and should be on Kure for six months or so. WV6PGA expects to terminate his Kwajalein tour this month after obtaining special authorization to operate KX6BU on 14,000-14,050 kc. John also puts KX6BU on the 15-meter Novice band between 2100 and 2200 GMT, Saturdays. Don't forget to circle your calendars for the 1961 VK/ZL DX Contest slated for September 30th-October 1st—dope here next month. Oceaniagrams via WGDXC: Lord Howe's illustrious VK3ARX needs only N. Dak. to clinch ARRL's WAS diploma. Rich likes 20 c.w. on Sun. and Sat., 0600-0630 GMT.

(Continued on page 160)



• New Apparatus

Radio Industries Antenna Rotator

A NEW, rugged, compact $1\frac{1}{6}$ r.p.m. antenna rotator called the Loudenboomer Mark III, made by the Radio Industries Inc., Kansas City, Kansas, should handle almost any amateur antenna. The rotator is rated to withstand 1000 foot-pounds of torque from wind load and uses steel gears that are welded to the shafts, rather than being held by keys or pins.



The Loudenboomer Mark III antenna rotator and indicator control box.

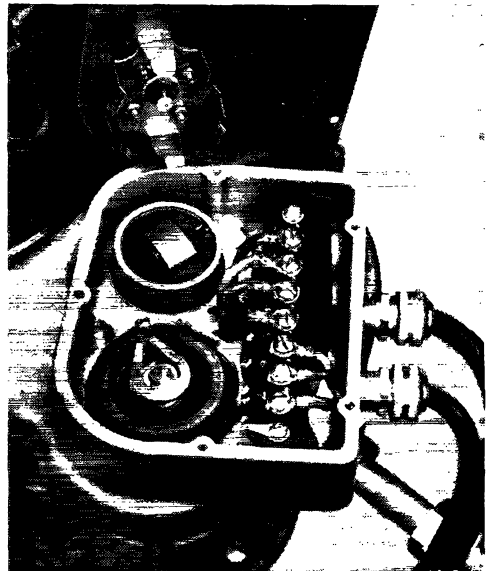
As the accompanying photographs show, the rotator package consists of an aluminum casting which houses the gears and direction-indicating components, a $\frac{1}{8}$ -horsepower electric motor, and an indicator and control box. The rotator assembly is designed so that it can be mounted inside a triangular tower. It has three threaded rod arms that extend out from the rotator body. These arms, which attach to the tower legs, have adjustable clamps with locking nuts. The rotator will fit inside towers that have a leg spacing as small as $8\frac{1}{2}$ inches. The entire unit has a length of $13\frac{1}{2}$ inches, a width of $9\frac{1}{4}$ inches, is 7 inches deep, and weighs 24 pounds.

Probably the most outstanding feature of the Loudenboomer is its rotating coaxial r.f. joint, which permits continuous rotation of the antenna in either direction, without fear that the feed line will wind up around the tower. The close-up shot shows how the fitting is put together. At the top of the photograph (in the bottom of the casting) is the rotating portion of the joint assembly. The center terminal terminates as a phosphor bronze "loop" spring, which makes a pressure contact with the fixed part of the assembly on the lid plate. The plate has been removed and hinged back in this photograph.

The stationary fitting on the lid is an SO-239 coaxial connector with a small cap attached to its center-conductor terminal. The outer conductor or shield side of the joint, which is attached to the lid plate, consists of several spring fingers shaped roughly like a cup. When the lid is in place, the fingers fit over the outer aluminum ring which is part of the rotating joint. The joint maintains the 50-ohm impedance of the system and doesn't put an appreciable impedance "bump" in the line even at 50 Mc.

Just below the rotating joint in the photograph is a rheostat used in the direction-indicator circuit. It is also capable of continuous rotation. The direction indicator and control box measures 5 inches long, 6 inches deep and $4\frac{1}{4}$ inches high. It houses the power switch, power-on indicator lamp, control switch for clockwise or counter-clockwise rotation, and the indicating meter. The meter is calibrated in both degrees and points of the compass, with north at both ends of the scale. When the rotator reaches north at one end of the scale and the antenna continues to rotate, the indicator pointer swings to the other end of the scale and maintains correct antenna-heading indication.

Seven leads are necessary for remote operation of the rotator, three for the motor control and four for the direction indicator. These leads pass through the rotator housing through weather-tight connections. — E. L. C. QST



Close-up view of the rotating r.f. joint (top) and indicator rheostat. Connections to the rotator motor and indicator circuits are made to the seven-connection terminal strip.

The plate at the top is the lid cover which has been removed for the photograph.



Correspondence From Members -

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

LESS TECHNICAL

Most of your articles are very technical but I realize that most hams are very proficient in radio theory and would indeed be bored with articles of an elementary nature. No doubt there are others like myself who have little knowledge of theory but nevertheless have the desire to construct something which would be useful to our operations. So we continue to look forward to an occasional article of this nature. Two articles in the June issue entitled "Construction Techniques" and "Screws-Nuts-and Things" are very helpful to those of us who have to start from scratch.

Even though most of the articles are for the "experts," yet I look forward to *QST* every month. It is the only magazine in which I read the ads — amidst much drooling and dreaming — from cover to cover. — *Paul W. Sturm, K4ILP, Golden Pond, Kentucky.*

WHICH DATE?

Following your successful campaign for the adoption of GMT you might like to consider the problem of dates. For example, the date 2/5/61 means, to me, the second day of the fifth month; but to you and many others, the second month and the fifth day thereof. Judging by QSLs received, half the world uses one system, half the other. So how about spelling the month, or using Roman numerals, or what? — *Alan K. Head, VK3AKZ, Victoria, Australia.*

UPDATING?

Enclosed is a check for ARRL membership for another year. A few days ago I received my General Class license, superseding my year-old Technician Class license.

It may be of some interest to you that I am contemplating putting up a rotatable beam and sticking with 6 meters; the lower bands are a madhouse. I do have a transmitter that covers the lower frequencies — but six seems more in the spirit of what ARRL in *QST* keeps referring to as "The Good Old Days." At least, on six no one ever (well, hardly ever) zero beats your frequency to call CQ at a 1000-watt reference level. Besides, I haven't figured out a good lower frequency antenna setup yet. I might eventually dabble a bit in 10 meters.

In any event, I positively will not use c.w. I only learned code in order to meet antiquated licensing requirements. But I will admit that just yesterday I picked up a beautiful war-surplus key — in case I ever change my mind.

My file of *QST* is nearly complete back to 1945, and I am looking forward to receiving a good many issues in the future. I would like to see less emphasis on construction articles and more on reviewing, repairing, updating, and improving commercial equipment. I think *QST* has been falling behind the times in this respect — or else fighting a gallant rearguard delaying action.

Also, *QST* tends to be on the "stuffy" side. Perhaps a new editorial slant could be undertaken. In particular, I would like to see *QST* print more correspondence from members. Some of the opinionated letters sent in are as unintentionally humorous as anything heard over 80 meters. — *Jay Kay Klein, W4ZLLI, Syracuse, New York.* [What opinionated letters? — Ed.]

"ALLO SAY COO"

I am a junior in high school. I have taken two years of Spanish, and it is amazing the number of comments I receive on the air and in many fine letters, praising me for having learned a little of their language. Many times I work Latin American operators who tell me that I am their first Ohio contact, even though they have been on the air for years. My QSL cards are printed in Spanish, and are a nationalistic red, white, and blue.

Most U. S. amateur radio operators take for granted the

fact that almost all foreign operators speak the English language, even if somewhat limited. We also take for granted the fact that all QSL cards received from foreign countries are printed in our English language. I am sure (and this has been confirmed in many letters which I have received) that my Latin contacts are very thrilled to display in their shacks and show to their friends a colorful QSL card printed in their own language. . . .

There are a few stations around the country who have a monopoly on the lower portions of twenty meters, and those few render it useless to everyone else. Almost always they are working a good friend who is just a few states away and who could easily be worked with much less power, on up the band, or on a lower frequency band, so that stations calling DX could use that precious lower segment.

My proposal is that all U. S. amateur radio operators who can speak a foreign language be allowed to operate in the twenty-, fifteen-, and ten-meter foreign phone band segments, (perhaps with power input restrictions) . . . *Doug Lutz, K8HFJ, Ashland, Ohio.*

QRP CLUB?

I have just been the flattered (but puzzled) recipient of a circular from the Malaysian Radio Transmitter's Society regarding certain recommendations their society has made to the IARU concerning power limitations on the 10-, 15- and 20-meter bands to 250 watts final input, and for a separate c.w. segment on the lower ends of these bands with 200 kc. for 10, 150 kc. for 15 and 100 kc. for 20.

The circular further states it has been sent to member societies of the IARU and "to a limited number of the DX fraternity." The former I certainly am not and the latter hardly fits me, with my little old nine countries! But I am pleased and honored they wrote me and possibly can attribute it to past letters I've written concerning reduction of power and/or division of the amateur spectrum to substantially reduce the QRM.

I admire those with a kw. final, but I don't need nor want one. It should be readily apparent to all of us that now is the time to cease interfering with one another through high power and also to cease alienating our fellow hams in other countries (limited to a lot less power) through our "brute force" tactics. Ham radio has something for each of us — DX'ing, rag chews; a.m., s.s.b.; contests, traffic — each unto his own choice and may we all enjoy it. . . .

Anyone interested in joining up with me building up a QRP Communications Club, to prove the point? — *Harry F. Blomquist, K6JSS, Saratoga, Calif.*

SECTION 501

Readers of *QST* will notice in most issues the suspension of amateur licenses for violation of FCC rules. For instance, violations included operating a transmitter at more than the legal input, using obscene or profane language, or using unauthorized call signs.

These suspensions are to serve as a warning to violators of the rules. Obviously, these amateurs are not concerned at all with the possibility of losing their licenses. As a matter of fact, their punishment at the most will be loss of license, or possibly a brief suspension. However, the Communications Act states that there may be severe penalties, a fine of not more than \$10,000 or imprisonment for a term of not more than two years for violations of the Act. This should be known by all amateurs, since even the Novice examination has a question on this provision of the Act.

If the FCC were to begin handing out fines and prison terms along with the revocation of licenses to violators, this habit of illegal operation would come to a very abrupt halt. You may say that this sounds harsh, but I feel certain, should this be done, that it would deter these illegal practices very quickly.

(Continued on page 140)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, WIDGL, Ass't. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWPO, DXCC Awards
LILLIAN M. SALTER, WIZJE, Administrative Aide
ELLEN WHITE, WIYYM, Ass't. Comm. Mgr., Phone

Let's Use the National Calling & Emergency Freqs. *QST* each month lists ARRLs designated frequencies for *calling* and emergency use. The purpose is to facilitate general calling use whether states, cities, traffic or contacts are concerned; the plan creates spots in each band where any emergency calls can quickly be spotted. These frequencies deserve wider daily use. In the emergency department, stations set up at Red Cross and other Hq. monitor these NCEFs usefully. The more amateurs who use the NCEFs properly, the more useful they will become. In general the frequencies are well within phone and c.w. band sectors; this is so that all operators tuning up and down the bands will cross the channels and *hear the calls*. These National Calling and Emergency Frequencies we are talking about:

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

HOW TO USE THE NCEFS

1. Whenever you are in your station and *not* actually working someone or listening on some other frequency, keep your receiver constantly adjusted to the C and E frequency in the band and mode to which your transmitter is adjusted.
2. If you hear anyone calling your area, warm up the transmitter and make the contact.
3. As soon as communication is established, shift to any frequency *other than* a C and E frequency to carry on with the QSO. (This leaves the NCE frequency clear for other stations.)

When *you* want to contact someone in a certain city or area, get on a C and E frequency and give short calls . . . three times three suggested. Break frequently. If it seems there are no replies, wait a few minutes between your calls. Different C and E frequencies may be tried. Preferably use the one that seems best for skip, or propagation and distance factors. As more and more amateurs tune receivers to these frequencies, it should never take much longer to make a contact than for the man at the other end to tune up.

To traffic dedicated operators: This presents a way to monitor and pick up messages. Even if you are not the destination point, you can still deliver in your state through the Section Net or offer to relay (QSP) via the National Traffic System. For non-traffic men: This plan is good for finding states for WAS. This is another way to start a message and place it at destination or

in reliable hands. (Use directional CQs on the NCEFs). This is a *system*, not just casual "looking over the band." In short it is a way for all amateurs to use the monitoring by ardent, experienced traffic hounds, and stations designated by RMs and PAMs to collect traffic that may be bound for their areas.

Pacific Area Net News rates much credit for progress already made, promoting the C and E frequencies in the western areas. All credit to W7OF, W3CVE, and others now using and furthering the idea. We discussed views for betterment in July and Nov. '60 *QST*, but most liked the NCEF plan just-as-it-is. Vic, W7FIX now expounds some further thoughts, so let us quote May '61 *PANN* and then ask for *your* ideas and reactions:

"Will the idea work in our amateur bands? Bet your life it will. More extended use depends only on enough of the gang tuning the frequency and leaving receivers on the NCEFs, operating in accordance with the numbered points. Perhaps too, we ought to set aside a C and E plan week? This would get all hands 'hep' to the idea and give the scheme a good test. Once so demonstrated, it will become apparent to many more amateurs that the NCEF plan is the ideal mechanism to make contacts with *any* locality at *any* time.

"The C and E system will do it better and faster than any casual methods. Net Managers in the Pacific Area for a start are asked to advise net members to guard the C and E frequency when not actually in a QSO. Whenever one wants to contact someone at a time that the net is *not* in session, use the proper C and E frequency for a short call."

One moves *off* the NCEF channel to handle traffic or extend a QSO for RCC or WAS or traffic, of course. W7FIX suggests a special NCEF week. We wonder if a fall contest of some simple character *could* be put together. For about 15 days the starting or relaying of a message . . . MOVING IT AFTER CALLS STRICTLY ON THE C AND E FREQUENCIES COULD BE REPORTED TO ARRL

DXCC NOTES

Announcement is hereby made of two additions to the ARRL Countries List. These additions are DAMAO and DIU. Both Damao and Diu are pieces of Portuguese territory situated on the west coast of India. Each of these will be considered as separate from each other and from the present listing of Goa by virtue of Point 3 of the criteria (see page 80, April 1960 *QST*, DXCC Notes).

DXCC credit claims may be made for these additions starting October 1, 1961. Confirmations for contacts with either Damao or Diu must be dated November 1, 1945, or later. DXCC credit claims for either of these additions received before October 1, 1961, will be returned without credit.

HELP KEEP TOP 15 KC. OF 20 METERS FREE FOR SSB DX

(DIRECT POSTCARD REPORT) WITH A POINT FOR EACH SUCCESS IN RAISING A STATION AND PASSING ONE OR MORE MESSAGES IN THE DESIGNATED DAYS. THE TOTALLED POINTS WOULD BE PUT IN QST OR A BULLETIN FOR CREDIT. ARRL RMs and PAMs will start overhauling and expanding net operations about the first week in September. How do you readers like the idea of a try out and contest of this nature — the purpose, 15-days or for a month or two, to

give the plan a real whirl, and get the C and E frequencies ever more widely used, so it may be a permanently useful feature of amateur work.

To be habit forming, such activity obviously cannot be for a single day or even a single week-end. Would you like reports to cover a two week, or two month or other period? September-October? Can you top the booster plan? With what ideas can we expand the appreciation of all amateurs, and their individual wide practical use, of such a potentially wonderful tool?

DX CENTURY CLUB AWARDS

HONOR ROLL

W3GHD.....311	W6CUQ.....307	W8BKP.....304
W4DQH.....311	W3KT.....307	W8BF.....304
WY2CK.....311	W9YFV.....307	W6ENV.....303
W3JNN.....311	LU6DJX.....306	W4TM.....303
W8JIN.....310	CE3AG.....306	W9HUZ.....303
W6AM.....309	W7GUW.....305	W1CLX.....302
W2AGW.....309	W5ASG.....305	W1BIE.....302
K4AA.....309	W7GBW.....305	4X4DK.....302
W1GKK.....308	W5ADZ.....305	W2HMJ.....302
W8MDM.....308	W6EBG.....305	W1JYH.....302
W9RBI.....308	W8UAS.....305	W0ELA.....302
W2HUQ.....308	W1ALE.....304	W3BES.....302
W8BRA.....308		W9LNM.....302

Radiotelephone

W3GHD.....311	VQ4FRR.....299	W6AM.....295
W8GZ.....304	W8KML.....299	ZS6BW.....294
W3JNN.....303	4X4DE.....299	W9JHN.....294
W8BF.....303	CX2CO.....299	W1OUP.....293
W9RBI.....301	W6YY.....296	W4DQH.....293
		ZL1HY.....290

From May 1. to June 1, 1961 DXCC Certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

P21AX.....203	DL4ME.....105	W1AIO.....100
LA8LF.....177	SM2BQE.....105	W2LJF.....100
K4JYQ.....149	KW6DF.....104	K3CHP.....100
W1CV.....136	OK1BI.....104	K4VNY.....100
OK3UI.....134	K4VCR.....103	W5EZE.....100
DM2AEJ.....123	DL7DX.....103	K5PZJ.....100
OK3EE.....123	J1BWA.....103	W6WQX.....100
OZ6RL.....119	OK2OV.....103	K6TQJ.....100
PY5FO.....116	K4SUJ.....102	K7BJE.....100
W4JQM.....113	W8KSR.....102	K8AUL.....100
W7FC.....112	K9UI.....102	K9GLJ.....100
DR8WP.....112	DJ3XO.....102	W9YMZ.....100
H4SKAG.....111	W2NCG.....101	W0JN.....100
OK3KFE.....111	W4ZLB.....101	K9RNZ.....100
W7DF.....110	K8NXD.....101	G13NKQ.....100
DJ5VQ.....108	W9PXW.....101	K6PGC.....100
UA4KHA.....108	IA8AT.....101	SM5AIO.....100
W1AMT.....107	OK1NIS.....101	SM5AIO.....100
W7MH.....105	UP5FJ.....101	Y06AW.....100

Radiotelephone

W8DUT.....150	VE3CJO.....107	W4LJV.....100
LA8LF.....143	W8RLP.....104	K4QWM.....100
K3IIN.....128	KR6LP.....104	W6NAT.....100
W6WNN.....128	FQ8AE.....103	W7AQB.....100
HK3QV.....116	K1JNE.....102	K9IHT.....100
HTFC.....111	W9GAL.....102	W9KFX.....100
K1JMV.....109	W4ENQ.....101	XFLUV.....100
	W4FBZ.....100	

ENDORSEMENTS

W8QVZ.....301	W1ZZK.....273	W9ICO.....250
W3LMA.....300	W2CYS.....272	W5DA.....250
W6GPB.....300	W8IRN.....272	IT1TAI.....248
W8KIA.....300	ON4DM.....272	W9UIG.....246
CX2CO.....300	W1IAS.....271	W6UQQ.....243
W2TQC.....297	W2NUT.....271	K9EQO.....242
W7ENW.....297	W8OT.....271	W9BTD.....241
W3JTC.....296	W3CE.....271	VE3JZ.....241
W8EWS.....295	K6CQM.....271	W1TS.....240
W2LV.....292	W8VBQ.....271	W0AJU.....240
W5ABY.....292	W2SSC.....270	D13RK.....240
W8MFW.....292	W4OM.....270	SM5WI.....240
W9YSX.....291	W9FGI.....270	KZ5WZ.....237
W1ZW.....290	G8RH.....270	W1ACB.....234
K6FNX.....290	HAOF.....270	SM5CCE.....233
OE1ER.....290	W6SIA.....262	W1JNV.....232
W4AIT.....285	W2FBS.....260	W3BQA.....232
W8KPL.....285	W6ID.....260	W3AYS.....231
W4AAU.....281	W8UOV.....260	W3SOH.....231
W2SUC.....280	ON4NC.....258	SM5CO.....231
W2VUE.....280	W9QNO.....256	W5PSB.....230
W8UPN.....280	W9GFF.....252	G3EYN.....230
G3AAE.....275	W1BGA.....250	I1XK.....230
G5VT.....275	W1GYE.....250	W0MCK.....228

K6EDE.....225	K4LEX.....180	ZL2PM.....150
ZL4BO.....223	W5CK.....180	W6ERS.....148
DLIIN.....222	W9AUB.....180	W42CCC.....144
W4LRN.....221	W1UMC.....179	K9DJN.....141
DJ2AF.....221	W8DWP.....176	W9IVG.....141
W3GRS.....220	LA3SG.....176	W2BTG.....140
W1PSL.....219	G4HFN.....175	W3QJW.....140
W5QK.....219	W1AZW.....172	W6MDK.....140
W7CMO.....215	K1MLI.....172	W7JWE.....140
W3LPE.....212	CR7FC.....172	W9BZW.....140
W8LY.....212	SM3AZI.....172	W7YXO.....140
OK1KTI.....212	G3JLB.....171	VE7ANR.....133
VE2BV.....211	W4MSI.....170	W6EAM.....131
DJ2JL.....211	W7UJL.....170	K3OEH.....131
HB9NU.....211	W8KMD.....170	ZC4AK.....131
K9IYW.....210	W42DG.....169	K8MTI.....128
VE7CE.....208	W1ICV.....168	W1AZU.....127
ZL3IS.....208	M14BBE.....166	DL1XS.....127
W9RH.....207	W81QS.....164	G3KAY.....125
W1ORV.....206	W2IGH.....162	K4BYD.....122
W9IHN.....206	W8ARA.....162	W4HUE.....122
W1OUP.....203	K7GCM.....162	K8VDW.....121
W8GB.....203	W1UQP.....160	F9BB.....121
W9KMN.....203	W3CLP.....160	K1GUD.....120
W0SMV.....203	K4FLA.....160	W1ONP.....120
K4RJN.....202	W9YZB.....160	W2MES.....120
K2ZKJ.....200	F9JFC.....159	K2UHC.....120
VE2AA.....201	K9GFK.....159	K2ZVR.....120
W2PDB.....200	W7LYR.....153	W46EXR.....120
W4JLJ.....200	K8ONV.....153	K9LEQ.....120
W5RX.....200	LA1K.....153	VE4OX.....120
K6GLC.....200	W4GF.....152	F8DP.....120
K6SJJ.....199	W0JMB.....152	SM5DS.....120
I1CHJ.....199	I1CHJ.....152	W3DIS.....118
W9MZF.....199	I1ZQ.....152	VK9NT.....118
W2RGV.....196	VP7NS.....152	W3TMZ.....116
W2CDD.....192	W6YC.....151	W4USM.....114
K4ASU.....191	K0WQI.....151	K8QJH.....112
K9PTX.....191	Z8ICR.....151	W1ORG.....111
Z8BEU.....191	Q05IG.....151	W3JJA.....111
W7CWE.....190	W1HO.....150	W7CNL.....111
SM5KV.....190	W4AYM.....150	K3DCP.....110
W6LV.....184	W3CDG.....150	W4AHY.....110
HB9QO.....182	W4BHG.....150	K4HMN.....110
W1IKB.....181	G8ON.....150	W8CUT.....110
IS1FIC.....181		G3LGL.....110

Radiotelephone

W8BKP.....281	ZL4BO.....185	VE1WL.....151
W9YSX.....280	W6EAK.....184	W1ZSU.....150
G2PL.....268	W1ORV.....184	W3XG.....150
G5VT.....268	K8RTW.....181	W3QD.....150
ON4DM.....267	W2VCZ.....180	W9PGI.....150
I1AOF.....262	W1UMC.....179	W5DA.....148
W3KT.....260	W42IS.....175	W6SIA.....147
W1PST.....242	W2QNO.....175	W5CE.....146
W9QZ.....242	W1ZW.....173	D13RK.....143
W1OOS.....233	K9KVE.....173	VE3BK.....141
W9LMN.....233	W2RNV.....171	W4UWL.....140
W5HJA.....231	W2CVZ.....170	K9EMG.....140
W1BAN.....222	W1ICV.....168	I1CHJ.....137
HB9NU.....211	K1IXG.....162	K9LUI.....133
G3AAE.....209	W3VSV.....161	W9DOR.....131
W1OUP.....203	PJ2AF.....160	W9CYL.....130
P21AX.....202	SM3AZI.....160	DJ3CN.....130
W8IUA.....201	IE18N.....160	I1ZLW.....129
K6LGF.....200	W4MS.....153	W1WTF.....122
I1RIF.....197	F8SE.....153	F2MO.....121
DLIIN.....193	W0MCK.....152	W2DSB.....113
W5TU.....191	W4SW.....151	W9MRJ.....111
G6RH.....187	W7LYR.....151	CE3JE.....110

U.S.-Canada Call Area and Continental Leaders

KH6CD.....261	VE3DIF.....260	ZS6BW.....294
KL7P.....261	VE4XO.....200	G3AAM.....300
VE1PQ.....256	VE5RU.....220	G4CP.....300
VO1DN.....251	VE6NX.....256	ZL2GX.....300
VE2WW.....285	VE7ZA.....300	W9MRJ.....111
	VE8AW.....195	CE3JE.....110

Radiotelephone

W1FH.....289	W0AIW.....283	VE4RF.....102
W2BXA.....283	VE1PQ.....161	VE5RU.....203
W5BGP.....265	VO1DN.....141	VE6TF.....181
KH6OR.....261	VE2WW.....231	VE7ZM.....279
KL7AFR.....190	VE3QA.....241	I1AMU.....274

If you want none of it, and if that is a majority sentiment, we promise that's what we'll so advise. On the contrary, if a period try-out needs a contest angle, suggest how you would like to see it set up, please. We would like to hear from you promptly, since besides reporting in *QST*, we should like to treat the subject in a fall bulletin to all LOs (League Officials) so as to get the full support of amateur officialdom and networks. Let's hear what you would like, but don't wait for fall. **START MONITORING AND CALLING-VIA-THE-NCEF'S RIGHT AWAY IN ALL YOUR FAVORITE BANDS; "WAS" WORKERS, HERE IS YOUR OPPORTUNITY TO CALL AND DO LOTS OF LISTENING, AND KNOCK OFF SOME HARD-TO-GET ONES. HOW ABOUT THAT?**

Some Pointers for Improving Phone Traffic Handling. *Pacific Area Net News* provides us with another item dedicated to the voice operator who wants to adopt methods of handling traffic efficiently, without any wasted time, but with full accuracy. The following comment is excerpted from May '61 *News* and speaks for itself.

"Phone operation should more often receive the credit it deserves, when it is proving on our nets its value as a traffic handling medium. As a phone operator of some years traffic standings I would like to point out some things which I and some of my fellow phone traffic handlers have been doing that are unnecessary in serious traffic handling.

"Some operating expressions may seem humorous but ridicule is not intended in giving them as examples. It is hoped discussion will emphasize the value of other methods for improved accuracy and speed. First there is the simile approach, which parallels or includes some of the following expressions: Tom, like the cat. West, like Mae. Richmond, like Grant took. Park, like a public place with trees and stuff. Boulder, like a large rock. Beach, like a place where you go to take a swim. Crescent, like a wrench. I am quite sure that on serious examinations lots of us will be quick to agree that the above words would have been better spelled out.

"Then too many of us use the phrase 'common spelling'; The common spelling of a word to one person can be uncommon spelling to another. 'John' happens to be a given name. There are others whose names are pronounced the same as mine, but spelled J-o-n or J-a-n. Some of us unnecessarily say 'common spelling' and then proceed to spell out

a word with the regular alphabet or phonetically. 'When some of us feel we have been sending faster than the receiving operator can copy, we go back and repeat a part of the subject matter forgetting to say 'I repeat.' Quite often the slow copier is lost completely and the fast copier has written some of the subject matter in duplication! In either case the confusion which exists could have been avoided by 'I repeat.' Sometimes it almost seems each one of us has his own set of phonetics. (I am waiting to hear N, as in pneumonia!) In the interest of standardization and accuracy I feel we should utilize an appropriate list. In addition to the military service list, there are several sets of standard recommended phonetic alphabets for our use." . . . John, K6OZJ.

—F.E.H.



Letter from one of our avid fans says, "All this hifalutin' philosophy you give us in the AREC page is just dandy, but tell me this: suppose a ham wants to get into AREC and RACES, just how does he go about it?"

If this is an implied rebuke, it is probably well deserved. Often we become so tangled up in the complexities of administering a volunteer organization such as AREC that we tend to neglect the basics. Nearly every day the fact that it isn't always easy to join the AREC comes forcefully 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 supposing the EC doesn't act like a living being, what then? We get so many questions of this nature that we thought we'd try to answer some of them here, maybe save ourselves some correspondence.

Let's assume you're a young amateur who decides he's had enough rag chewing, DXing and general fiddling around and decides he wants to do something useful for a change. "Join the AREC!" says the literature you get with your ARRL membership, and enclosed you find AREC forms and a letter from Johnny Huntoon telling you about this and all the other advantages of being a ham and belonging to ARRL. 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 form in fullest detail.

Hmm, it says to 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, like it says. Funny, you never noticed that page before. Okay, you mail the registration form to your SCM, then sit back and wait for things to happen.

Up to this point, your experience is fairly typical. From here on out, however, the variables are tremendous. Of course if you knew who your EC was to begin with, it would simplify matters; you could put the bee on him directly. Otherwise, if you're lucky, your SCM will forward your registration to your SEC, who will forward it to your EC, who will issue your membership card and send you complete dope about the local setup and invite you to the next drill. That's a lot of forwarding, but it's the way we do it at present. Years ago, we used to print a list of ECs in *QST*, but now there are over 1600 of them and there just isn't room, because we have to make space for hogwash like this.

Anyway, suppose nothing happens? If you're persistent, 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 a new EC. Get together with others like yourself, or with your club, and send the SCM or SEC a recommendation; or, if you'd prefer, volunteer for the job yourself (you have to be a League member and a full-privileged amateur — that is, conditional class or higher).

If there is no EC in your town, county or other local jurisdiction, your SEC is supposed to issue your AREC membership card, send you a copy of the Emergency Man-



The communications for Alhambra's (Calif.) 16th annual Hi Neighbor parade on May 27 were handled by members of the Ramona Radio Club, Inc., and the local AREC. Members of the crew, left to right standing: WV6PBC, K6TVC, W6ORG, WA6HBY; kneeling, K6SUJ, K6ZSL, WA6GVJ.

ual and keep your registration forms on file until an EC can be appointed — after which he forwards them to him.

Once in a while you run into a case where you cannot get action from anyone — your EC, SEC, SCM or headquarters. We don't blame you for being irked, after all the propaganda urging you to join the AREC; but basically, AREC organization is a local function. The local EC is the key man; if you don't have one, your hands are pretty much tied. *Someone* has to take the lead. If that someone cannot be you, this may be understandable, but you have no right to assume that anyone else's personal affairs are any less important than yours; you have no right to criticize the leadership that does exist or the fact that none exists.

Despite what statistics to be released later will show, the fortunes of the AREC are on the upswing. We may have fewer ECs and fewer AREC members, but those we have are better, more active, more *alive*. The fervor for public service is on the increase. Inactive AREC officials are receiving less tolerance from apathetic amateurs and often are being booted out of appointment. So if you are one of those amateurs who has been unable to join the AREC because there is no one to accept your registration, don't despair. The fact that you are interested shows that the fever is spreading and will soon affect others in your area, and soon you *will* have an AREC unit in your own town. — *WINJ.M.*

The San Diego AREC Ten Meter Group conducted a fund collecting operation for the local March of Dimes committee on Feb. 21. Using the club call, W6VMS, under the direction of EC K6HQJ at Red Cross headquarters, amateurs were dispatched to various sections of the city and by midnight had delivered over seventy thousand dollars to the committee. All this occurred *after* the regular transmitter hunt that is conducted on Tuesday nights. — *W6LYF, SEC San Diego.*

On Feb. 19, under the direction of EC W7DQW, as asst. EC, the SCM, SEC and two other amateurs, the Salt Lake Lake County AREC provided communications for the Inter-mountain Ski Assn. Jr. Giant Slalom at Alta, Utah. Communications were provided from the finish line to the scoreboard at the Lift House, and to the Lodge, on 145.5 Mc., to relay scores to these two places. The event was quite successful. — *K7BLR, SEC Utah.*

On Feb. 19, under the direction of EC W7DQW, an asst. requested by the Huntsville C.D. Director to assist with communications in their project "Fall-Out Shelter." The amateurs set up a base station at the site and dispatched mobile units to pick up material and supplies. Seven amateurs took part. — *K4RSB, EC Madison County, Ala.*

Amateur communications between the starting point and finish line of the annual races of the Ventura Yachting Assn. near Ajai, Calif., on Mar. 12, were provided by K6s HIT OQK RIE and WA6NVA, and a p.a. system, also set up by the amateurs, passed latest news to the 3000 spectators around Lake Casitas. The chief ranger spoke highly of the "professional-like service" given by hams.

The Arlington (Mass.) AREC went out on its third annual cancer fund drive on Apr. 25. Seven mobiles, each with a collector, were assigned mapped-out areas to cover the town on a dispatching system initiated by phone calls from daytime collectors. K1GCU acted as net control of the group. In addition to performing a public service, this activity provided operator training, equipment check-out and field control orientation. — *WIENS.*

On March 28, flooding in Lynn County, Iowa, brought amateur radio communications to the fore. One group of amateurs set up equipment at strategic spots while another recruited volunteers for operating. Operation commenced! on Mar. 29 on six and ten meters at Red Cross Headquarters, the Fire Dept., the Street Dept., the mayor's office and several schools. Nine units operated on a three-shift basis from 1400 GMT Mar. 29 to 1600 GMT April 1. All equipment functioned well and much valuable communication was handled by the group of nearly 90 amateurs. EC W9GQ lists the following as definite participants: K0s ARV BEC BPQ BZP CIG COM CTD CYM DLK DNI DRU HDK HGB HRX HTH HTP JIY JRM JCQ KGV KON LSE LTH LKN LYP LPK OUU PIY PPJ PSC QCI QKR RQN RQR SGC SLE TRU UOA UVU VAM VBG VMX

WMJ WMN YEZ YFC YLN YPQ ZPZ ZUU ZOL, W0s ADG APA AGI BSG BWX DAN DNK DXN ELK GDJ GM GQ GRR GXJ HDH HDX IUY KCL KRJ KRU LBK MIE MNA NIP N J QCB QLU RRR RTJ SDI SYF SCM TFN TUL WAE WKW YEY YZD ZAM. — *W0GQ, EC Linn County, Iowa.*

On April 23, the town of Phillipsburg, Mont., was isolated by heavy, wet snow that tore down power and communications lines. W7PMC received a call from the power company requesting assistance in contacting Butte. An emergency call brought response from VE6AN and W7NPS, and the latter notified the power company at Harlowton who relayed the message to Butte. He also notified the telephone company that Phillipsburg was cut off. Later, W7QJY relayed traffic direct to the power company in Butte, W7OIO in Butte and K7KLF in Helena were also on the job. Amateurs on 3910 kc, cooperated by staying off the air. Power was restored later in the afternoon of April 27. — *W7PMC.*

On April 23 a line of tornadoes swept across northern Linn County, Iowa, knocking out electric power and telephone service over a wide area. First word of the emergency situation came from W0QWI/mobile, operating near Center Point, requesting generators. Amateurs assisted with communications and transportation until well after dark over a wide area. Those involved were K0s CIG CTD DLK IZQ LYP TRU VBG, W0s ASU JYTB GQ KCL. The following morning, EC W0GQ was called by the telephone company with a request for communications assistance until telephone service could be restored. By 1630Z several mobiles were on their way, operating through a fixed station to telephone hq. Participating were K0s DLK BEC SGY, W0s LBK QLU YZD. — *W0GQ, EC Linn County, Iowa.*

On May 14 (0041Z, May 15) a tornado struck Douglas, Ill., completely cutting off power and communications. As soon as word was received, K9SOO tried to activate the net but received no response. At 0143Z, contact was made with K9BEI/9, and then net members started to report in. Within 30 minutes, five mobiles with three auxiliary power units were ready to go. Three went to Ellisville, one to Douglas and one stayed on stand by at Galesburg. Members participating on the night of the disaster included K0s BWU BEI SOO BHF MEI YGB, W9AYX. The next day (Mar. 16), at 0030Z, K0s BEI MVF and MEI set up a portable six meter rig at Red Cross disaster headquarters and handled traffic with W9YEV in Galesburg. The station was reactivated at 1300Z by K0s BEI and MEF on both 6 and 75 meters and traffic was handled for the Red Cross to Galesburg through K9MEI, to Peoria through W9MXD, to Canton through W9DRV and to Moline through W9BBF. Excellent cooperation was received from all agencies. Telephone service was reestablished at 2030Z and the station was closed. — *K9MVF, EC Knox County, Ill.*

The Orange County, Texas, Emergency Net was just getting under way on May 21 when W5NMV reported that communications were needed to assist the sheriff in finding the body of a boy drowned in a bayou near Highway 10. NCS W5CIM sent mobiles K5SUB and W5QLE to the scene, later joined by K5BJB. The body was recovered about dark. W5RCG and K5BJB continued to conduct necessary communications until after the inquest and everyone had left. — *K5BJB, EC Orange County, Texas.*

Local amateurs took part in rescue work in connection with a B-52 bomber crash about ten miles south of Lexington, N.C., on Mar. 29. Within half an hour there were seven six-meter mobiles and the Thomasville communications bus on the scene, and traffic was handled for the Air Force and newsmen all through the night, despite a cold rain that hampered rescue operations. Contact was maintained on 50,380 kc. to K4CVJ in Thomasville, telephoned to Seymour Johnson AFB. — *K4HGK.*

Twenty-nine SEC reports were received for April, representing 11,239 AREC members. This is an all time high for April in both respects. One new section, Ontario, makes its first appearance in 1961, bringing our total sections heard from to 40 this year. Other sections heard from in April: E. Bay, Ga., Santa Barbara, N. Texas, S. Dak., Colo., E. Mass., Maine, Ohio, Mich., Ind., NYC-LI, Sac. Valley, Minn., Iowa, Nevada, Md.-Del.-D.C., Utah, Ore., Va., E. Pa., N.N.J., S.C.V., Mar., Okla., W. Mass., Tenn., E. Fla.



Shown above are three mainstays of the Redwood City, Calif., AREC and RACES organizations. Left to right are K6TQN, RO, trustee for club station W6WWJ and assistant EC; K6MPN, chief of mobile operation for W6WWJ and assistant EC for publicity; and W6MZO, asst. supervisor of W6WWJ.

RACES News

Above, we have discussed how you get into the AREC. Now let's discuss how you get into RACES. Actually, in most places you will find the two working closely together, and when you are in one you are in the other, or dual membership is easily come by. Even if the two organizations are separate, the EC can usually at least give you information on who your RACES radio officer is.



The key man in RACES is the RACES radio officer. He is the one to see about signing up in RACES. If you don't know who he is, contact your local

civil defense office and inquire. If they don't know who he is, then chances are there is no RO and therefore no RACES.

RACES is not sponsored by ARRL, so don't complain to us if you don't like the local RACES setup. It is sponsored by the Office of Civil and Defense Mobilization (current name, as of this writing) through local c.d. A long time ago, in this column, we said that you cannot do anything as an amateur to establish RACES until you have first done something as a private citizen, along with a lot of other private citizens, to establish civil defense. This is still true, because there are still a lot of places without any c.d. organization whatsoever, although all 50 states now have state c.d. plans. But you can't just "sign up" in RACES; you have to have a RACES organization to sign up in.

Okay, let's assume you have RACES locally. The first thing you have to do is sign up in your local c.d. Then, in order to be a RACES operator, you have to have two things: an FCC operator's license (3rd class commercial or higher) and a certification from your c.d. director that you are signed up in c.d. as a radio (RACES) operator. That's really all there is to it as far as operating is concerned — except that of course you have to observe whatever operating restrictions your class of license, amateur or commercial, imposes. FCC issues no RACES operator licenses, as such.

As a matter of fact, there is no RACES station license, as such, either. Amateur stations licensed to holders of conditional class licenses or higher can be authorized to operate in RACES through application on FCC Form #81, which must be signed by the RACES radio officer. The RO sends in the application, and the authorization is sent to him by FCC. Any subsequent operation of this station in RACES is under his jurisdiction.

— . . . —

Not so long ago we had a visitor — Vincent Kenney, W2BGO, New York State radio officer and grandpappy of the United States Civil Defense Amateur Radio Alliance (USCDARA). W2BGO has been in c.d. a long time, since 'way back in the WERS days of WWII. While here, he left us a copy of a 33-page booklet entitled *Radio Officer's Guide*, written by himself and published by the New York State Civil Defense Commission under copyright. Vince tells us that only a limited number of copies were printed, primarily for ROs in New York State, and that they are not available for national free distribution. However, at our request he sent us 25 copies, and we'll hand these out to ROs who can use them as long as the supply lasts — which won't be long unless you take it easy on us.

We also recommend for good RACES reading the Standard Operating Procedure booklet of the USCDARA and OCDM's Advisory Bulletin #122. You are supposed to be able to get these from your local or state c.d. office, but again we'll hand out our small supply as long as it lasts; just expect a little AREC propaganda to be included with it.

ELECTION NOTICE

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

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

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

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

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

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

Communications Manager, ARRL. [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the
. ARRL Section of the
Division, hereby nominate
as candidate for Section Communications Manager for this
Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
West Indies	Aug. 10, 1961	William Werner	Aug. 10, 1958
Kentucky	Aug. 10, 1961	Robert A. Thomason	Aug. 16, 1960
Wisconsin	Aug. 10, 1961	George Wolda	May 12, 1961
San Francisco	Aug. 10, 1961	Leonard R. Geraldi	Aug. 14, 1961
San Joaquin			
Valley	Aug. 10, 1961	Ralph Saroyan	Oct. 10, 1961
Rhode Island	Aug. 10, 1961	John E. Johnson	Oct. 12, 1961
East Bay	Aug. 10, 1961	B. W. Southwell	Oct. 14, 1961
Indiana	Aug. 10, 1961	Clifford M. Singer	Oct. 14, 1961
San Diego	Aug. 10, 1961	Don Stansifer	Oct. 15, 1961
Utah	Aug. 10, 1961	Thomas H. Miller	Oct. 28, 1961
Arkansas	Aug. 10, 1961	Daniel B. Patterson	Resigned
Maryland-Delaware-District of Columbia	Oct. 10, 1961	Thomas B. Hedges	Dec. 10, 1961
Manitoba	Oct. 10, 1961	M. S. Watson	Dec. 10, 1961

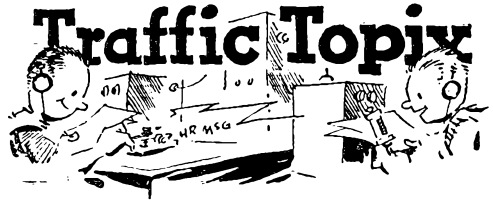
Saskatchewan	Oct. 10, 1961	H. R. Horn	Dec. 10, 1961
Mississippi	Oct. 10, 1961	Floyd C. Teetson	Dec. 10, 1961
Alabama	Oct. 10, 1961	William D. Dotherow	Dec. 14, 1961
Western Florida	Oct. 10, 1961	Frank M. Butler, jr.	Dec. 15, 1961
Illinois	Oct. 10, 1961	Edmond A. Metzger	Dec. 15, 1961

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections completing their election in accordance with regular League policy, each term of office starting on the date given.

Nebraska	Charles E. McNeel, WØEXP	June 10, 1961
South Dakota	J. W. Sikorski, WØRRN	July 3, 1961
Hawaii	John E. Montague, KH6DVG	July 14, 1961
New York City		
& Long Island	George V. Cooke, jr., W2OBU	July 31, 1961
Oklahoma	Adrian V. Rea, W5DRZ	Aug. 9, 1961

In the Iowa Section of the Midwest Division Mr. Dennis Burke, WØN'VB, and Mr. Loren G. Vanderzyl, KØJVO, were nominated. Mr. Burke received 297 votes and Mr. Vanderzyl received 154 votes. Mr. Burke's term of office began June 16, 1961.



It begins to look as though garbled traffic is here to stay. No matter how much yowling we do about it, a lot of traffic still comes through garbled. Since such traffic inevitably leads to a lot of "service" (SVC) messages, we'd like to talk a little, this month, about who should originate such a message.

Time after time we have been told by a station to whom we are *relaying* a message that for one reason or another the message is undeliverable and we should service the originator. This leaves us in a position of having to tell the originator that the message is undeliverable and have him ask, "How do you know? Did you try it?" When we are a couple thousand miles from the delivery point, this is a good question. The other way to phrase the service message is to say "So-and-so says it is undeliverable," implying your complete acceptance of so-and-so as an expert on the subject.

No, if a message you are receiving is undeliverable, copy it anyway, QSL it, then you service the originator. Don't try to stick the guy you are getting it from — he's not responsible either for its origination or its delivery, and he is not really qualified to originate service messages about it. The only one qualified to do that is the operator who actually tries to deliver it and fails. Don't refuse a message because you know you can't deliver it unless the originating station is the one sending it to you. Accept it, file it, and service the originator yourself.

Another question that often comes up is, what do you do when you know that a message is addressed wrong and are aware of what it *should* be? For example, the other day on TCC we received a message addressed to Brockway, Ga. Being an old Pennsylvanian, we knew of a Brockway, Pa., and were suspicious that someone may have dropped a dit, so we looked in our atlas and postal guide. Just as we had suspected, no Brockway, Ga., was listed in either place. Did we change it? We did *not*. Oh, the temptation was there all right, but for all we know there might have been a new post office set up in Georgia since our issue of the guide, or maybe there was such a place without a post office. We let it go through as we had received and confirmed it. Let some Georgia station worry about it — he

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for May Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	321	1808	1387	393	3909
WØLGG	338	845	796	55	2034
W6YDK	114	129	103	21	1367
WØJOZ	23	609	627	15	1274
WØLCX	30	620	520	100	1270
K6BPI	72	597	532	65	1266
VE2AZI/W1	32	615	605	4	1256
WØBDR	79	584	444	27	1134
K4AKY	45	328	483	44	1100
W7DZX	16	533	495	33	1067
K2UAT	225	413	376	35	1049
W8DAE	24	523	413	60	1020
W6GYE	339	283	242	6	870
W18MU	13	409	367	23	812
W3BML	20	383	372	9	784
W9DYG	41	377	310	26	754
W6EOT	15	352	303	18	688
WØBES	29	314	286	57	686
K6QWR	29	321	272	38	660
K5USE	55	291	290	1	637
W8UPH	9	313	271	42	635
K6KCB	38	298	255	31	622
W7BA	5	303	293	10	611
KØONK	135	242	217	13	607
K48JE	81	309	195	12	597
W4PL	11	299	258	23	591
K9OZM	15	287	190	99	591
W3WRE	40	279	251	20	590
W3VR	51	277	241	11	580
WA6LVX/6	48	264	235	14	561
K2UCY	105	219	200	19	543
W6WPF	35	239	229	10	513
K3IMP	12	258	230	10	510
W3TFS	11	151	345	3	510

Late Reports:

WA6LVX/6 (Apr.)	52	270	252	12	586
W0OHJ (Apr.)	4	286	281	5	576
K4VDU (Apr.)	107	226	89	136	558

More-Than-One-Operator Stations

Call	Orig.	Recd.	Rel.	Del.	Total
W6LAB	96	2405	2375	27	4906
K6MCA	70	639	623	9	1341
W4PFC	18	288	238	6	550

BPL for 100 or more originations-plus-deliveries

K8AAG	396	K7BKH	120	K3LFD	105
W2BW	209	KØLTI	114	W1ECF	104
K4UBR	207	VE3CWA	114	K3JYZ	104
K9RMI	192	W8BZX	111	Late Reports:	
WA6LPS	180	K8KMQ	111	KØHGI (Apr.)	172
K6GZ	166	WØFEO	111	W1ECV (Apr.)	105
KØHGI	163	K3KDP	107	WA6DBC (Apr.)	100
W2GKZ	158	KØVTG	107		
W4JSJ/4	156	W9IMN	106		

More-Than-One-Operator Stations

W2FXR	108	K6SUJ	100
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BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: K3GSU, K3JYZ, WA6ECF, WA6FCO/4, K9OZM.

The BPL is open to all amateurs in the United States, Canada, Cuba and U. S. Possessions who report to their SCM a message total of 500 or more or 100 or more originations plus deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt, in standard ARRL form.

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

- Aug. 3: CP Qualifying Run — W6OWP
- Aug. 22: CP Qualifying Run — W1AW
- Sept. 14: CP Qualifying Run — W6OWP
- Sept. 14: Frequency Measuring Test
- Sept. 16-17: V.H.F. QSO Party
- Sept. 20: CP Qualifying Run — W1AW
- Oct. 7-8: Simulated Emergency Test
- Oct. 11-15: CD Party (c.w.)
- Oct. 21-22: CD Party (phone)
- Nov. 11-13, 18-20: Sweepstakes Contest

OTHER ACTIVITIES

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

Aug. 26-27: Second All Asian DX Contest, Japan Amateur Radio League (p. 75, this issue).

Aug. 26-27: Second New Jersey QSO Party, Garden State ARA (p. 108, this issue).

Sept. 30-Oct. 1: VK/ZL Phone DX Contest (next month).

Oct. 7-8: VK/ZL C.W. DX Contest (next month).

probably knows more about what's in Georgia than we do. In other cases, it's hard to know what to do. Now supposing, being an old Pennsylvanian, we had recognized the name of the street in Brockway, in addition to ascertaining that there was no such town listed for Georgia. Then would we have changed it? Some will say, of course. Others will say definitely not. Frankly, we don't know what we'd have done; we're glad this didn't come up. If you do what seems logical, chances are the message will get there more quickly; but at the same time you are violating a basic rule of message handling — never change the content of a message. If you gamble and lose, you're a lid. If you win, nobody knows about it.

These are the little things in the traffic game that are like to drive you batty. — *WINJMM*.

Net Reports.

Net	Sessions	Check-ins	Traffic
Eastern Area Slow	31	99	18
Northeast Area Barnyard	27	778	12
Early Bird Transcon	31	—	163
Interstate SSB	—	944	246
20 M. Interstate SSB	22	539	1467

National Traffic System. Whew, it's hot! It's even too hot to write this column, so we'll pass along a few innocuous remarks and get along with the tabulation. We're getting our copy in on time this month, for a change, because we have places to go, so those of you who habitually submit your reports a day or two late are going to be left out in the cold. Hope it won't do too much damage to our statistics.

This is a vacation month. It's a lecture one for net managers because NCSs and liaison stations often have a habit of leaving the net high and dry without notification. We urge all such key operators to be sure to let the net manager know when they will be unable to perform their regular duties so the boss can scrounge around for a substitute. If this is not done and the net, upon convening, finds itself without a NCS, the customary procedure is to wait for three minutes, then someone QNG (take over as NCS). This should not follow a big discussion about who should do it. Any qualified station without too much traffic on the hook should step in and take over, so the net won't be wasting time. Also, under normal circumstances, this station should retain control whether or not the regular NCS finally shows up. It's wasteful of time and may be confusing to change NCSs in the middle of a net.

May net reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN	31	1361	.887	43.9	98.92
CAN	31	1245	.839	40.1	98.93
PAN	31	1326	.713	42.8	100.0
1RN	60	745	.389	12.4	69.5
2RN	62	420	.411	6.8	97.2
3RN	62	715	.403	11.5	100.0
4RN	60	629	.310	10.4	85.4
RN5	62	710	.344	11.4	79.9
RN7	62	642	.278	10.5	46.4
8RN	61	364	.201	6.0	74.3
9RN	61	707	.457	11.6	78.6
TEN	88	1196	.584	13.5	52.2
ECN	23	85	.171	3.7	75.4 ¹
TWN	31	409	.343	13.2	89.7 ¹
Sections ²	901	7056		7.7	
TCC Eastern 93 ³		658			
TCC Central 89 ³		1010			
TCC Pacific 111 ³		874			
Summary	1626	20152	EAN	10.8	PAN/3RN
Record	1951	21774	.909	22.1	100.0

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

² Section nets reported: Tenn. CW; SOCAL 6, SCN (Calif.); AENT, AENP Morn, AENP, AENO, AENB (Ala.); SCN (S.C.); NJQ, SDN (S. Dak.); S. Dak. 75; GBN (Ont.); BUN (Utah); MDDS (Md.-Del.-D.C.); QFN (Fla.); ILN (Ill.); VSN, VFN, VN (Va.); CN, CPN (Conn.); RISP (R.I.); NTX, NTTN (Texas); CCW (Colo.); PEN (Sask.); NJN (N.J.) QMIN (2 Mich. nets).

³ TCC functions reported, not counted as net sessions.

Although this part of the report is being written before the above data are totalled, it is easy to see that we are

not going to break any records this month. Traffic for May is far below last May and even below other Mays in the past. This is caused mainly by a falling off of section net reports. We don't have nearly the traffic activity we had a year ago. Are conditions that much poorer? We hardly think so, and wonder what is the reason for this sudden drop from a year ago. Please get your section net reports in by the fifteenth of the month, even if you have to send them direct to headquarters. SCM reports often do not reach us in time to meet our deadline; their deadline is nearly a week later than ours.

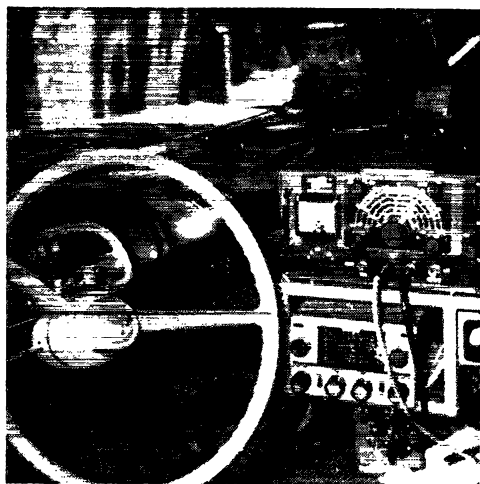
K9OZM has received his CAN certificate; W9DYG suggests we keep the QRN on the East Coast. K0EDK makes his final PAN report; WA6R0F (formerly K0CLS/6) took over as of June 1. The 1RN report shows a decrease in representation, but WIBVR says they are sticking to the NTS standard timetable regardless. W3UE reports that 3RN hit 100% representation again in May, E. Pa. logging over 600 consecutive sessions in 3RN. Region net certificates have been awarded to W4FOR, W4LK and K4ZYI; K4AVU hopes to turn 4RN over to W4SHJ at the end of June. K4YUD has received his RN5 certificate; W5GY says the boys handled a lot of Armed Forces Day traffic during QNF which was not added to the net total. W8DAE reports traffic, time, rate and average all show an increase over April; they are endeavoring to improve attendance from W. Va. TEN is having a tough time with representation from sections; W0LCX attributes it to poor conditions and "the usual summer slack period." TWN moved to 7060 kc. on June 12, to get away from the QRN on eighty.

Transcontinental Corps. No rest for a TCC manager; W1SMU notes that now he is getting the functions with Pacific Area ironed out, the Central Area functions are suffering from QRN. W0BDR reports by radio; seems his XYL has been ill. W6EOT notes rapid turnover in TCC roster and is expecting it to be even more so during the summer months.

May reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	103	90.3	1702	658
Central	93	95.7	2020	1010
Pacific	111	96.4	1729	874
Summary	307	94.1	5451	2542

The TCC roster: Eastern Area (W1SMU, Dir.) — W1s, AW EMG NJM OBR SMU WEF, K2s SSX UFT, W2RXL, W42APY, W3s EML FAF WG WRE, W4DVT, W3s ELW UPH, VE2AZI/W1VE3CWA. Pacific Area (W6EOT, Dir.) — W2MTA/5, W0s EOT IIC, K6s QPH LKD KCB GID, W46s LVX JDB ECF, W7s GMC DZX, W0s WME KQD, K0s EDH EDK IIT CLS/6.



Carl Franz, W5ZHN, SEC for New Mexico, has his mobile rig mounted on a "swivel stick" in his Corvair. It can be swung around and locked into place for operation either by the driver or passenger. W5ZHN/mobile operates on the low ends of both 80 and 40 meters, using full break-in.

SUGGESTED RTTY OPERATING FREQUENCIES

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

W1AW SCHEDULE

(August, 1961)

(All times given are Greenwich Mean Time)

Operating-Visiting Hours:

Monday through Friday: 1700-0500 (following day).

Saturday: 2300-0630 (Sun.). Sunday: 1900-0230 (Mon.).

A map showing how to get from main highways (or from Hq. office) to W1AW will be sent to amateurs advising their intention to visit the station.

Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules.

C.w.: 1820, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800.

Phone: 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.

Times:

Monday through Saturday, 0000 by c.w., 0100 by phone.

Tuesday through Sunday, 0330 by phone, 0400 by c.w.

General Operation: Use the chart on this page for times and frequencies for W1AW general contact with any amateur. Note that since the schedule is organized in GMT, the operation between 0000 and 0500 each day will fall in the evening of the previous day in some U. S. and Canadian time zones.

Code-Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Tuesday, Thursday and Saturday, and at 5, 7½, 10 and 13 w.p.m. on Monday, Wednesday, Friday and Sunday are made on the above-listed frequencies (except 1820 kc.). Code practice starts at 0130 each day. Approximately 10 minutes' practice is given at each speed. On Aug. 22, instead of the regular code practice, W1AW will transmit a certificate qualifying run.

*Single sideband.

GMT CONVERSION

To convert to local times subtract the following hours:

ADST -3, AST -4, EDST -4, EST -5, CDST -5, CST -6, MDST -6, MST -7, PDST -7, PST -8, Honolulu -10, Central Alaska -10.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)

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

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

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

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 Aug. 22 at 0130 GMT. Identical tests will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from WGOWP only will be transmitted Aug. 3 at 0400 Greenwich Mean Time on 3590 and 7129 kc.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each day at 0130 GMT. Approximately 10 minutes' practice is given at each speed. Reference to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of QST text sometimes is reversed. To improve your fist, hook up your own key and audio oscillator and attempt to send in step with W1AW.

Date Subject of Practice Text from June QST.

- Aug. 8: *The HBR-16 with an Eddystone Dial*, p. 18
- Aug. 11: *Naval Reserve Communications Divisions*, p. 22
- Aug. 16: *Low-Pass Filter for 6-Meter Operation*, p. 23
- Aug. 20: *Construction Techniques*, p. 26
- Aug. 25: *Recent Equipment*, p. 44
- Aug. 29: *Screws — Nuts — and Things*, p. 30
- Aug. 31: *Keyboard-Controlled C. W. Station*, p. 40

W1AW GENERAL-CONTACT SCHEDULE

W1AW welcomes calls from any amateur station in accordance with the following time-frequency chart.

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	.....
2330-2400	14,100	.....	3555	.....	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 licensees on the Novice portion of this band before looking for other contacts.

• 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. Brainer, W3ZRQ. New section appointments: K3JJG and NZ1J as OESs. New gear dept.: K3HXX has a new triband beam and is looking for s.s.b. QSOs. AXA has a new 2-meter Pawnee. GSB has a new daughter. K3AVX has a new grounded-grid amplifier. BUR is building power supplies for the ART-13. JSX and HNK are 2-meter mobile. K3IPK has a new HQ-170 receiver. NOH is building an s.s.b. adapter for the new Apache. K3CRU is looking for new members for the Philadelphia Area 6-Meter Traffic Net. FEY was on Mt. Equinox, Vt., for the V.H.F. QSO Party. The jr. operator of ID is SKL and acquired a new XYL June 15. K3BFA has a pair of 4CX250s on 2 meters. K3LNM will be in WI-Land for the summer vacation. K3s DXD, ANU and HWY have graduated from high school. K3DSO and EAN shipped two 1-kw. rigs to Peru for use of the Jungle Aviation Radio Service. YAZ is operating week days from his second station, K3EZF. NNL is QRL with the summer chores, house-cleaning, grass-cutting, etc. K3MVO is experimenting with a trap-type dipole. K3KRN is working DX with a 6L6 in the final on 40 meters. PDJ is using a new kw. linear amplifier. Summer QRN and band conditions are hampering CUL's skeds and traffic clearing. EML is gathering parts for a keyer. K3GSU received a BPL medallion. K3CNN received the Keystone Award. 4DVT is changing his QTH to Strafford, Pa. K3ADS has changed his QTH from Maryland to Quentin, Pa. A report from our National Emergency Coordinator, WINJM, informs us that annual EC reports were received from 13 out of the 18 ECs in this section. Where are the other 5? W3AQN's daughter Shirley was married in a candlelight service at York May 20. If you change your address at any time, please inform the League. While you're making out a card for them, drop one in the mail box for the SCM so he can keep your file up to date. The next activities report from this office will start another two-year term as your SCM. I wish to thank each and every one for the cooperation the past two years. Thirty-eight Section Net certificates were presented to members of the various traffic nets in Eastern Pennsylvania and adjoining sections. Traffic: W3CUL 3909, EML 784, YR 580, K3IMP 510, W3IVS 510, K3GSU 333, W4DVT 216, W3FAP 160, HNK 148, K3IPA 103, W3AXA 97, CUU 77, K3HTZ 56, CAII 50, IPK 47, JSX 44, BHU 40, DCB 29, MVO 29, W3BFF 28, NNL 28, ZRQ 17, JSX 11, BUR 10, OY 10, MJM 9, YAZ 7, ADE 6, K3KNL 6, ANU 5, W3EAN 5, K3KZG 4, W3PDJ 4, K3NZD 3, W3ELI 1, IWO 1, K3LNM 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Thomas B. Hedges, W3BKE—SEC, CVE. The MDD Traffic Net meets at 1915 EST Mon., Sat. on 3650 kc.; the MIDS (slow speed) Net at 2030 EST daily on 3650 kc.; the MEPN (phone) Mon.-Wed.-Fri. at 1800 and Sat.-Sun. at 1300 EST on 3820 kc. MYB is the new District of Columbia EC. Other May appointments: K3KPZ and K3LVD as OESs, YZI as OC, K3KDP as ORS and OPS. Congratulations to the Friendship ARC on its recent ARRL affiliation. Remember the Washington TVI Committee meetings each 2nd Tue. at Broadcast House. Good luck to K3ADS, who is leaving MDDC for E. Pa. AYD is giving his shack a beauty treatment with malogany walls. K3BYD reports he is back on the air. The Baltimore ARC held its May meeting at Lotus Inn. K3BYJ is making a good start as EC for New Castle Co., Del., and has appointed K3AZH as assistant. CDQ is back in harness and has received QCWA publicity. QCS has had the same call for 30 years. K3DCP finally made DXCC. Congrats! VE3DYK/W3 is back on the air. The U. of Md. station, EAX, now has a 250-watt rig. EFZ will be missed on the MDD Traffic Net while

he is on 3 years active duty in the Philippines. EOY is a good RTTY repairman, and is one of many in the MDDC Area who copied the Armed Forces Day message. EQK reports BARC station FT is back on from the Baltimore ARC Building. K3GJA is keeping Montgomery Co. AREC busy with drills. K3GKF is fast becoming MDDC leader in certificate-winning. K3GZK is ready for emergency work with a portable transmitter. K3HIG is busy with the AREC. HQE has a new 3-band quad. The Washington RC had a movie. Electronic Airways, at its May 5 meeting. K3IRF has a new modulator ready to go during the summer vacation. K3IZM reports 50-Mc. openings to Florida and Kansas. JFR says Kent Co., Del., AREC has a new 6-meter rig. JNE is rebuilding. K3JVB is active in Baltimore Co. AREC. K3JYZ makes BPL for the third consecutive month. JZY keeps active in Smithsburg. Welcome to K3KDP, a new arrival in Newark, Del. K3IA is in summer training at Ft. Meade. K3KHK will be on as a VPT this vacation season. K3KHN has a new modulator. K3KPZ is busy as Baltimore Co. EC. K3LFD is doing real fine in traffic work. K3ANA is back in the MDD Net for the summer. K3MDL says BCEN has moved to 3720 kc. 1MTX, 3 is back on the air. KN3NFJ is looking for a new receiver. K3NKX has a new COBRA certificate. The Loyola HS RC at Towson needs a new receiver. Any offers? TIZ has a new 70-ft. tower. TN keeps up traffic activity. UE is happy that 3RN is keeping up 100 per cent attendance. 2CVW still is active at K3WAG. K3WBJ has a new Ily-Gain doublet. The National Capital V.I.L.F. Society had a successful hamfest and picnic at Marshall Hall Park. YZI now has 140 countries confirmed. PHT is back on s.s.b. after a 2-year layoff. K3NDU has a new 40-meter beam. ZAQ keeps up OO activity in Baltimore. ZGN plans to help at EAX after returning from a USNR cruise. ZNW keeps the MDDS Net going full speed. K3BYB, secy. of William and Mary ARC (W4PYN) says the club has worked 16 states on 6 meters. K4VPA has given the club invaluable help in test equipment; check-ins are in four different nets. Traffic: (May) K3JYZ 200, LFD 161, KDP 127, W3UE 78, K3WBJ 70, W3TN 59, BKE 50, K3MZY 33, W3EOV 30, HQE 28, K3KPZ 27, GJA 26, W3CQS 23, K3MDL 23, K3HK 16, W3AG 12, GZK 10, W3JFR 10, KN3PEJ 10, K3DCP 7, W3EQK 6, K3BYJ 3, W3JZY 2, YZI 2. (Apr.) K3KDP 443, W3UE 228, JFR 10, K3GJA 8, VE3DYK/W3 5.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC, K2ARY. RMs: W2BZJ, W2HJW and W2ZI. New appointments: W2ZC, Marlton, as OBS; W2KWB, Yardville, as OBS; and W2HJD, Paulsboro, as ORS. W2ARJ, newly appointed Radio Officer for Millville, reports the passing of W2TYI, N.J. Emerg. Phone and Traffic Net totals for May: 31 sessions, QN1 633, traffic 134. W3AX, Washington, D.C., received the "Grand Old" award at the DVRA's Old Timers Nite. W2KWB, Yardville, worked 84 stations in the recent 160-meter test. The Levittown (N.J.) Radio Club plans a graduation dinner for its theory class. The Southern Counties ARC recently held a transmitter hunt with W2EVL, W2AWD, K2KPM, K2CIR, W2KWM and W2AGNL taking part. K2HBA, the club's president, operated the transmitter. W2NXV is building a new ham shack. The SJRA moved from 8th to 3rd place in the November Sweepstakes. W2KRX put up a new antenna with W2BTO and W2MQV as helpers. Salem Radio Club members were guests of the Gloucester Co. Radio Club at the latter's June meeting. W2CKX, Gloucester Co. ARC, reports that 7 students have passed the Novice Class exam. The SJRA's Hamfest is planned for Sept. 10 and the Gloucester Co. Club's Hamfest Sept. 17. Both will be held at Molia Farms. K2BPN is heard again on 144 Mc. after a long absence. The SJRA held its 2nd Annual QSO Party with many stations earning its coveted award. Club papers were received from the SCARA, Levittown Radio Club, SJRA and Gloucester Co. ARC. All are very informative. My thanks to their editors. Official Observer activity is on the increase and OBSs are making use of most of our frequencies. Monthly reports are needed and appreciated. Traffic: K2RG 131, W2BZJ 73, K2RNB 57, W2ZI 40, W2WB 18, K2MOV 17, K2SON 17, W2AMEQ 16, W2AHJD 7, K2SNK 7, W2ARJ 2.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK SEC: W2LXE, RMs: W2RUF and W2EZB. PAM: W2PVI. NYS C.W. meets on 3615 kc. at 1900, ESS on 3590 kc. at 1900, NYSPTEN on 3925 kc. at 1800.

(Continued on page 98)

Quite a number of amateurs have suggested we spell out the name *Hallcrafters* in the margin of this page. One made a good effort, so we are printing it.

HAPPY were those who attended the Southwestern Division Convention where the weather was great, hospitality was wonderful, and there was never a dull moment.

ALTHOUGH the Arizona boys and girls were in the minority taking home some of the wonderful awards, they planned it that way so that the guests would go away happy.

LITTLE was said about what should have been done other than the speech given by Senator Barry Goldwater should have been taped for re-broadcast at various ARRL meetings.

LISTENING over the air was a lot of fun, for hams on every band were talking about the wonderful time they had in Phoenix.

INCIDENTALLY, everyone had a chance to meet ARRL's new General Manager, John Huntoon, and all were impressed with his frank way of answering questions.

CARL SMITH, the Rocky Mountain Director, now a Captain for Western Air Lines, was taught to fly by Barry Goldwater and they recounted many experiences at Luke Field in Arizona.

RAY MEYERS, the Host Director, was flabbergasted when they announced at the banquet that his charming daughter Marilyn had passed her FCC exams and was waiting for her ticket.

ALTHOUGH she told the OM she was attending college at night to take shorthand, he learned for the first time she has been attending an electronics course and is still plugging for Extra Class.

FROM the Pacific Division, Director Engwicht joined the group to pay his respects to the gang that he, too, enjoys visiting.

TRUTHFULLY, everyone had a wonderful time and in behalf of all the manufacturers, we salute the Arizona contingent of the SW Division for a job "well done".

EXACTLY what the ORANGE County boys are planning to top the Phoenix affair we don't know, but we have a feeling they will come up with something at Disneyland next year that will be fabulous.

RAY, we all salute you and congratulate you and the gang for the efforts. We also feel sure that FCC is to be commended for selecting you to serve on the NIAC Amateur Radio Services Committee..

SEE all of you in DISNEYLAND next year.

— HALLICRAFTERS

Bevel Halligan Jr.

W. J. Halligan W9AC

for **hallicrafters**

"INVADER"

EXTENSIVELY FIELD

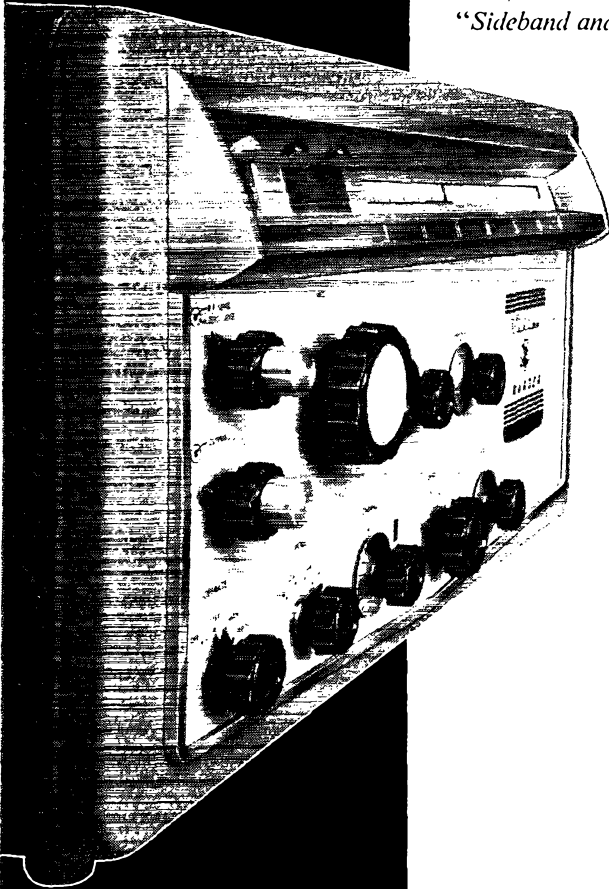
here are typical reports:

"Sideband never sounded so good!"

"Excellent penetration and an outstanding signal!"

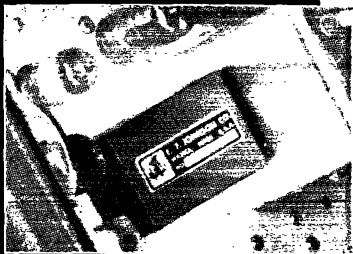
"Full-fidelity voice reproduction—picks up the lows for that 'natural' sound for the first time!"

"Sideband and carrier suppression is tops!"



Here's the transmitter with the sharp, penetrating signal you've been waiting for—plus *more* exclusive operating and convenience features than any other SSB Transmitter on the market today! A classic of modern communication equipment design, the "Invader" offers instant bandswitching coverage 80 through 10 meters—no extra crystals to buy—no realigning necessary—delivers a solid 200 watts CW input; 200 watts P. E. P. SSB input; 90 watts input on AM! Unwanted sideband suppression is 60 db or better! Built-in VFO is differentially compensated. Exclusive RF controlled audio AGC and ALC (limiter type) provide greater average speech power—high gain push-to-talk audio system has plenty of reserve gain for either crystal or dynamic microphones. VOX and anti-trip circuits are extremely smooth in operation—built-in anti-trip matching transformer—adjustable VOX time delay circuit. Mixer-type shaped keying is crisp, sharp—click and chirp free. Single knob wide range pi-network output circuit—fully TVI suppressed. Blocking and operating bias for noise-free T-R switch operation.

Cat. No. 240-302-2—Wired and tested with tubes, crystals and crystal filter. Amateur Net . . . \$619⁵⁰



superior to phasing-type units

. . . sets a new standard in filter design!

EXCLUSIVE—Now, for the first time, not only better audio fidelity—but balanced audio response in a filter-type transmitter. The only equipment on the market using a specially developed high frequency, symmetrical, multi-section band-pass crystal filter for more than 60 db sideband suppression—more than 55 db carrier suppression! Select either upper or lower sideband instantly with a front panel "mode" switch.

the finest SSB signal on the air!

TESTED BY DOZENS OF UNBIASED AMATEURS!

**A BOLD STATEMENT
FROM E. F. JOHNSON CO.**

The sophisticated engineering and styling of the "Invader" is *unmatched* by other equipment within the amateur field—*bar none!*

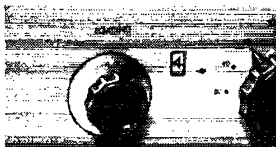
Long recognized as the "first choice among the nation's amateurs" . . . Viking transmitters achieved popularity in a solid and healthy way. Known the country over as the line that gives you excellent engineering and performance, outstanding dollar value and more features at a popular price . . . the Viking line now achieves a new pinnacle with the introduction of the "Invader" and the "Invader-2000". We feel that the creative and imaginative engineering in the "Invader" sets aside "old fashioned" ideas that a unit is good simply on merit of the manufacturer's name alone! It has to perform—and nothing outperforms the "Invader!"



EXCLUSIVE—Converts to the Invader-2000, an integrated desk top transmitter, with the addition of high power conversion unit. (Remote power supply can be placed in any convenient location.)



EXCLUSIVE—The only transmitter with both limiter ALC and audio AGC for an extra sharp signal! Reduces over-driving and flat-topping—increases average audio level for greater penetration and the best signal anywhere!

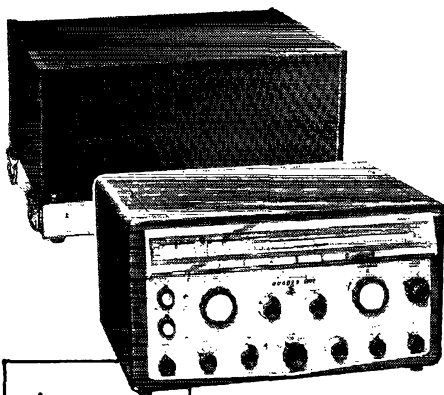


EXCLUSIVE—Single-knob wide range output circuit makes it possible to load into just about any conceivable type of antenna!



EXCLUSIVE—Full-time VFO heater element keeps VFO at operating temperature, even with the equipment turned off! No warm-up drift—rock-solid stability!

add hi-power conversion overnight for an integrated 2000 watt desk-top transmitter!



HI-POWER CONVERSION—Take the features and performance of your "Invader" . . . add the power and flexibility of this unique Viking "Hi-Power Conversion" system . . . and you're "on the air" with the "Invader-2000". Completely wired and tested—includes everything you need—no soldering necessary—complete the entire conversion in one evening!

Cat. No. 240-303-2 . . . Amateur Net **\$619⁵⁰**

INVADER-2000—All the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply completely wired and tested. Rated a solid 2000 watts P. E. P. (twice average DC) input on SSB; 1000 watts CW; and 800 watts input AM! Wide range output circuit (40 to 600 ohms, adjustable.) Final amplifier provides exceptionally uniform "Q". With multi-section power supply, tubes and crystals.

Cat. No. 240-304-2 . . . Amateur Net **\$1229⁰⁰**

free

**8-PAGE
BROCHURE . . .**

Yours on request . . . complete specifications and photographs on the "Invader" and the "Invader-2000"!

FIRST CHOICE AMONG
THE NATION'S
AMATEURS



Viking

E. F. JOHNSON COMPANY • WASECA, MINNESOTA.



LEE PAUL, K1LCV, covers the non-business aspect of his Raytheon activity via QSO with other members of the company's world-wide field team.

FIELD ENGINEERING WITH A FUTURE

Hustling for 'Hustler'

The smiling ham above is Lee Paul, K1LCV, energetic engineer-in-charge of the B-58 'Hustler' product support group at Raytheon's Sudbury, Mass. laboratory. From his command post, Lee maintains contact on technical problems with various field groups situated throughout the country.

Lee's Raytheon experience typifies the organization's field-engineering-with-a-future concept. Since joining Raytheon three years ago, he has filled a variety of challenging assignments, including depot overhaul, reliability studies and systems test activities at Fort Worth, Texas, Long Island, New York,

and other field locations. Now he heads "home support" at Sudbury.

Perhaps you too can qualify for a Raytheon field engineering future. Requirements are previous experience plus an E.E. degree or equivalent in practical know-how in guided missiles, fire control, ground and bombing radar or sonar.

Benefits: attractive salary, insurance, educational programs, relocation assistance, opportunity for advancement. For details, please forward your resume to Ronald Guittar, Electronic Services Division, Northwest Industrial Park, Burlington, Massachusetts.

RAYTHEON

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Special "Bonus" Offer

for Summer Buyers

5 new-design Log Books and Handsome Cover FREE!

- Designed for round-table QSO's
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- Fits your desk; measures 8½ x 5½ closed

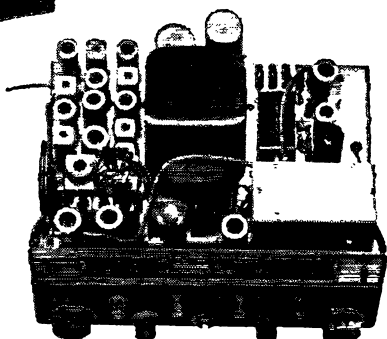
This new log book puts the fun back in operating by taking the work out of log keeping. Designed for round-table QSO's, you log basic data only once on a page and fill in spaces for each station's call, handle, etc. Each page has a calendar and spaces for traffic summaries, schedules, and notes. You get a neat log as you operate; no more laborious transferring of notes to another book for permanent filing. Get 5 log books and a handsome vinyl cover in which to keep the current book on your desk, FREE with your Heathkit Amateur Gear order of \$50 or more!



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with Amateurs for quality
with economy...*



KIT HW-10 \$199.95



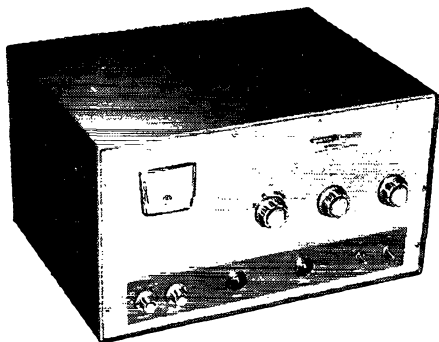
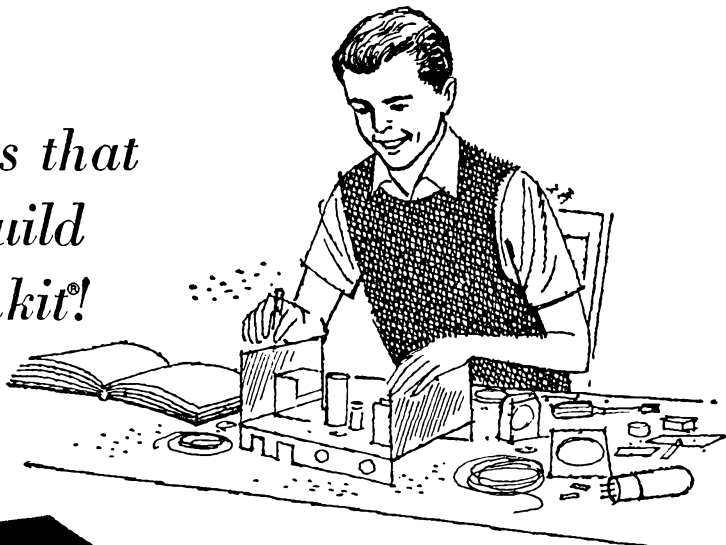
Compare features, performance, and price... and you'll
choose Heath's new VHF transceivers, "Pawnee" and "Shawnee"

- Output: 10 watts nominal CW, 8 watts nominal AM • Built-in VFO • Tracked exciter stages for single-knob tuning • 4 switch-selected crystal positions • "Spotting" switch • Built-in low pass filter • Built-in 3-way power supply, 117 vac, 6 or 12 vdc • Push-pull 6360 final rf amplifier • Dual-purpose modulator provides 10 watts for plate modulation or 15 watts for public address operation with external speaker • Push-to-talk microphone • Double conversion with first oscillator crystal controlled, first IF and second oscillator gang tuned • Voltage regulated oscillators • Illuminated slide-rule dial • Tuning meter automatically reads signal strength or relative power output • Squelch and noise limiter controls • Built-in speaker • Heavy-duty AC & DC power cables • Primary fused relay • Complete shielding • Compact, 6" h x 12" w x 10" d • Recommended for the experienced ham kit builder; time approximately 70 hours.

KIT HW-10 (6 meter), KIT HW-20 (2 meter)... \$20 dn., \$17 mo. \$199.95 ea.

SPECIFICATIONS—Frequency coverage: (HW-20) 143.8 to 148.2 mc; (HW-10) 49.8 to 54.0 mc. Noise figure: (HW-20) 8.5 db or less; (HW-10) 6 db or less. Sensitivity: for 10 db S/N ratio, 0.5 uv or less. Squelch sensitivity: less than 1 uv. Selectivity: 15 kc at 6 db down. Image rejection: better than 70 db. IF rejection: 50 db. Output impedance: 50 to 72 ohms, unbalanced. Transmit & receive power requirements: A) 6.3 vdc: 14.5 & 8.5 amp; at 12.6 vdc: 7.5 & 4.5 amp; at 117 vac: 120 & 60 watts.

*Guarantees that
you can build
any Heathkit®!*



**HERE'S THE RIG THAT'S WINNING PRAISES
AROUND THE WORLD . . . THE NEW HEATHKIT
"WARRIOR" G-G KW LINEAR**

The HA-10 is a completely self-contained desk-top kilowatt linear, loaded with special features! • Amplifier and HV, filament and bias supplies are built in. • Drives with 50-75 watts, no matching or swamping network required. • Grounded grid circuit puts part of drive in output for up to 70% efficiency. • 4 paralleled 811A's, fan-cooled, and 2-866A's. • Oil-filled, 8 ufd 2 KV capacitor and 5-50 henry swinging choke for high peak power output with low distortion. • Neutralized, for high stability. • Best value in amateur gear. 100 lbs.

- Operates SSB, AM & CW on 80 through 10 meters
- Exclusive internal RF shielding for maximum TVI suppression
- Interlocked switching of HV for maximum protection
- Clean, functional styling—easy to build

Kit HA-10 . . . \$23 dn., \$20 mo. \$229.95
Assembled HAW-10 . . . \$33 dn., \$28 mo. \$329.95

SPECIFICATIONS—Maximum power input: SSB-1000 watts P.E.P., CW-1000 watts, AM-400 watts (500 watts using controlled carrier modulation), RTTY-650 watts. **Output circuit:** Variable pi-network (50 to 75 ohms). **Driving power required:** 50 to 75 watts—depending on frequency. **Input circuit:** Broad banded—requires no tuning. **Input impedance:** 50 to 75 ohms. **Band coverage:** 80, 40, 20, 15, 10 meters. **Panel metering:** Switch-selected, grid current, plate current, high voltage and relative power output for ease of loading. **Tube complement:** 4-811A, 2-866A. **Size:** 19½" W. x 11½" H. x 16" D.

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The Heath Company unconditionally guarantees that you can build any Heathkit product and that it will perform in accordance with our published specifications, by simply following and completing our check-by-step instructions, or your purchase price will be cheerfully refunded.

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Benton Harbor 9, Michigan

Please send my FREE copy of the 1961 Heathkit Catalog

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Address _____

City _____ Zone _____ State _____

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a \$16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-T12TG)

OR IS K4ZRA THE NEW CHAMP?

Read his letter, and see his diagram of a typical installation and what it achieved:

2539 Christie Place
Owensboro, Kentucky

GOTHAM
Miami Beach, Florida

Gentlemen:

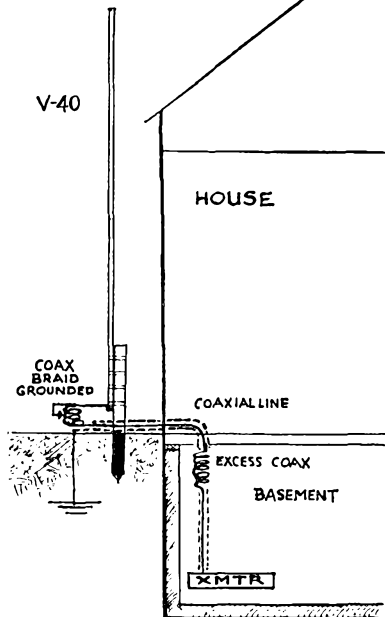
While I was at home last summer, I had occasion to use your GOTHAM vertical antenna on the air for about two months. I was quite amazed with the excellent performance of that inexpensive and simply installed antenna. It did everything you, K6INI, and others said it would, in spite of the generally poor band conditions during the summer months.

During the time I used this antenna, I worked well over 100 DX stations in 44 different countries, earned a WAS certificate, and worked the necessary stations for WAVE, receiving very fine signal reports from all. My rig ran from 75 to 100 watts plate input and the receiver was an old military ARR-7 (Hallicrafters rebixed SX-28.)

The above mentioned contacts were made with the vertical mounted several inches off the ground, without radials, with only a simple ground connection to the coaxial shield. Later I raised the antenna up about 20 feet and installed the radials and this improved the already good signal pattern and enabled me to pick off another 12 DX countries and other DX contacts in a couple of weeks of good band conditions. In the latter part of August I used several single-band vertical and ground plane antennas and found that the single GOTHAM vertical equalled all these individual antennas.

Another attractive feature is the versatility of installation. It works high or low on ground, with or without radials,

K4ZRA's INSTALLATION THAT WORKED WONDERS WITH A GOTHAM V-40 VERTICAL



mounted in any space. Of course I did find that the best installations were the two mentioned above, but they were fairly simple to arrange, especially the first one!

The GOTHAM vertical is also a superior receiving antenna and I would strongly urge you to recommend that it be used for receiving as well as transmitting.

I just wanted to tell you how pleased I was with the overall performance of your antenna. For an inexpensive, easy-to-install, dependable antenna that really works for both DX and "local" W/K contacts, I don't see how one could ask for more and I would certainly recommend a GOTHAM V-40 to anyone desiring these features. Good luck in 1961 with those FB antennas!

Sincerely,

Daniel F. Onley, K4ZRA

FREE

Send a card for our valuable catalog of 50 different antennas with specifications and characteristics. Gives bands and frequencies covered, element information, size of tubing used, boom length, shipping weight, feed line used, polarization, and other data.

FACTS

ON THE GOTHAM

V-80 VERTICAL ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Withstands 75 mph wind-storms.
- Non-corrosive aluminum used exclusively.
- Omnidirectional radiation.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price. **ONLY \$16.95.**

73.
GOTHAM



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WONDERS WITH
A
GOTHAM
VERTICAL
ANTENNA!

FILL IN AND SEND TODAY!

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Enclosed find check or money-order for:

- V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15..... \$14.95
- V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... \$16.95
- V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... \$18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

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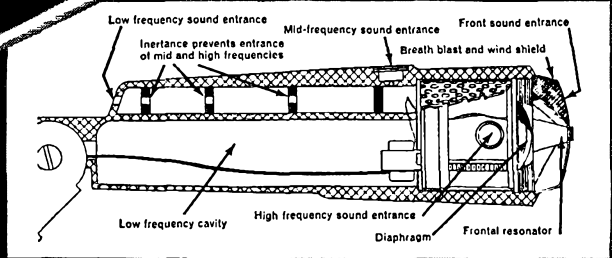
City.....Zone.....State.....

The Least Expensive Way to Increase

Flat response penetrates QRM more effectively because it permits an actual increase in RF power output!

More effective cardioid pattern, essential for SSB, cuts accidental tripping of VOX circuit!

MODEL 664



HERE'S HOW IT WORKS

Exclusive E-V Variable-D* (Variable Distance) provides three sound-cancelling entrances at different fixed distances in back of the diaphragm. These entrances, utilizing the proper acoustical impedances, combine to form an effective front-to-back spacing which varies in distance from the diaphragm inversely with frequency. The resulting phase and amplitude conditions provide a uniformly true cardioid pattern at all frequencies. *Pat. Pending

Here's What the Top Radio Amateur Operators in the World Say About These E-V Microphones:

- CX2CO** "My new 664 resulted in better and more consistent QSO's."
- W8KML** "The 664 surpasses its claims in difficult operational environments."
- ZL1HY** "During QSO's . . . everyone preferred the 951."
- W3JNN** "I am really sold on the 664."
- W8BF** "I have had many unsolicited compliments since using the 729."
- VQ4ERR** "The performance of the 664 matches its thoroughbred appearance."
- PY2CK** "My 664 microphone vastly improved my SSB transmission."



Average Peak-Power and Intelligibility!

CHOOSE AN *Electro-Voice*[®] MICROPHONE

Model 664 for Highest Front-to-Back Discrimination Manufactured, Plus Peak-Free Wide-Range Response!

The effective strength of all sounds arriving at the sides of the 664 are reduced by as much as 50%, and arriving directly at the back of the microphone by as much as 90%. This uniquely effective design permits you to work at twice the distance from the microphone . . . a perfect invitation for "arm chair" QSO's—with no VOX tripping problems.

Smooth, peak-free response guarantees maximum P.E.P. Remember, a peak in response in or out of the voice range will limit maximum modulation and result in reduction of P.E.P. You do not have to talk with your lips on the mike. For best results, sit back and talk naturally.

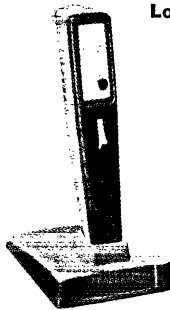
Virtually indestructible Acoustalloy[®] diaphragm withstands high humidity, temperature extremes, corrosive effects of salt air and severe mechanical shock. Extra ruggedness means extra service, year after year.

MORE 664 FEATURES: Output—55 db. On-off switch (can be wired for relay control). 150 ohms or Hi-Z output selected at cable connector. Satin chromium finish. High-pressure die-cast case. Pop-proof filter plus magnetic shield. 90° swivel mounting. 18 ft. cable. 7 $\frac{1}{8}$ in. long (less stand coupler) by 1 $\frac{1}{4}$ in. diameter. Net Weight 1 lb., 10 oz. Amateur Net, \$51.00. Matching desk stand with DPDT switch. Model 419S, \$9.00. Less switch. Model 419, \$6.00.

The World's Finest Mobile Microphone. Model 600D Dynamic Widely Known As Military Types T-50 And M-105/U!

Designed for high articulation under rugged mobile conditions, the Model 600D provides all the advantages of a dynamic element with peak-free, flat response for maximum P.E.P.

High-impact case soaks up physical abuse, feels comfortable at any temperature, fits hand naturally. Extremely high output of -55 db. is ideal for mobile equipment with severe audio requirements. Available in 50, 250 ohms or Hi-Z. DPDT switch. 6 ft. coiled cord. Panel mounting bracket included. Model 600D Amateur net, \$28.50.



MODEL 729SR

Lowest-Cost Ceramic Cardioid Available ... Includes Every Feature Essential For SSB Operation. Flat, Smooth Response From 300 To 3,000 CPS!

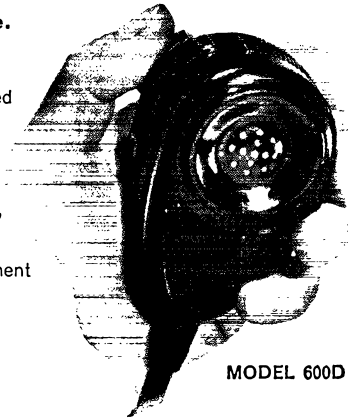
Rugged enough for mobile operation, the slim, small Model 729 fits easily in your hand or slips into the desk stand or floor stand adapter provided, without any hardware adjustments. Hi-Z output -60 db. Two-tone grey, pressure die-cast and plastic construction. Shielded, 8 $\frac{1}{4}$ ft. cable. 7 $\frac{1}{2}$ in. long by 1 $\frac{1}{2}$ in. wide. Net weight 1 lb. Ceramic element unaffected by high heat, humidity. Model 729. Amateur net, \$14.70. Model 729SR with relay-control switch. Amateur net, \$15.90.



MODEL 951

First True Crystal Cardioid With Variable-D Design. Combines High Output With Excellent Noise Rejection At Modest Cost!

Finest crystal microphone available for SSB. Variable-D design of Model 951 cuts room noise, interference from receiver speaker to a minimum. Allows greater working distance to microphone. Peak-free rising response for high intelligibility. Hi-Z output -60 db. High-pressure, die-cast finished in Metalustre grey. On-off switch. Shielded, 18 ft. cable. 5 $\frac{1}{2}$ in. long (less stand coupler) by 1 $\frac{1}{4}$ in. diameter. Net weight 1 $\frac{1}{2}$ lbs. Model 951 Amateur net, \$32.70. Matching desk stand with DPDT switch. Model 418S, \$9.00. Less switch. Model 418, \$6.00.



MODEL 600D

See your Electro-Voice distributor and choose an Electro-Voice Microphone . . . For the fastest, easiest and least expensive way to boost the efficiency and quality of your rig! Satisfaction is guaranteed or your money refunded!

ELECTRO-VOICE, INC., Commercial Products Division
Department 812Q, Buchanan, Michigan

Electro-Voice[®]

Station Activities

(Continued from page 86)

NYS C.D. on 3510.5 kc. and 3993 kc. (s.s.b.) at 0900 Sun., TCPN 2nd call area on 3970 kc. at 1900, IPN on 3980 kc. at 1600. Endorsements: K2KNV as OO and ORS. K2LJG as OO. New officers of the RAGS are WA2KQR, pres.; W2VSP, 1st vice-pres.; K2DXV, 2nd vice-pres.; WA2AWK, treas. and corr. secy.; and K2SSX, rec. secy. Auburn ARA elected W2TCN, pres.; WA2LVW, vice-pres.; W2QHQ, secy.; and A. Infanger, treas. The club has a new call WA2QBL and K2KIR was FD chairman. WA2DAC, mgr. of the N. Amateur Propagation Society, heads up a group that will launch a project "OSCAR" Beacon transmitter in a balloon. W2GCH stopped by to see K2HUK and W2LXE on a recent trip through the Buffalo Area. W3YA, K2LUK and W2UED were LOs in attendance at the 8th Annual "Ham Family Day" sponsored by the Rome Radio Club. A good turnout and perfect weather made a very enjoyable day for all concerned. The Vestal Central H.S. ARC and the Lewiston Porter H.S. ARC have joined the ranks of league affiliated clubs. K2UZJ plans to go to Carnegie Tech. in the fall. W2EMW has worked 3 new countries since he put up a beam. K2IOJ was featured as the station of the month by the SIARC. New officers of the Squaw Island ARC are K2ZVF, pres.; K2PPO, vice-pres.; K2BWK, secy.; K2BRE, treas.; K2HDW, K2INV and K2ZIF, area reps. The Syracuse V.H.F. Club held a contest for 220-Mc. rigs. Winners were K2ZRX 1st and W2MTG 2nd. K2AYA just installed a new 6-meter rig in the car. The RARA elected K2SSB, pres.; K2ISP, vice-pres.; K2UXP, secy.; K2UCI, treas. Don't forget the New York State ARRL Convention to be held in Niagara Falls on Sept. 15, 16 and 17. For information, contact the Niagara Radio Club, Inc., P. O. Box 682, Main Post Office, Niagara Falls, N.Y. This is the first convention held in our section in a long time. Plan now to attend. All amateurs are invited to report items of interest and traffic to the SCM by the sixth of each month. Form 1 report forms are available on request from ARRL Hq. Traffic: (May) W2OE 228, K2QDT 123, WA2CIG 101, WA2CRH 97, K2RTQ 94, W2RUF 89, WA2ANU 74, W2FEB 68, K2TDG 51, W2RQF 44, WA2DAC 43, K2GAO 22, W2QQK 19, WA2HEC 16, WA2AME 14, W2TPV 14, W2MPM 12, K2RYH 12, K2BFJ 11, K2HOH 11, K2BWK 8, W2PVT 8, WA2GLA 7, K2MQA 7, WA2MCC 4, W2EMW 2. (Apr.) K2JBX 6.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mrozcka, W3UHN—SEC: OMA. RMs: KUN, NUG and GEG. The WPA Traffic Net meets Mon. through Fri. at 1900 EST on 3585 kc. The Keystone Slow Speed Net (KSSN) meets at 1830 EST on 3585 kc. Mon. through Fri. Our sympathy goes to NUG on the loss of his mother. KUQ and WRE sharel operation duties in Operation Alert, Cambria County. K3KMO now has 45 stations on 3.5 Mc. for WAS. GJY's DX total is now 253+246. The Horseshoe RC reports via *Hamateur News*: IOB is joining the 2-meter mountain group; AUD is changing his QTH to McKeesport; BZN and BTX are taking advantage of good skip conditions on 6 meters. ZZO's XYL has the call K3ONN. LIV, Blair County EC, reports the AREC/c.d. members took part in the Armed Forces Day Parade and in a demonstration of amateur equipment. The Cumberland Valley ARC reports through *Valley QRM*: ACH is doing a swell job on phone working Antarctica; the club meets the 4th Sat. of each month at the Scotland Community Center. QYG's DXCC total is now 120. K3GQA has a new ham shack complete with air conditioning. Congratulations to WRE on making BPL again. The Steel City ARC, through *Killowatt Harmonics*, reports: PML is back from Japan; K3EKL is moving to West Virginia; LIP, MJC, TQN, ZDW and SVJ participated in Operation Alert. SMV received his W-Delaware Award. K3CLX is plate-modulating his DX-40. ALD is back home from the service. The Coke Center RC is working hard to get the range station in 1st-class condition. McKean Radio Club members K3NUW, K3INH, K3IKD, IBI, GQA and OCR, with their mobile rigs, handled the Boy Scout Parade in Bradford. Nittany ARC reports via *QST de K3HKK*: New hams are K3PMI and K3PML; K3AIIY has a Ranger; MGP is building a 6-meter converter; the club is having great success with hidden transmitter hunts. The Etna RC through the *Oscillator* reports: K3JSS is active on 40 meters; KHY is back on the air after an illness; THY is recuperating at the Fayette County Home in Uniontown. Congratulations to AOH in placing first in the CQ World-Wide DX C.W. Contest, multi-operator group. We are looking forward to increased activity this fall. Traffic: (May) W3WRE 590, KUN 121, K3DKE 119, W3SMV 47, K3CLX 32, W3UHN 20, K3KMO 16, GQA 14, W3NUG 13, K3COT 3, W3LOD 3. (Apr.) W3WRE 150, K3KMO 61, W3LSS 52, K3HSE 18, W3GJY 4.

CENTRAL DIVISION

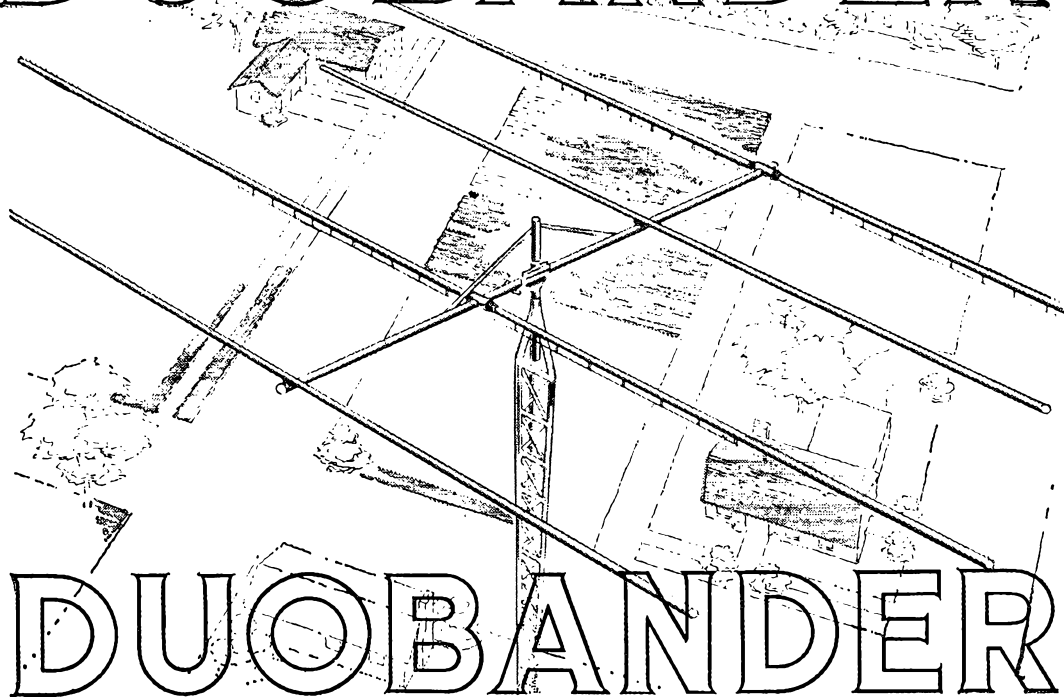
ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, 9GME, SEC: PSP, RM: USR, PAM: RYU, EC of Cook County: HPG. Station net: ILN, 3515 kc. Mon. through Sat. at 1900 CDT. This is the last call for the Central Division Convention which will be held in Springfield Sat. and Sun., Aug. 26 and 27. For registrations and hotel reservations contact SHM, c/o Radio Station WMAV, in the Capitol City, Montgomery County was well represented in the YL-OM Contest with K9AMD winning the YL awards and K9AKF taking first place in the phone a.m. section. The Knox County AREC was very active during the aftermath of the tornado that struck Douglas, Ill., on May 14. UJ is home at his QTH after many months of wandering through the South Pacific. The Hamfesters outing was held May 12 at the same place. SJR wishes to thank all who helped to make the LARKS' Midwest YL Convention an FB success. The Will County amateurs were lauded by the c.d. office of that territory for their fine emergency work following the tornado that hit Peotone. Emergency communications and power generators were put to use to help put the town back in shape. CN is sporting a new KWM-2. MRJ is recuperating after a short hospital sojourn. The Litchfield Amateur Radio Club, the Chain of Rocks Amateur Radio Club, Inc., the Wheaton Community Radio Amateurs and the Valley V.H.F. Club, Inc., have had their applications for ARRL affiliation approved by the League's Executive Committee. KCR is now a radio operator of the Illinois State Police with QTH at District No. 3. The ILN handled 240 messages during 25 sessions and the North Central Phone Net's traffic count was 139. The new ITN had 11 pieces of traffic. K9OZM reports that the ITN meets on 3740 kc. every Tue., Thurs. and Sun. at 2000 CDT. News has been received from Headquarters that the ARRL will seek an issuance of a commemorative stamp for amateur radio during 1964, which will be the 50th anniversary of the founding of the League. K9QPJ is the new trustee of the Lane High School Amateur Radio Club. K9QAIJ received his WAS award. Members of the McDonough County 6-Meter Emergency Net is monitoring 50.35 Mc. for a station located at Boy Scout Camp Pearl near Tennessee, Ill., so that request for supplies, emergencies, etc., will be handled during the summer period of the camp. A new ham club in the Rockford Area is the Experimental Amateur Radio Society, or EARS for short. The club call is BKT. The Peoria Area Amateur Radio Club's Annual Hamfest will be held in Peoria, Sun., Sept. 17 at the Exposition Gardens. K9OZM and IMN are recipients of the BPL Award for May traffic. Traffic: (May) K9OZM 591, W9DO 306, IDA 238, IMN 230, USR 230, K9UGY 161, W9JXV 104, K9QAE 97, W9PAW 70, K9BTE 67, UOV 63, WEG 37, IVG 35, TVA 35, JJD 32, QYW 28, RAS 22, W9LXG 17, SXL 16, K9BIV 9, W9PRN 9, K9RHU 9, ISP 2. (Apr.) K9IVG 153, W9EET 32, BVN 14.

INDIANA—SCM, Clifford M. Singer, W9SWD, Asst. SCM: Arthur G. Evan, TQC, SEC: SNQ, PAMs: K9AOM, K9PFQ and RVM. RMs: DGA, TT and VAY. Net skeds: IFN, 0800 daily and 1800 M-F on 3910 kc.; ISN (s.s.b.), 1930 daily on 3920 kc.; QIN (training), 1800 M-W-F on 3745 kc.; CAEN, daily at 1900 on 1805 kc. New appointments: K9KOW as EC for Crawford County. GFO is EC of Washington County and K9LVV is EC of Miami County.

A great loss came to Indiana when W9BKJ, the grand old gentleman and a former SCM of Indiana, became a Silent Key on May 29. George had held many ARRL appointments through the years and was active in the Indiana Radio Council and local club affairs. He was founder of the IFN and was the recipient of the first Indiana Outstanding Amateur Award.

The Columbus ARC held a very successful hamfest with some 300 present to enjoy the activities. KN9EFY is active on 40 and 80 meters. Hancock ARC offers a certificate to amateurs who work five club members. Contact DZC for particulars. Western Electric ARC members have new "500" QSL cards and give a fine certificate to those who collect five of these cards. Contact K9BSU for this award. ZVN is doing a fine job as OO, especially in helping Novices and c.w. operators. For Indiana News and Calendar of Hoosier hamfests send \$1.00 to IHO to be put on the *Bison* mailing list. A new club is the Tioga ARC of Monticello with K9JCD, pres.; JFF, vice-pres.; K9LJP, secy.; and K9SPH, treas. *Amateur* (Please turn the next page)

DUOBANDER



DUOBANDER

THE NEW HY-GAIN DUO-BANDER FOR 20 and 40 METERS

20 AND 40 METER POPULARITY

Low sun spot activity and fewer band openings on 10 and 15 meters prompted the Hy-Gain engineering staff to design this important new antenna system for the very popular and very usable 20 and 40 meter amateur bands. The new Hy-Gain Duo-Bander consists of three full sized elements on 20 meters and two reduced size elements on 40 meters in a relatively compact, light weight, highly practical antenna configuration.

NO TRAPS

Two band operation is made possible through the use of an exclusive Hy-Gain development -- the linear decoupling stub. This new advancement eliminates the use of inductance and capacity traps, yet decouples various sections of the Duo-Bander elements in an extremely efficient manner.

LINEAR LOADING

The linear decoupling stubs also perform a second function in reducing the overall length of the 40 meter element to approximately $\frac{3}{4}$ normal size. Another Hy-Gain exclusive, the linear loading principle, far exceeds the efficiency of a loading coil in reducing antenna size.

THE BETA MATCH

A proven Hy-Gain development--THE BETA MATCH makes possible maximum gain and low standing wave ratio into a single 52 ohm coaxial feed line. For perfect pattern symmetry, a broad band balun is an integral part of the matching system.

SPECIFICATIONS

ELECTRICAL

Forward Gain over a tuned dipole 20 meters8.1 DB
 Forward Gain over a tuned dipole 40 meters4.9 DB
 Front to back ratio 20 meters20-30 DB
 Front to back ratio 40 meters15-20 DB
 VSWR at resonance (typical)1.2:1
 Nominal impedance50 ohms
 Power Capability5 KW P.E.P., 3 KW AM

MECHANICAL

Net Weight54 lbs.
 Boom Length24 ft.
 Element LengthApprox. 40 ft.
 All aluminum construction
 Alloy 6063T832 — Tensile strength 45,000 PSI
 All hardware iridite treated to military specifications,
 all plastic high impact Cycloc
 Wind surface area6.9 sq. ft.
 Turning Radius24.2 ft.

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teur radio crists as a hobby because of the service it renders. May Net Reports: ISN 236, IFN 340, CAEN 28, QIN 192 and RFN 43. Making BPL: JOZ and K9RMI. Traffic: (May) W9JQZ 1274, K9RMI 383, W9ZYK 383, MM 279, TT 216, K9OET 167, GLG 165, W9VAY 165, SWD 78, NZZ 68, K9WET 54, W9BDG 51, GJS 51, FWH 49, RTH 47, RVM 47, DGA 32, QVQ 32, DOK 27, K9UBL 26, CMG 25, W9CC 20, EJW 20, DZC 19, HTK 19, K9LZN 19, W9MIU 16, SNQ 16, K9UEF 14, ONY 13, WJS 11, W9BUQ 9, K9HMC 9, W9ZSW 9, BDP 6, AQW 3, HUF 3, K9IXD 3, MAN 3, W9VYS 3, K9TFJ 2. (Apr.) W9AOJ/9 58, K9PFQ 37, W9FWI 35, BZI 11, K9ULW 8, W9IMU 5, K9DXQ 3.

WISCONSIN—SCM, George Wolda, W9KQB—SEC: BCC. PAMs: NGT and NRP. RMs: VIK and VHP. New appointees: K9VNO as OES; K9JVP and IQW as OO Class III and IV. WIN certificates went to K9s JXW and YDY; BEN certificates to K9AAW and GKO. K9LCA received his 1st-class phone license. A 15-w.p.m. CP certificate went to K9ZU. NSS, AIR and WAR were worked by K9GDF on all eight of their c.w. frequencies on Armed Forces Day. Ex-W9IKY is now K7OGF in Billings, Mont.; and is an OBS and OO class I. New officers of the Milwaukee Radio Club include RKP, pres.; VQD, 1st vice-pres.; LVR, 2nd vice-pres.; K9PSU, secy.; and K9MJJ, treas. KKK added s.s.b. operations for DX. All appointees, please send certificate for yearly endorsement shortly before expiration date. This will eliminate sending you a reminder card. Our section is in need of an OBS for 7-Mc. c.w. and ECs for several counties. Milwaukee AREC/RACES station IJT operates Mon. nights for drill sessions on 2, 6 and 10 meters, a.m., 1.m. and RTTY, from 1915 to 2000 local time. It has a c.w. liaison to the NTS. DKH has a new Gonset G-76. The call W9BSO has been assigned the Milwaukee Scout Unit #61 Club. Officers are K9MNZ, act. mgr.; K9ULE, pres.; K9NYES, vice-pres.; and treas.; K9NAQC, secy. An interesting bulletin is being edited for the Waupaca Club by K9LWV. More news is solicited for this column from clubs and individual operators. Please mail by the 3rd of each month. Traffic: (May) W9DYG 754, KQB 244, CXY 230, K9GDF 86, SQV 84, VSO 64, W4VRD/9 42, W9YT 37, NRP 35, OTL 25, VIK 24, K9GSC 16, W9VHP 16, K9ZYU 12, DOL 10, YTJ 10, HDL 8, W9ONI 8, APB 6, K9WIE 4, YDY 4, W9IJT 1. (Apr.) W9APB 24, K9YJT 3.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, W9HVA—RM: WOKTZ, PAM: KOKJR. Certificates renewed during May: ZCM as EC, PHC as OBS and YCL as OPS and EC. Two EC certificates were cancelled, WFO and KOKLU. The Williams County AREC Net meets on 3825 kc. Sun. at 1300 CST. The North Dakota Post Office Net, with KQJTP as manager, meets Sun. at 1830 CST on 3845 kc. The Post Office Net reports for May: 4 sessions, 45 total check-ins, maximum 14, minimum 9, 15 pieces of formal traffic, 7 informal and 5 relays. YCL reports he called the North Dakota 75-Meter Net 5 times with 110 total check-ins, 27 maximum and 18 minimum; 27 pieces formal traffic, 11 informal and 2 relays. No other reports were received on the N.D. 75-Meter Net. Only 2 traffic reports for May were received. K9OSW and OSV have a new triband beam up. Traffic: KQIVQ 289, W9YCL 19.

SOUTH DAKOTA—SCM, J. W. Sikorski, W9WRN—SEC: SCT. PMA and VTX received WAS certificates. KN9HPY was inducted into the Army. A new call, KN9GCO, is issued to Clive Hennick, of Watertown, who operates HT-40 and NC-300. He's 80 years of age and the step-father of BJV. K9BSW, Madison, has a new daughter. Other new calls are KN9s IBX, IKC, IBY, INJ, Sioux Falls and IJX, Valley Springs. BLZ, SMV and PHY have each worked more than 200 countries. K9YVC passed the General Class test and has accumulated an Invader 2000, an HQ-170, a 60-ft. tower and 40-meter and triband beams. K9s WEM and WEN also have a 60-ft. tower. RRN and SCT made an official visit to the Huron ARC. K9ALU is erecting a 40-ft. tower. Other new calls in Watertown are KN9HIP (she's the XYL of TLD) and KN9HQA. Traffic: (May) W9SCT 293, DVB 115, K9BMQ 65, W9WZL 45, K9YNR 36, BSW 14, W9VTX 10, YVF 10, KOVY 9, YJF 5, KN9GSY 4, K9SEJ 4, W9OFF 2, K9RQY 2, TVJ 2, VIZ 2. (Apr.) W9DVB 160, VTX 19.

MINNESOTA—SCM, Mrs. Lydia S. Johnson, W9KJZ—Asst. SCM: Charles M. Marsh, Q9ALW, SEC: TU'S. PAMs: OPX and K9EPT. RMs: PET and IZD. ORS and NCS K9SNG now lives in Delano and has a new HT-37 on the air. K9OQT is RACES RO for Wadena County. New club officers for the SPRC are K9LNE, pres.; HKF, vice-pres.; KKO, treas.; K9WML, secy.; THY and ORA Board members. The new editor of *Ground Wave*, the SPRC's club paper, is K9RSJ. MJN, Minn. Junior Net, our traffic training net, had its hour

of glory by having '57 Edison Award winner and top traffic-handler 3CUL check in with a message signed by America's first astronaut, Cdr. A. B. Shepard. The message was directed to the veterans in the VA Hospital. Don, our PAM, is working on his DXCC all 40-meter contacts. ZL2BX and his XYL were the guests of SFU. LIL has put up a new five-element beam for 20 meters. K9VTG, 14 years old, made his first BPL. AGL accompanied Vice-Pres. Lyndon Johnson on his recent tour of six countries. K9UKU won a golf tournament at the Scout Jamboree. GBG and XYL Lee returned from their winter Arizona home to spend the summer in Minnesota. K9ERP has been transferred to Kansas by the FAA. OO LST is using an HT-37 on s.s.b. TYP has a Viking II and an NC-183D receiver. K9ZRD and her OM vacationed in New Mexico for two weeks. KN9FLT, in Hibbing, is using a 50-watt Heath transmitter and an HQ-129 receiver. The following appointments were endorsed: K9SNG as ORS; K9MEQ and VCC as ECs; NYM as OES. The following EC appointments were cancelled: VTX, VOA and K9OQT. OPS cancelled were TWG, TCK, KFN and K9EWC. OOs KLG and WMA listed a total of seven violations. No AREC report was received from our SEC, TUS, for May. Traffic: W9ISJ 343, KJZ 329, PET 192, KOVGT 192, SNC 130, PML 125, UKU 83, W9HEN 71, KLG 68, OPX 63, K9QB1 56, W9DQL 49, K9OZD 44, W9LST 42, UMX 40, BUO 28, FGP 28, K9ZKK 28, W9NYM 23, KOVVP 19, W9RIQ 18, WMA 18, K9LIX 15, BAD 14, MGT 14, W9RQJ 14, ATO 12, K9RHN 12, W9THY 9, KOVPP 9, ZRD 8, QLM 7, WYV 7, IKU 6, W9WVT 6, K9CIB 4, KYK 3, SNG 3, KN9EUI 2, W9SZJ 1, K9VXW 1.

DELTA DIVISION

ARKANSAS—SCM, Daniel B. Patterson, W5SMN—SEC: K5CIR. PAM: DYL. RM: K5TYW. After the flash flood which hit Harrison, Ark. in May 7, amateur radio once again proved its worth, both to the general public and to the agencies which were assisting the victims. An overall look at the communication picture of this disaster shows that the communication was by far the best of all the aspects of the disaster. While there was only one station operating, it was able to handle all the traffic. It was an ideal station, some of the best equipment, very good location, good antennas and facilities to operate 24 hours per day. OCY, WEE, K5AUC and RYM, of Green Forest, Ark., were the operators who kept the station going 24 hours a day. It was operated on the RACES frequency with direct contact with State C.D. Some of the other hams who helped handle traffic out of Harrison were RIT, K5UPZ, K5KAC and K5TYW. The hamfest held at Forest City was well attended, with over 55 registered hams and XYLs. CIS and VRB were the horse-shoe pitching champions. DYL swore that he would move the stakes next time so that they couldn't ring them so fast. Hams were guided in with a Viking and a forked limb antenna. The MARSfest was held at McCrory and was well attended. The Boss was IXC. Traffic: K5USE 637, W5DTR 155, K5IPS 97, W5SZJ 76, RYM 69, PAM 45, K5TYW 42, W5SMN 9, K5CIR 4, MEA 4, W5DYL 2, K5VOL 2, W5WEE 2.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—That Monroe Convention may not have been the biggest but it was the friendliest one your SCM has attended. CEZ won a 6N2. Through the courtesy of the phone company, Ed Handy addressed the convention direct from Hartford. PDP and his XYL were married in New Orleans June 8. They met again after thirty-four years through her son, AOF. The Loyola University ARC reports that the situation in Cuba turned the club's station into a short wavy listening post for awhile. The Arcadia ARC reports two new emergency generators in Crowley. BMN and JRK and their families attended the hamfest at Lake Anacoco. JRK is trying to get set up with RTTY with TRP helping. K5ANN furnished s.s.b. for Field Day. BAC was very busy during the recent C.D. Alert. He is Parish C.O. K5FZT still is sweating out his Conditional. K5RUX is working c.w. only, not by choice though. K5TJG, KSN and KBX are all MDS. K5QXV, a newly-appointed OPS, is busy handling traffic. UQR and BGL made a three-and-a-half-week DX-pedition to Alaska. They used a KWM2 and a Heath "Sixer." HHA has a special cut 75-meter antenna for his favorite frequency. IAW was awarded a WA 25 N.O. station certificate. K5LZA decided on attending one session of summer school at Texas A&M. His roommate is K5RDC. Waco. FMO retired his 23-year-old HQ-120 for a 75S-1. Traffic: (May) W5CEZ 239, MXQ 107, NUH 52, K5ESW 46, CVZ 23, W5HHA 16, EA 14, K5LZA 6. (Apr.) K5QXV 66.

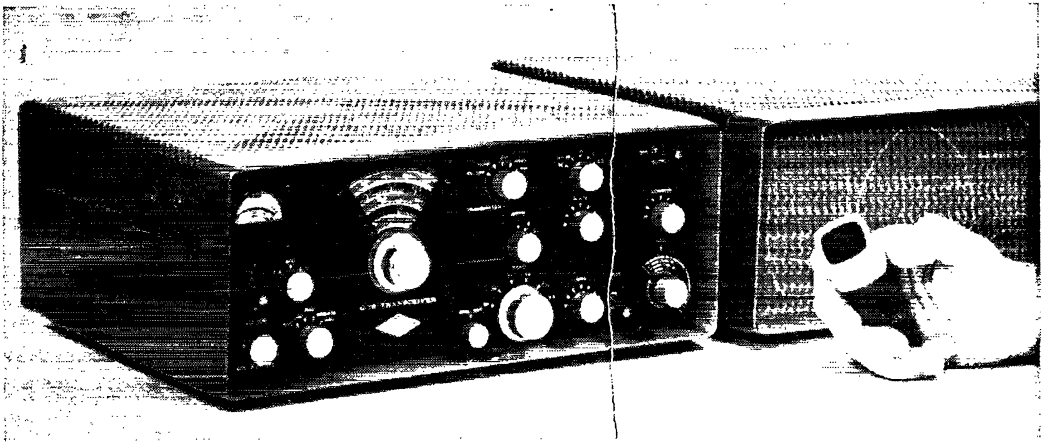
MISSISSIPPI—SCM, Floyd C. Teetson, W5MUG—K5EYS was a recent representative to Boys State. Nice going, Will. DLA is the new civil defense director for Gulfport. Congratulations, Jay. I recently met with the SCMs of Louisiana and Tennessee along with the Division (Please turn the next page)

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A Word from Ward . . .



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Think it's only a matter of time before some bright-eyed genius invents a receiver that'll be about as big as a Rolex wrist watch. When that day comes I wouldn't be a bit surprised to see a diamond-shaped design on the face of that "watch". And do you know what you'll find inside that diamond? The letters: GONSET.

Up. I honestly think the folks at Gonset have learned as much about the art of miniaturization as anyone around these parts. Want me to prove it? Fine. Permit me, sahib, to invite your attention to the new GSB-201 RF Linear Amplifier.

Here's a little powerhouse that really lives up to its name. Only 8½ by 12¾ by 17 inches, it takes up about as much room as an electric typewriter. But what really stumps me is how Gonset managed to get such a multitude of features in so small a package! Look at 'em:

Full bandswitching on 10, 15, 20, 40 and 80 meters. 1500 watts P.E.P.* input for single side-band—1,000 watts input on CW—and 400 watts input, AM. Power consumption? Approximately 2000 watts peak. Can be driven by exciters in the 65–150 watt range depending on the input, has an input impedance of 50 ohms nominal and an output impedance of 50 ohms with SWR less than 3:1.

So much for size: so much for power. The only thing I haven't talked about is the looks of the GSB-201. I know I could have put a cut of the unit at the top of this space—but a picture the size of a postage stamp just wouldn't do it justice.

Tell you what let's do. You send me your name and address, I'll send you a dope sheet. Right? Right!

Sincerely yours,

Ward J. Hinkle : W2JFE

*P.E.P. input is approximately twice average d.c. input.

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Ward J. Hinkle, Owner

Director. We discussed several topics and the results will become apparent as time goes on. K5TFD has moved to Greenwood, K5MDX made 41 VP9 contacts in a recent Bermuda Contest. A good many of the gang took part in the recent Armed Forces Day activity. 411QZ:5 has a pair of 250THs putting out an FB smoke signal. W3GTG has gone s.s.b. with a 10-A and a pair of 813s. W5BSA is on s.s.b. with a new homebrew rig. It sounds fine. Doc, I'm beginning to get more reports of late. Keep them coming, gang. Traffic: K5RUO 105, UBI 25.

TENNESSEE—SCM, R. W. Ingraham, W4U10 SEC: K4OUK. RM: K4AKP. PAMs: W4UVP, W4PQP and W4VQE. The Mid-South Club in Memphis held its hamfest on June 18 and reports that nine 50-Mc. mobiles took part in the Cotton Carnival Parade. W4WXH has a new lightning bug. Congratulations to K4PUZ, who was high man in the SS and WVE Contests. W4AOY reports renewed interest in the Johnson City Club, which meets the 3rd Thurs. Oak Ridge announces plans for the Crossville Picnic to be held July 22. W4YRM reports the High-banders Net meets at 8 p.m. Thurs. on 51 Mc. W4WBK reports that K4BOM, W4YMG and K4DXS have returned to Memphis for the summer vacations. W4HSR is entering U.T. to study electrical engineering and hopes to be heard from the club station. W4ONO. New appointment: K4VZL. OBS in Knoxville, with schedules on 50.4 Mc. at 1845 EST. Traffic: (Maj) K4AKP 1100. W4PL 591, W4WXH 324. W4FX 237. K4SNR 82. W4HSR 65. W4VJ 57. W4UVP 28. W4U10 27. K4AMC 25. W4TZG 18. K4LPW 8. W4CVL 7. W4ZJY 7. W4TYV 5. W4VTS 5. W4YRM 4. (Apr.) W4HSR 61. K4OUK 6. W4YRM 4.

GREAT LAKES DIVISION

KENTUCKY—SCM, Robert A. Thomason, W4SUD—Asst. SCM: W. C. Alcock, W4CDA. SEC: W4BAZ. RM: K4KWQ. PAM: W4SZB. V.H.F. PAM: K4LOA. The SEC/SCM team of W4BAZ and W4SUD visited the club at Murry State College. BAZ also visited several in Paducah on the same trip. Kentucky dropped from first place to twelfth in the number of ECs reporting this year. W4ADH is working on the mobile rig for vacation. K4YTD plans to be portable at Murry College in our section nets this summer. WN4AGH has a new IIR0-5. George is manager of the Kentucky Novice Net. Look for it daily on 3720 kc. at 1800 EST. K4KWQ is working DX with his Heath "Sixer" during the good band openings. KN4YZU is active on KNN and hopes to join KYN and KPN with a General Class ticket soon. K4WOL has CB27 mobile on 10 meters. W4SZL plans to take it easy this summer. K4QCQ thanks those who QN'd the special KYN session May 18. W4CDA has a new 15-meter antenna. K4YUD has a new Matchbox and an 80-meter antenna. The ABC V.H.F. Club meeting was held at K4ZQR's QTH. K4ZQR has a new BC-221. K4PGH has received an appointment to West Point. K4HOE reports that he will not be transferred out of this section as was planned. K4HOE also reports that the BC-610 failed after six hour's operation during Operation OPAL 1961. W4SZB is redecorating his home with odorless paint. OO reports were received from K4ZQR, W4JU1 and W4SZL. K4VDN is a new OBS. Traffic: K4KWQ 156. W4BAZ 65. K4PGH 65. K4CSH 58. K4OZG 58. W4CDA 48. K4QCQ 42. W4RNF 32. WN4AGH 31. KN4YZU 25. W4SZB 21. W4SUD 19. K4YTD 19. W4KJP 16. K4HOE 15. K4VDO 11. W4YY1 11. K4PWX 5. W4WVU 4. W4JU1 3. W4SZL 3. K4ZQR 3. W4VJY 2.

MICHIGAN—Ralph P. Thetreau, W8FX—SEC: ELR. RMs: EGI, SCW, QOO and FWO. PAMs: K8CKD and JTQ. V.H.F. PAMs: NOH and PT. Appointments: K8HLR and K8KQV as ORS; K8EFY, K8GJD, K8GOU and QPO as OPS; K8OTJ as OBS; NOH as OES; K8RDE as OO. New officers: Mich. Tech ARC—DXX, pres.; K8HLT, vice-pres.; K8AXL, secy. Benzie County RC—UTE, pres.; VTM, vice-pres.; AIO, secy.—treas.; K8KVM, net mgr. OES reports were received from BAN, K8BGZ, K8XEY, NOH, K8PBA, EMD and PT. All stress 50-Mc. band openings during May. The Annual V.H.F. Picnic will be held Aug. 6 at Marquette. JYJ's eyes are well enough to drive his car, but ZHB is not improved. The Central Michigan ARC bulletin now is called *The Scope*. K8PUU likes his 75-S1. K8HKM joined the Air Force. K8PQH moved to Benton Harbor. TJJ and his XYL now are recovering from serious illness. K8NHC now has YL—bye ham radio. Not much information in various club bulletins was received this month. K8KMQ BPLed for the seventh time on originations and deliveries. EMC reports after many years. MID is going to summer school. PDO is off for the summer. K8JED has a new tower and tribander. CPO Wright showed movies of the Morocco disaster to the SVARA. Do not ask for an OO appointment until you have made at least one FMT! Wayne State U. RC still is after the call W8UA. PT works 225 miles on 432 Mc. and is building a 432-Mc. collinear array. K8BGZ worked VE1YQ and KP4XC on 50 Mc. 50-Mc. activity is increasing. Any-

(Please turn the next page)

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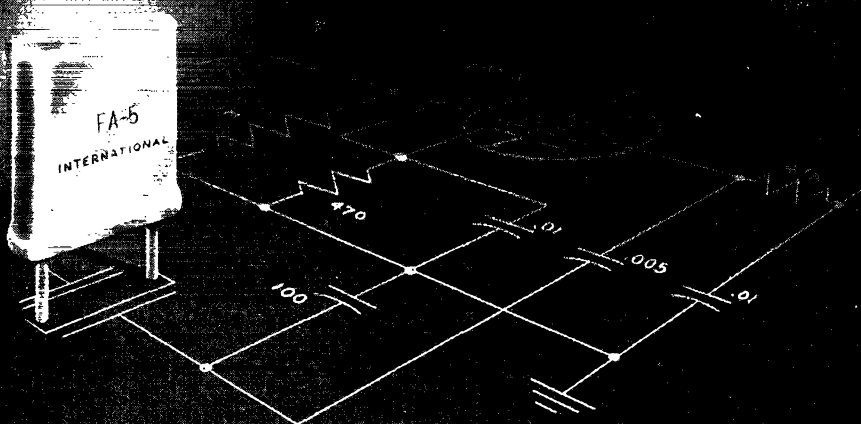
one copying the new NAA on 14.9 kc.? Traffic: (May) K8KMQ 163, W8OCC 162, K8HLR 153, JUZ 147, W8EMC 118, JTQ 115, K8EXE 102, W8FWQ 73, ELW 64, ZIB 57, FX 49, NOH 49, K8GJD 43, W8EOI 38, K8AEG 31, W8HKT 30, K8PKU 30, W8MPD 29, K8CDO 27, W8FDO 23, EU 22, DSW 20, K8JJC 18, W8AUD 17, EGI 16, K8GOU 16, LZP 14, JED 12, KVM 12, W8XJ 11, K8QEX 8, W8YAN 7, K8KQV 6, W8ZJE 6, K8BZL 5, DJQ 5, W8BAN 2, K8LOS 2, NHC 1, W8UTN 1. (Apr.) W8JTQ 128, ELW 86, UFS 34.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, 8DAE, SEC: HNP, RMs: BZX, DAE, VTP and K8ONQ, PAM: K8MPY. Here are the Ohio Intra-state QSO Party scores: N8K 9976, K8HSU 9086, VZ 4950, K8KSN 4005, MEI 3612, K8MHO 3388, K8OEX 3075, K8RYU 2484, K8BXU 2418, K8HTM 2112, K8RFU 2100, YPT 1792, K8RUC 1653, K8RUU 1479, K8MTI 1300, AL 1186, K8KFP 1127, CJX 966, K8VIX 740, VDF 693, K8IKO 448, IBX 408, K8BZF 192, YGR 187 and EQN 49. IBX received the White Rose Award and WANJ. ULC and K8TCR set up communications on 6 meters during a flash flood at Morrow with K8BLS as net control and FAK, PBX, K8s GYJ, GYK and RIZ helping. W9KOY and W9LRH moved to Ohio. K8s ZQI and ZQJ are new hams in the Sandusky Area. Greater Cincinnati ARA's the Mike and Key informs us the club members were shown two movies at a recent meeting and held their second annual ham picnic and swapfest with an HQ-110 as a prize. TIZ has a new HT-37 and Drake 2-B operating s.s.b. The ham family of TZO and K8BOF has a new baby girl. K8BPZ's sister is KN8YWK. The Seneca RC saw a movie and heard a tape recording of the 2540-mile QSO on 144 Mc. Dayton ARA's R-F Carrier tells us that the club heard a talk on transistors with slides to illustrate by K3JAI/8, then was shown a color film of a trip through the RCA Semi-Conductor plant; KN8ACJ is a new ham and there were 120 at the Hamvention S.S.B. Dinner. Inter-City RC's IRC News Bulletin contains two pages of pictures of member stations, namely EMK, GGH, JYY, LRR, QJF, SOU, TAJ, VBF, ZET, K8s AKA, CRO, DKO, ERV, JPF, MFZ and PTM; the members were shown a movie of ARRL Headquarters; showed gear made in a home-built contest; the 2-meter net has ten check into it; K8s BFW, CRO, ELV, MFZ and ORB are operating on 1296 Mc.; GGH has a new Drake 2-A and KN8ZDD is a new ham. Lorain County ARA's 1961 officers are QW1, pres.; K8IQQ, vice-pres.; K8NQD, secy.; K8GIM, treas.; FEZ, LWH, K8s HBK, JOS, KGV, council. IBX received the BA-88 and WRONE Awards. K8s VIX and VWN received their General Class licenses. Van Wert ARC's 1961 officers are K8PFD, pres.; K8LMN, vice-pres.; SGX, secy.; DIIG, treas.; and K8EUF, act. mgr. K8DDG has a new 75-13. K8PBE has a new SX-110. HZJ spent the winter in Florida. Smoke Signals from the Indian Hills RC states the club was shown a scientific film; had a display of new mobile and fixed equipment and along with other Cleveland clubs heard a technical talk by JDF, from ARRL Headquarters. Findlay RC's The W8FT News informs us the members saw the movies Supersonic Flight and Rival World; QKO moved to Newark and the stork brought a baby boy to IYC. Toledo's Ham Shack Gossip names K8SWD as its Ham of the Month and relates that K8TVW received his General Class license and has a new KWM-1; KN8ZTZ is a new Novice; SDI is on 6-meter mobile; K8GOT was married. From Springfield ARC's Q-5 we hear that K8NVS demonstrated amateur radio to a Boy Scout troop; K8SUJ is moving East and BMC is on 432 Mc. Columbus ARA's Carascope states that JSU won the club's DX C.W. Sweep-the-Deck Contest. We received Warren ARA's The Q-Match. Canton ARC's Feedline's cover page had a picture of YAB's station in color with the code practice equipment the club used last winter for code practice on the air and tells us KN8s ZCO and ZMN are new Novices; a new 6-meter net known as the Sunday Noon Naggers became affiliated with the club; K8AGB was married; IIV and K8DGO are on 160 meters; DIM has a new HQ-180. Parma RC's P.R.C. Bulletin states that K8MHZ moved out to the West Coast; AJW received the WOC-30 certificate and EPP showed movies of the jet and jet engine. My thanks to the OH-KY-IN V.H.F. Radio Society for sending me their Q-Flier, which reports that K8HAQ is home from the hospital and K8VJN spoke on wave propagation; AL received WANJ and CHC, PTM moved to Florida. BZX, DAE and UPII made the BPL in May. Traffic: (May) W8DAE 1020, UPH 635, K8AAG 416, W8ICR 271, BZX 196, ZYU 170, K8ONQ 146, RUC 50, W8CKM 48, K8BPZ 47, UQW 33, W8LT 25, K8LUP 21, W8AL 19, IBX 18, K8HTM 13, PFD 10, W8YGR 8, K8VKK 7, W8LZE 6, EEQ 4, HZJ 4, LMB 2, W8YS 2. (Apr.) K8BPZ 39, W8PMJ 14, TXT 11, PBX 8, ONT 5, VJV 5, K8MAZ 4, JSQ 3, W8LBZ 2, K8WLP 1.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC, RMs: W2PHX and K2QJL.
(Please turn the next page)

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SHORTWAVE PROPAGATION by Stanley Leinwoll (Radio Frequency & Propagation Mgr.—Radio Free Europe). This review in QST (May 1960) sums up the book's vital interest to all amateurs:

"Of special interest to QST readers are chapters on amateur contributions to knowledge of wave propagation and a forecast—advanced with admitted caution!—of probable amateur-band conditions during the coming sunspot cycle. Throughout the book the reader is introduced to various interesting aspects of propagation: one-way skip, for example, scatter, meteors, auroral effects—all the things that hams continually encounter in everyday operation. It would be hard to find a question about propagation in the 3-30 Mc. region—at least the type of question that an amateur would ask—that isn't covered somewhere in this book..." #231, \$3.90.

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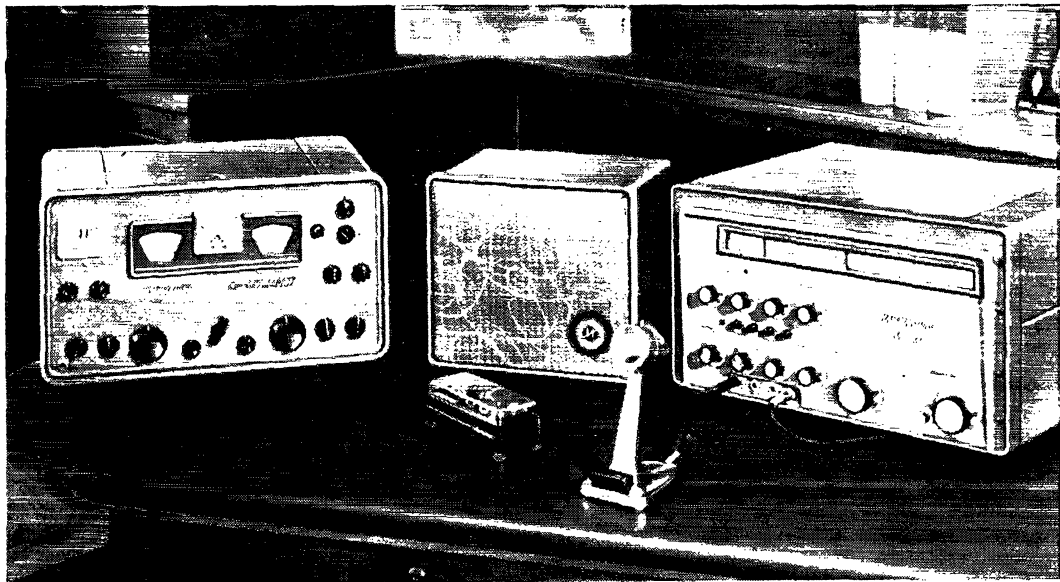
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PAMs: W2IJG and W2NOC. Section nets: NYS on 3015 kc. at 1900; NYSPTEN on 3925 kc. at 1800; ESS on 3590 kc. at 1800; MHT (Novice) on 3716 kc. Sat. at 1300. Endorsements: W2HZZ, W2SQW and K2CXO as ECs. Appointments: WA2IIGB and WA2KUS as ORTs, W2IC as OO. W2URP hit the jackpot: a 35-w.p.m. certificate, perfect copy on Armed Forces Day message and new tower, rotator and beam. The following were active in the Feb. FMT: W2AZO, W2FVP, W2ZBS, W2ZSJ, K2UTC and WA2KUS. Graduating from Cornell, K2DEM will attend Yale Law School this fall. The Ulster Co. Mike and Key Club held a spring auction with more than 45 in attendance. Assisting with the Memorial Day Parade in New Rochelle were K2SJN, K2YCV, WA2JZI, WA2JZA, WA2OBZ and W2NRB. City officials were impressed. K2OUA is reactivated after two years away at college. K2RRZ has a GHF-1X in operation. K2IQB is new director of the New Rochelle Club. The club's April meeting attracted a record attendance. The Dutchess Co. V.H.F. Society will give a trophy to the highest scoring multiple operator station in ENY in the June V.H.F. Party. Send your scores to W2HZZ. The award will be presented at the Syracuse V.H.F. Roundup in Oct. WA2BAH reports 14 states on 2 meters. New gas-driven power plants are reported by W2DQW and WA2KUS. Do you have emergency power? W2PHX is running new linear a pair of 811As with 300 watts input. Your humble reporter was recipient of the Broughton Award for public service traffic sponsored by the Schenectady Club. My deepest thanks. Traffic: (May) WA2HGB 159, K2YZI 126, WA2KUS 125, W2EFU 87, W2PHX 26, W2PKY 22, W2URP 20, K2HNW 10, K2TXP 7, K2YCV 7, K2OUA 5, WA2MID 4, K2BGU 2. (Apr.) WA2KUS 32, W2PHX 16.

NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Dannals, W2TUK—SEC: W2ADO. RM: K2-UFT. PAM: W2UGF. V.H.F. PAM: W2EW. Section nets: NLI, 3630 kc. at 0030 GMT nightly and 0015 GMT on Sat. NLI (late), 3630 kc. at 0330 GMT nightly. NYCLIPN, 3908 kc. at 2230 GMT nightly. V.H.F. Traffic Net, 145.8 Mc. at 0130 GMT Tue.-Wed.-Thurs. It is with pleasure that I announce the election of W2OBU to succeed me as SCM effective Aug. 1. George needs no introduction to most of the NYC-LI section members because his past work as SCM for four years and Hudson Division Director for six years shows his devotion to our hobby. Reports for August traffic and activities should be mailed to W2OBU, 3 Daisy Lane, Commack, L.I., N.Y. I will be with you via this column for two more issues of QST, covering activities through July. BPL cards were earned by K2UAT, W2GKZ, W2EW and W2FXR, the latter three on originations plus deliveries. Please note that the early session of NLI has been discontinued. However, a late session is announced in order to handle 2RN traffic rather than hold over for a day. The NLI gals celebrated its 15th anniversary with a dinner and had the pleasure of a chat with WINJM and his very pleasant XYL. The net hopes to improve liaison with other section nets and your cooperation is invited as a participant in any of our nets. Some folks are complaining about conditions on the h.f. bands, but the v.h.f. boys enjoyed almost daily 50-Mr. openings extending to W6- and W7-Land and Mexico. W2FXR, the Manhattan College RC, is on the air with a 75A-2 and an Apache with s.s.b. exciter. WA2NWX is using a Ranger and an SX-101 MKIII. W2AEE, the Columbia U. RC, is working s.s.b. with an HT-32 and an SX-101. The section lost one of its very active members when K2AZT moved to the Western Florida section. K2-IBJ is running a Communicator III on 2 meters and is working on a nuvistor converter. K2OVN is returning to 20-meter c.w. K2QBW, on vacation from M.I.T., returned to East Marion, W2IUU has a new Lettine rig for 6 and 2 meters. K2UYG has a 75A-2 receiver. W2JBQ is celebrating his 30th year in ham radio and hasn't missed a Field Day since 1938. Congratulations, Joe. WA2BWO has been very active on NLI. K2RHG now owns a 75A-3. WA2KFN has a "Twoer" and an Ameco converter into his HQ-110. The Nassau Community College at Mineola has received the call WA2STY. WA2OFT is trustee. A suggestion often received and now repeated by K2QGA urges that you register your call with your post office to insure delivery of partially addressed QSLs. WA2SOZ, a new call in Bethpage, is active on 2 meters. New officers of the Brooklyn Poly. RC, W2BXX, are K2SFZ, pres.; K2RDP, vice-pres.; K2PAR, secy.; and K2RHG, treas. Ex-W2CQG now K1OXU, sends regards from Ellington, Conn. WA2JQU is now using a new RME-6000 and a DX-20. W2DTL was visited by JA3SQ during the latter's recent business trip to N.Y.C. Excellent club bulletins were received from the Radio Club of Brooklyn, Suffolk County RC, Larkfield ARC, Five Towns RC, Amateur U.H.F. Club, NYRC, Levittown ARC and the Mid-Island Six Meter Net. Bulletin editors are requested to forward bulletins to the new SCM, W2OBU. I have enjoyed reading your club news, much of which has appeared in this column. Ex-WA2AFX will soon be in Keflavik, Iceland, for a short assignment. Please remember all reports com-

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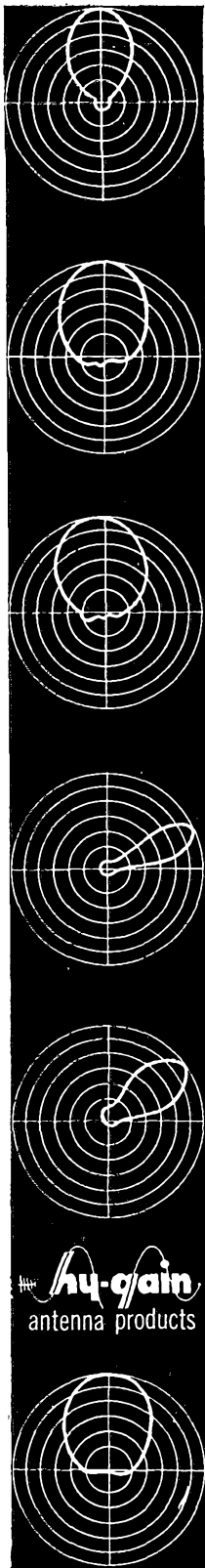


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mencing with August go to W20BU. I'll sign clear in the October issue. Traffic: K2UAT 1049, W2GKZ 337, W2EW 326, K2UFF 178, W2FYR 157, WA2BWO 150, WA2OGA 45, WA2NWG 39, K2TNY 37, WA2CZC 36, W2PF 17, WA2GAF 15, W2DBQ 12, K2CMJ 10, W2AEE 7, W2JBQ 7, K2RHG 6, K2MEM 4, W2DUS 3, W2OKU 2.

NORTHERN NEW JERSEY—SCM, J. Sparks Reemzky, K2MFF—SEC: WA2APY, RM: K2VNL, PAAM: K2SLG, V.H.F. PAM: K2KYR. Section nets: NJN, daily at 2300 GMT on 3695 kc.; NJPN, Mon. through Sat. at 2200 GMT and Sun. at 1300 GMT on 3900 kc.; N.J. 6 & 2, Thurs. and Sun. at 0300 GMT on 51.15 Mc. and Wed. and Sun. at 0200 GMT on 147.75 Mc. The above times are based on EDT. The NJN reports 31 sessions held, attendance 613 and traffic 390. The NJPN reports 31 sessions, attendance 633 and traffic 134. The N.J. 6 & 2 nets report 21 sessions, attendance 221 and traffic 22. W2VAV has moved to Cedar Grove. K2LSX is stationed in Korea. The North Jersey DX Association has become an ARRL affiliate. K2MFX has a new "Invader" on the air. Welcome back to WA2SNY, who was last on the air as W2GFN 26 years ago. W2NIY and K2MFF received the Colonial America Award. K2EQP is on the air with RTTY. WA2EQO is spending the summer in California. WA2ERI received his General Class license. WA2CZX also received his General. The Union County ARA held an open house Memorial Day. W2DNO, W2EUI, W2EWZ, W2HFP, WA2HZC, K2KRI and W2ONH were on hand to explain ham radio to the public and 71 messages were originated for visitors. W2OQP is putting a converted SCR-522 on the air on 2 meters. WA2CCF and K2UCY earned BPL cards for May traffic. K2BTM and W2BVJ are heard regularly on 220 Mc. WA2KRI is now EC for Monmouth County and manager of the Shore Emergency Net. WA2JHQ is working hard on some equipment for 220 Mc. K2OQA received the R6K Award. The Columbia High School RC, WA2IZN, has started a message origination service for the students and teachers. WA2EJZ and WA2KKH are complaining that schoolwork doesn't leave enough time to operate. WA2KRC's brother has received his Novice Class license. His call is W2SSH. Correction to June announcement that W2GRF is a new 00. It should have read W2GFR. Traffic: (May) K2UCY 543, WA2GQZ 458, WA2COO 241, K2VNL 224, WA2JHQ 200, WA2APY 181, WA2CCF 180, K2VVL 169, W2QNL 85, W2RXL 85, W2GIZ 71, WA2EDG 53, K2MFF 53, WA2EQO 52, WA2KKH 40, K2CCF 39, K2PYH 26, K2ITU 25, W2ANG 24, K2SLG 19, K2MFX 14, K2VNK 8, W2EWZ 6, W2CFB 4, K2EQP 4, K2TWZ 3, WA2IZN 2, W2NIY 2, W2OQP 1. (Apr.) WA2GQI 51, W2CVW 38, K2SLG 23, K2MFX 24, K2CCF 6, WA2EJZ 1. (Mar.) K2CCF 28. (Feb.) K2CCF 18.

SECOND NEW JERSEY QSO PARTY

August 26 and 27

The Garden State Amateur Radio Assn. invites all amateurs the world over to take part in the Second New Jersey QSO Party.

Rules: 1) The time of the contest is from 2200 GMT August 26 to 0400 GMT August 28. 2) Phone and c.w. are considered the same contest. A station may work another station twice per band, once on phone and once on c.w. The same station may be worked on other bands. 3) General call is "CQ New Jersey." N. J. stations are requested to identify themselves by signing "DE NJ" on c.w. and "New Jersey calling" on phone. Suggested frequencies are 1815, 3530, 3900, 7030, 7250, 14100, 14240, and 21100 kc. 4) Exchanges consist of QSO number, RS(T), and QTH (state, province, or country). N. J. stations will send county for QTH. 5) **Scoring:** Outside stations multiply number of complete contacts times number of N. J. counties (maximum of 21). N. J. stations multiply number of complete contacts times total number of states, provinces, and countries. 6) Awards will be sent to the highest scoring station in each state, province, and country. N. J. stations will receive first and second place awards in each county. Novice and Technician awards will be issued when two or more logs are received. 7) Logs must also show time, date, band, and emission, and be postmarked no later than September 12, 1961. Logs go to GSARA, Red Cross Building, Broad Street, Shrewsbury, New Jersey.

MIDWEST DIVISION

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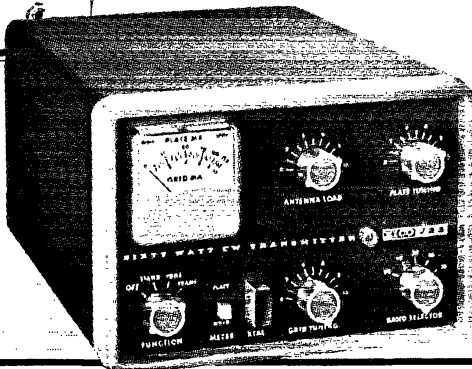


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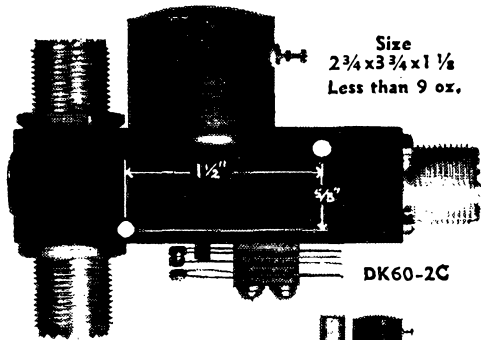
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DK60-G

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MECHANICAL SPECIFICATIONS:

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Thief River Falls, Minnesota

this report reaches you, you will have a new SCM, WONTB, so I wish to take this opportunity to express my thanks to the Iowa gang for its cooperation during my six years in office. I also wish to express my special thanks to UJC, Assistant SCM, for his good work and help. Good luck and keep the section growing. The Iowa 75-Meter Phone Net report: 1230 QNS in 28 sessions and 102 QTC. The TLCN held its Annual Party June 3 in Des Moines. PKH was elected net manager. The SUI Radio Club, the Des Moines Tech. High School Radio Club and the Story County Radio Club are now ARRL affiliates. KÖHTE received appointment as OES. KÖGXP renewed his OPS appointment. FDM reports that a Humboldt County AREC Net has been organized. It meets each Sun. at 1330 CST on 3906 kc. IO, SUI Radio Club, now has a HY-Gain TH-3 beam on a 110-ft. tower. KÖZNU has his General Class ticket. QVZ had 300 countries confirmed. Early this spring the amateurs in Cedar Rapids furnished communications for two emergencies. On Apr. 23 tornadoes knocked out power and phones in Northern Linn County. From Mar. 29 to Apr. 1 they were active during a severe flood. Nearly 90 amateurs participated. Traffic: (May) WÖLGG 2034, LCX 1270, BDR 1134, PZO 452, DCA 218, NTB 85, SCA 65, KÖWVK 27, WÖYDV 19, KÖKAQ 18, HBD 15, VHR 14, BHC 11, WÖIO 9, QVZ 7, KÖPOI 6, WÖQVA 5, KÖGOT 4, KBX 2, QKF 2, VSV 2, WÖGQ 1. (Apr.) KÖVBM 7, WÖQVZ 6, KÖSVJ 1.

KANSAS—SCM, Raymond E. Baker, WÖFNS—SEC: KÖIZM, RM: QGG, PAM: ONF, V.H.F. PAM: RAJ. Section nets: KPN, 3920 kc. Mon., Wed., Fri. at 1245Z, Sun. at 1400Z. NCSSs KÖQKS, EPL, WÖFHU, ORB and IFR, QKS, 3610 kc. daily at 0030Z. NCSS SAF, BNF, FNS. The Kansas Storm Net, 3925 kc. Mon. through Sat. at 0017Z. NCSS, SEC and ECs. The Kaw Valley Amateur Radio Club, Topeka, held its Hamarama May 21 with 143 registrations, 245 in attendance and 50 emergency mobile units. The Central Kansas Radio Club, Salina, held its hamfest June 4 with 175 registrations, 300 attendance and 62 mobile emergency units. Both of these clubs continue to have fine get-togethers. Johnson County ARC nominated DEL as its outstanding Member for the Month. The Newton ARC nominated KÖSFU Ham of the Month. ALA and LEW both have new HT-32s. NBC helped the Brown and Dean families talk to their sons in Hawaii through the Barbers Point ARC, making more friends for amateur radio. The Radio Club, Dickinson County Community HS, Chapman, set up portable on Visitation Day and accepted traffic from visitors. KNÖBHN and BHP were assisted by KÖUHF. Traffic: (May) KÖHGI 295, WÖSAF 141, QGG 119, ABJ 106, FNS 81, ORB 49, KÖJZM 42, WÖIFR 26, KÖHVG 21, PSD 20, WÖTOL 20, KÖQKS 15, EPL 13, UHF 11, GEL 7, YWG 5, JID 3. (Apr.) WÖHJ 576, HGI 384, QGG 142, KÖUHF 78, WÖRFJ 66, BFE 24, KÖZPN 24, QKS 12, LHF 10, WÖFDJ 2.

MISSOURI—SCM, C. O. Gosch, WÖBUL—Net reports: MEN (3885 kc., 2400 GMT, MWF), 14 sessions; QNI 435; QTC 142; NCSSs KÖONK 5, KÖMAR 4, KÖVNB 2, KÖQOD, OHC OV 1, HBN (7280 kc., 1805 GMT, Mon.-Fri.), 22 sessions; QNI 196; QTC 222; NCSSs KÖLTJ, KÖHGI ANT 2; QJU, REU, KÖYVT 1, MSN (3715 kc., 2230 GMT, Mon.-Fri.), 23 sessions; QNI 108; QTC 113; NCSSs KÖONK 9, KÖVPH 8; KNÖFPC 6; MON (3580 kc, 0100 GMT, Mon.-Fri.), 27 sessions; QNI 154; QTC 221; NCSSs OUD 11, KÖQQC 5, KÖUXQ 3, WYJ 2, RTW 1, SAM (3580 kc., 2200 GMT, Sun.), 4 sessions; QNI 11; QTC 1; NCS OUD 4. Appointments: LFE as V.H.F. PAM; IFC as OES; KÖETY and KÖKBD as OO Class I and II; KÖVNU as OO Class III and IV; KÖVNB, ANT, KÖHNF as ECs. Endorsements: OMM and KÖLTJ as OPs. Cancellations: KÖQZP as OO Class II and IV, KÖOEP and KÖRXD as ECs. The SCM extends thanks to the following for nice reports for the month: KÖONK, OO Class III and IV; KÖETY, OO Class I and II; KÖOYV, OO Class III and IV; KÖLCB as OES; ÖVV as ORS; ÖVV as PAM, net mgr. for report of activity of the Missouri Storm Warning Net. Other leadership appointees, please take notice and follow the example of those listed above. As stated previously in this column the MSWN (Missouri Storm Warning Net) is active on 3885 kc. Several periods of heavy weather were experienced during the month with the net activated each time. The annual SWMARC, Inc. (Springfield) Picnic will be held this year on Aug. 27. Further details will be announced later. The Annual Ham Butcher Net Picnic is slated for Aug. 20 at Emporia, Kans. BNZ, formerly of Van Buren, is operating portable 5 in Arkansas now. AYB reports a complete rebuilding project at Jefferson Barracks with new s.s.b. gear and crank-up tower. KÖJPL got over the hump on DXCC with 119,100. KIK is building an Apache rig. The MONKEY (publication of the MON) has folded up because of the marriage of MHS, its editor. Traffic: (May) KÖONK 607, WÖWY 413, KÖLTJ 399, WÖANT 160, KIK 143, OUD 128, KÖQQC 103, VPH 91, WÖMKJ 89, KÖBLJ 84, WÖMM 84, KÖPCK 84, RPH 70, WÖOYV (Please turn the next page)

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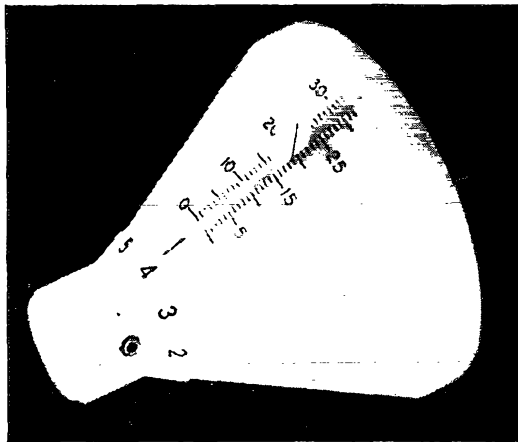
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52, BUL 49, KOUXQ 49, MMR 40, WORTW 33, ARO 28, KNÖPFC 28, KÖVNB 24, WÖEPI 14, KÖOMA 13, WÖ-BVL 12, PXE 9, KÖWNZ 8, WÖGBJ 2, (Apr.) KÖQCQ 76, WÖARO 8.

NEBRASKA—SCM, Charles E. McNeel, WÖEXP—SEC: KÖTSU. The 75-Meter Morning Phone Net, KÖ-DGW as NC, reports QNI 626, QTC 76. The Western Nebraska Net, NIK as NC, reports QNI 617, QTC 53, 100 per cent reporting KÖTÜH, KÖBMQ, DVB and RII. DDT reports the Nebraska Section C.W. Net had QNI 118, QTC 42. This net has secured operation for the summer and will resume operation on Sept. 1. The 75-Meter Emergency Phone Net, EGQ as NC, reports QNI 740, QTC 64, plus informal traffic 57. The Chadron Annual Picnic was held at Chadron State Park on June 4 with 113 in attendance. A c.d. meeting began at 10 A.M. followed by the picnic dinner and two hidden transmitter hunts, one for the XYs. *The McCook Amateur Radio Club, KÖTAJ, Park View Addition McCook, will issue a certificate for "Worked All Nebraska Counties."* The certificate will be issued for confirmation of 50 counties and an endorsement sticker will be issued for each additional 10 until all 93 counties are worked. Traffic: (May) WÖ-DDT 66, KÖDGW 65, QFK 52, WÖEGQ 46, KÖWEP 40, RRL 35, HKI 24, BRQ 19, WÖNIK 19, KÖDFO 17, WÖ-ZJF 14, KÖMSS 13, CGM 12, WÖMFP 12, VZJ 12, VEA 10, KÖKTZ 9, KJP 6, WÖYFR 5, CGG 4, HOP 4, KLB 4, ÖCU 4, ÖUV 4, KÖQYG 3, WÖHXH 2, KÖSCN 2, VTD 2, WÖWKP 2, KÖALY 1, WÖBOQ 1, KÖBYK 1, UWK 1. (Apr.) KÖRNH 48, QFK 41.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Henry B. Sprague, jr., W1CHR—SEC: EOR, RM: KYQ, H.F. PAM: YBH, V.H.F. PAM: FHP. Traffic nets: CPN, Mon.-Sat. 2200Z, Sun. 1400Z on 3880 kc.; CN daily 2245Z and 0115Z on 3640 kc.; CVN, Tue., Thurs. and Sat. 0030Z on 145.93 Mc.; CTN, Sun. 1400Z on 3640 kc. Out of 45 ECs in this section 15, or 31.3 per cent, made annual reports for 1960. We ranked 39th among all ARRL sections. Although a big improvement over the year before when only 4 reports were turned in, it still is a disappointing performance. Your SCM rarely hears from ECs on AREC activities and yet he would welcome any news. If you are active in AREC work, let's hear about it. NFG sold his s.s.b. gear and now has a Heath "Twoer." He's trying to reactivate AREC in Hamden. BSS attended the 160-meter convention. K1KSH is active on 2 meters. LQZ has been giving talks on the use of oscilloscopes at the Hamden ARC. KYQ reports for May that the CN had 31 double sessions handling 449 messages with 375 on the first session for an average of 12.1 and 74 on the second for an average of 2.3. First session attendance averaged 10.9; second was 4.6. High QNI were K1s MZM, IFJ and W1RZG. K1NFE took the Conditional Class exam and has acquired a Pacemaker. The Bristol RC is adding an extra room and hopes to resume Novice classes. The Southington ARC station, ECV, was operated by EFW and made BPL on originations, handling traffic for the local Rotary Club Progress Exposition. On a trip to Virginia K1NTX reported good 6-meter sigs from Ö- and 2-Land on his Gonset. YBH says CPN had 31 sessions with 287 messages handled for a 9 average. Daily attendance and net time averaged 26 stations and 53 minutes, respectively. The Honor Roll consisted of K1AQE, FHP, VQH, K1-DGK, DAV, K1s MZM, MBA and PUG. New or again active were K1s JVZ, OIX and PUG. FHP says CVN had 12 sessions with 37 stations and handled 14 messages. High QNI were FHP and K1NPKQ. PUG was a new station. New appointments: K1NPKQ and K1NTX as OESs. Appointments renewed: NFG as EC, BNB as ORS. Reports received: ÖO from EQV, K1s IFJ, GUD, IVR; OES from FVV and K1NTX. Traffic: (May) W1-KYQ 332, AW 283, RZG 225, NTH 159, YBH 151, OBR 119, K1JAD 106, AQE 102, W1ROX 85, K1JFJ 78, GGG 77, W1EFW 71, BDI 37, FHP 33, CHR 27, K1IVR 25, W1BNB 15, K1PUG 12, W1QV 12, CUH 10, CTI 2, HJJ 2. (Apr.) W1OBR 137, ECV 106, ROX 24.

MAINE—Acting SCM, Herbert S. Merrill, K1JDA—Appointments renewed: K1INL as OES; K1DUG as OPS. The PTN meets daily at 1900 on 3596 kc. The SGN meets daily at 1700 on 3940 kc. The MSSN meets daily at 1730 on 3726 kc. The boys operating mobile request that we drag our feet a little and give them a chance to break, especially on 3940 and 3960 kc. K1LPC, K1BZD and Q1H are converting 522s for 2 meters. K1DYG reports 2-meter activity in Deer Isle, Hancock, Ellsworth, Castine; also Washington and Knox Counties. EFR reports that a dozen stations are active on 2 meters in the Portland Area and K1INL reports activity in the Kittery-Sanford Area. According to K1CXX, some of the boys work c.d. rigs with vertical spikes in the middle of the band while those working DX run horizontal beams on the low end of the band. K1CXX has a home-brew rig on 220 Mc. The MSSN is keeping its members up to date with a monthly bulletin edited by K1MZB. K1OYB
(Please turn the next page)

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express collect, enclosed is \$ _____

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reports there was lots of enthusiasm at Maine Vocational Open House where K1BAZ operated portable. VYA has a new SX-101. VYE is moving to Lewiston. K1MPM and K1OAZ have new Apaches. Don't forget the gathering Aug. 13 at BOK's in Dexter. Registration fee is \$1.00 and advance registration would be appreciated, mailed to Elwood Stevens, W18OK, 11 Beech St., Dexter, Maine. Bring a picnic lunch and the whole family. There will be prizes and a mobile hunt. Traffic: K1MZB 85, KSG 55, M8A1 55, 1MI 50, LPC 20, W1GRG 18, K1MDM 17, OAZ 16, GVQ 13, BZD 12, W1EPN 12, K1MPM 12, W1KFY 8, K1OJH 7, DUG 6, DYG 2.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP SEC; AOG, UE is a new ORS. K1-GVR is in California. OFK has a new QTH in Somerville. K1EKO and K1NQOG have been issued 2-meter net certificates. KN1QLL has a DX-60 and an SX-100. Our 2-meter net had 23 sessions, 363 stations, 143 traffic. Many of the gang went to the Upton Hamfest. The same day the Cape Cod and Island Club held its Annual Picnic. New officers of the Yankee Radio Club: KYR, pres.; K1III, vice-pres.; SAK, treas.; K1BJZ, secy.; GHD, TTQ, MCX and K1BHI, directors; TY, ham tamer. Sorry to hear that MF has been sick. K1LIE sends a copy of *Barnstable Oscillator*. Heard on 2 meters: DYQ, K1s DXT, OSN, KN1s RZN, ROA QNZ. Heard on 75 Meters: ATI, SZB, KBN, K1O, K1s, KHT, WCK, KND, GRG. HPV is manager of the New England Phone Net which meets Sun. at 0900 on 3870 kc. K1AFF is home and feeling better after being in the hospital. His boy is K1-NPS/VO1, who came home for a visit. K9ADU/1 is on 2-meter mobile. 2HXD/1, Winchester, is going mobile. 4VLJ is ex-1KBS now in Eau Gallie, Fla., and is on 10, 15 and 40 meters. RSE visited him. QRA had a talk by W. R. Battersby on a 500-million-Mc. receiver. The Framingham Club had a talk on mobile operation by 8UDL/1. The Milton Amateur Radio Club held a meeting and has some Signal Corps pictures. The Malden Radio Assn. had an auction. COL and SAD have a new son. Another son has the call KN1SAR and won an NC-270 receiver at the convention. The Wellesley Radio Society held a meeting with a talk by R. Allen on binary computers. The King Philip ARS/Sudbury, and the Cambridge School RC of Weston are now affiliated with ARRL. K1NQOC will be in Europe most of the summer. BB is busy on 160-meter DX. The North Eastern States Net had 207 stations and handled 279 pieces of traffic. K1CBL is living in Burlington. UE is on 7080 kc. at 7 A.M. for traffic and also is on 160 and 20 meters. EAE spoke at the new radio club at National Co. AAU is on 40-meter c.w. K1QXX has his transmitter back again. K1NTS is on 6 meters with a Lafayette transceiver and a new halo. The T-9 Radio Club met at Reg Toof's QTH. Ex-LCY is working in Wayland. BGW is waiting for a card from So. America to complete RTTY WAC. EXY is with the Coast Guard at KP4CCG. ACB is on 21 Mc. FQA has QRP DXCC 218/213. K1BYV is back in traffic work again. K1CMS has an HQ-170. K1IU8/1 is on 40 and 20 meters. K1KBO is being renovated. PTR is rebuilding the receiver. PEX has 60-watt s.s.b. complete. K1MEM is on 6 meters. K1PDR is on his way to the Arctic on a Navy boat and will be on the air on 15 and 20 meters. K1D8S has a Globe King 500 watt, an SX-100 and emergency generating equipment. Our OESS, K1s KUY, KKS and JML, report that 6 meters has been wide open and they have been hearing all districts and some VO's and VEs. KKS has 18 states. JML worked Tennessee, Alabama, Illinois and Indiana. K1SBH is KUY's brother. K1SCJ is new. KUY is trying a new G-63 receiver. WA6EFX/1 is in Peabody. K1KTK is through night school and has a new shack where he can build and operate. He is on 6 meters and mobile on 2. W2BVU and QMN are doing some work on 2400 Mc. H1V and KTK may join them. K1ICJ has an Apache transmitter, an SB-10 adapter, an

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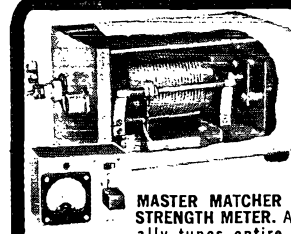
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The Feather-Weight with Spring-Steel Strength. Completely weatherproof. Fibre-glas covering, minimizes electrostatic noises generated by heat, moisture and foreign particles in the air.

FG-60 60"	\$4.95
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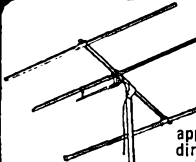


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MASTER MATCHER & FIELD STRENGTH METER. Automatically tunes entire band by remote control.

3 ELEMENT BEAM NO. SR-500



Power gain app. 5 (7DB) fwd. dir. 10 to 1 inter. red. from sides & rear. VSWR-1.1 to 1 at band center when fed with 52 ohm coax.

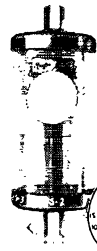
SR-500-10	\$24.95	SR-500-6	\$12.95
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New! easy-to-install, single band, top-loaded, plastic covered fiber-glas antenna. Maximum performance on the desired band.

10 Met.- 5 Ft. L.	\$8.95
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20 Met.- 5 Ft. L.	8.95
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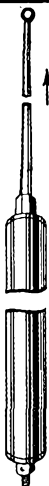
New plug-in type, operates with std. 3' base, 5' whip. Q of 525. 500 W input. Oper. with 52 ohm cable. Factory pre-tuned.

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96" WHIP

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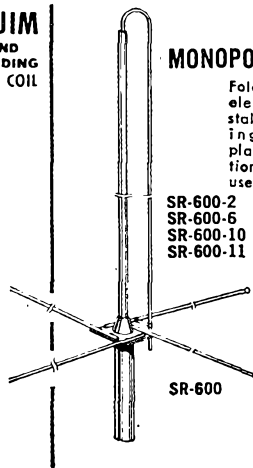
Positive action, just slide whip in or out to loading point and lock nut into position.

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SR-600

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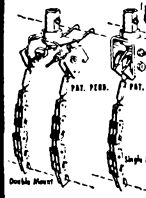
TWIN 6 - 2 METER BEAM



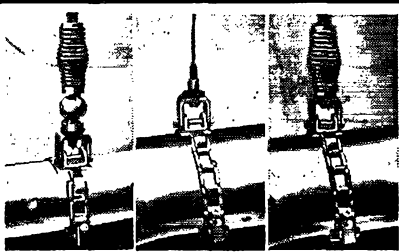
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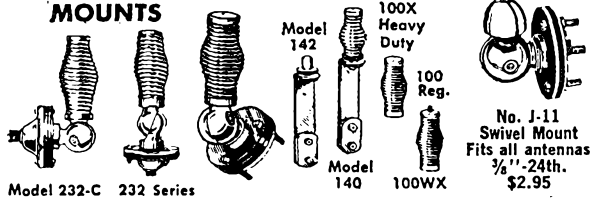


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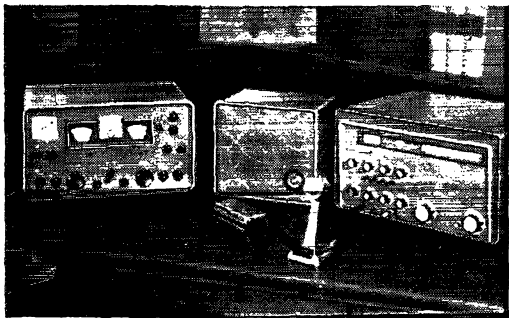
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HQ-140XA receiver, a Hornet Tribander, a 2-meter Gonsset and an eleven-element beam. Appointments endorsed: AOG, AR, KIs MEM and GNR as OPSs; COL as EC for Cambridge; LVK as EC for Medford, AR as EC for Belmont; KIKTK as OES; RCQ as ORS. FWS went on a trip to Cleveland, Ohio. KILFA will have 75 watts on 6 meters and has a BC-348. KILCO has a Navigator transmitter and an HQ-160. KBN is NCS on the 6-meter net. AAH had a very serious operation. New officers of the Bedford Radio Club: QJB pres.; KIBRO, vice-pres.; KIBRO secy. NKA is building a 4-250A amplifier for 6 meters. The Neighborhood Net held a picnic at KIJGX's QTH. KINO is about to make DXCC. DYV has a new 15-meter cubical quad. KIMLZ, QNQ and MPF have 2-meter net certificates. JNV was elected to conduct the code class for the new radio club at Milton. The Cross Band Net had 297 check-ins with 142 traffic. AWA is the manager. DFS is on 6 meters with a beam. Traffic: (May) WIEMG 366, AWA 342, KIBYV 153, WIEAE 163, KIDGI 121, WIOFK 76, FJJ 47, DFS 43, DOM 43, ZSS 31, AOG 25, KICMS 24, WIKBN 24, KIUUS 19, WIVYS 17, KIKBO 14, WISIV 13, KIGTX 9, AFF 8, WIPTR 7, KIGKA 6, WIRQL 6, MX 5, KIKTK 4, WIPEX 3, KIKX 2, LJK 2, LQ 2, DSA 1. (Apr.) WIEAE 171, KIMEM 61, GTX 5.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. RM: K1IJV. PAM: DXS. 60 per cent of our section's Emergency Coordinators submitted annual year-end reports, as compared with only 23.1 per cent last year. This ranks our section as twelfth among all the sections in the country. K1GCV will be counselling at a summer camp in Vermont this summer and will attend Clarkson College of Technology in the fall. DXS is at his summer location in Spencer for the summer, and he reports that the Mass. Phone Net handled 132 messages during May. The West. Mass. C.W. Net beat them by 2 messages in the same number of sessions—27. The West. Mass. Novice Net is off for the summer, but will start up again in September. Top attendance on WMN was by K1IJV, K1CAU, BVR and K1LBB. This section again had 100 per cent attendance on the First Region Net. Approximately 150 persons attended the Annual Dinner Meeting of the Hampden County Radio Association on June 3, and the Berkshire County Amateur Radio Association held its Annual Dinner Meeting on the same date. Top prizes at the HCRA meeting were three Heath 10-meter transceivers. New officers of that club are STR, pres.; MDM, vice-pres.; IC, secy.; LRE, treas. CVI has a 70-ft. tower and a Viking Invader. Ditto, FGV on the Invader! It is with regret that we report the death of "South" Nichols, ex-DUA, at the age of 79. Another Silent Key for this section—K1IXW, of North Adams. Our deepest sympathy. Traffic: K1IJV 184, W1LDE 151, BVR 147, K1LBB 84, CAU 40, W1ZPB 36, DXS 12, DVW 8, K1GCV 7.

NEW HAMPSHIRE—SCM, Ellis F. Miller, W1HQ—SEC: K1GQH. RM: K1CIF. PAM: KVG. GSPN meets Mon. through Fri. at 2300 and Sun. at 1330 on 3842 kc. CNEN meets Mon. through Sat. at 1045 on 3842 kc. N1IN (c.w.) meets Mon. through Sat. at 2300 on 3685 kc. New appointments: YH1 as EC for Hillsboro Co. and RMH1 as EC for Merrimack Co. Endorsements: YH1F as OPS; EVN as ORS; K1GQK and K1PGA as OESs; K1GQK as OO; K1GQK as SEC. With K1NSW as host the New England Weather Service held its annual outing at New Hampton with 59 in attendance representing Maine, New Hampshire, Massachusetts, Connecticut, Vermont and New York. A chicken barbecue followed by an excellent weather film given by Don Kent of WBZ was enjoyed by all. Results of the N.H. QSO Party: In-State C.W.—CUL, 2408. In-State Phone K1MID, 1250. Out-of-State C.W.—K1LPL, 308. Out-of-State Phone EFN, 684. Since Jan. 1, K1KOB has worked 14 states and 204 stations on 6 meters. Traffic: W1CUE 50, QGU 47, KPA 16, KVG 15, K1JDN 14, W1JNC 9, MOI 9, K1KOB 7, GQH 2, CFN 1.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: PAZ. RM: SMU. PAM: TXL. Report of R1SPN: 31 sessions, 317 QNL, 60 traffic. OBS reports were received from TXL and WED. The Toluan H. S. Radio Club, K1QDI, put its station on the air for the first time in May. LDK operated the station for a sked with HMO. The W1AQ Club of Rumford reports its Ham and Bean Supper was a huge success and enough money was raised to buy a new receiver. YUT has a new harmonic, a YL. TXL told the NCRC of Newport at a recent meeting that the Texas Tower Net had completed its 1000th meeting. The net meets at 3935 kc. at 1230 EDST. The Civil Defense Director and the Mayor of Newport complimented the club on the part it played in the recent C.D. Alert. K1NAL/1M1, on the USS *Kretchner*, reports they are on 20-meter phone and 40-meter phone and c.w. from 0200 GMT to 0600 GMT daily. K1GRC worked VOIDW on 6 meters. K1OUI has passed the General Class exam and states she worked as far as New Mexico on 6 meters. ABE has a new transmitter and can be

(Please turn the next page)

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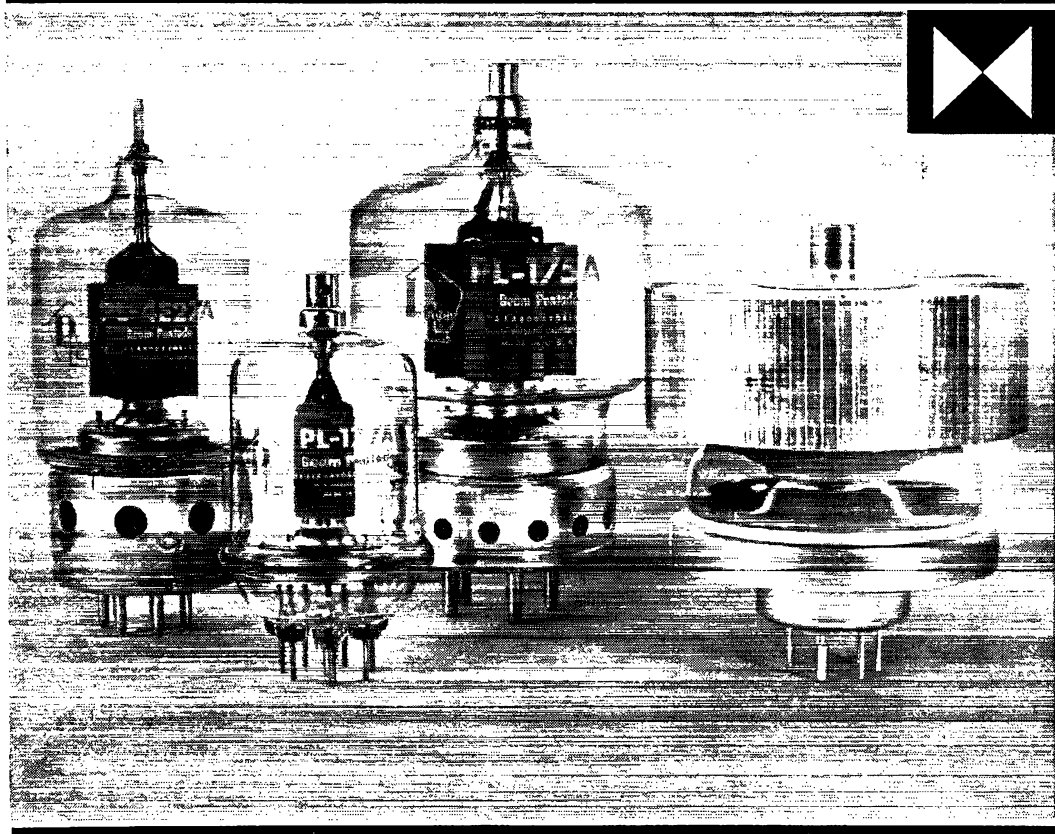
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				1000	1500	2000	2500	3000
PL-177A	6.0	3.3	75	96W	140W	210W	—	—
PL-4E27A	5.0	7.5	125	—	—	220W	280W	—
PL-175A	5.0	14.5	400	—	—	445W	570W	680W
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heard on 10 meters. Traffic: WISMU 812, K1BBK 62, WIDZX 40, GRC 25, NAL/MM 18, PNI 14, GRA 11, WIWED 6.

VERMONT—SCM, Miss Harriet Proctor, W1EIB—SEC: KIDQB. PAM: HRG. RM: KRV. The Wind Hams KC worked on a 6-meter rhombic antenna headed toward E. Mass. in preparation for Field Day and the V.H.F. Party. KISKE is a new amateur in Brattleboro. Active on 6 meters in Southern Vermont are K1SKE, K1EIO, TXY, ZJL, KIDV/M, K1QBQ and AD. Any others? D2QZ has a new antenna and operates mostly on c.w. K1GBF is with Uncle Sam in Florida looking for Vermont on 29.62 Mc. from 4SRX. VFB is moving from Randolph to Bellows Falls. KJG has a "hound dog" 16-ft. seven-element yagi working hard for him on 2 meters. LMI is scheduled to leave Burlington to go with IBM in Poughkeepsie. The Burlington Red Cross has a budget for radio equipment for emergency use. IT, K1AIPN and K1BKH are all on the mend. Traffic: VE2AZI/W1 1256, W1EIB 10, KIIRH 8, WIHGR 7.

NORTHWESTERN DIVISION

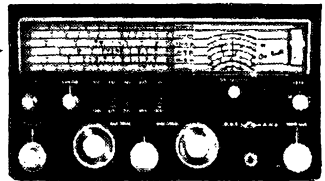
IDAHO—SCM, Mrs. Helen M. Maillet, W7GGV—Boise members of Idaho Radio Amateurs hosted a hamfest for RACES members. The theme was Civil Defense and Lt. Col. James F. Keel, jr.; Velma, YON; and Helen, GGY, were guest speakers. K7HRL now edits *HAMBONE* and solicits news from around the state. KN7PLT is the new secretary of the Treasury Valley Club, replacing K7GTK, who is leaving for the Air Force. The Magic Valley Club elected GDA, pres.; K7IUR, vice-pres.; K7DVC, treas.; and K7LLA, secy. Idaho amateurs from Boise to Twin Falls furnished communications for the Women's State Air Derby in June. New licensees are KN7PLU and K7LEO, who dropped the "N." Explorer Scouts visited the ham shack of K7OAL. IRM moved to Las Vegas and ISY to Salt Lake City. VQC vacationed in Ohio and Connecticut. FARM Net traffic, 86; check-ins, 324. Traffic: K7KBY 146, KNXJ 21, GGV 19, EEQ 6, VQC 5.

MONTANA—SCM, Ray Woods, W7SFK—SEC: BOZ. PAM: YHS. RM: K7AEZ. The MPN meets M-W-F at 1800 on 3910 kc. TSN meets Mon. through Fri. at 1200 on 7230 kc. MSN meets T-T-S at 1830 on 3530 kc. Montana amateurs regret the passing of IVY, of Helena. FTO is heard mobile again. NI moved from Baker to Great Falls. YQZ moved back to his home at Chinook. WVL, we hear, is working on a ranch now. The Southeastern Montana Radio Club at Miles City and the Park Radio Club at Livingston are now affiliated with ARRL. K7BKH has made her 24th consecutive BPL. ZSS is back in Livingston after four years. The Livingston Old Faithful Club will have its fish fry Sept. 3. On Armed Forces Day K7OGF worked NSS, AIR and WAR. All three Great Falls radio clubs are having joint meetings. K7BYC is to attend Massachusetts Institute of Technology. The Great Falls gang worked the mobiles on the fish derby again this year. Traffic: K7BKH 259, OGF 17.

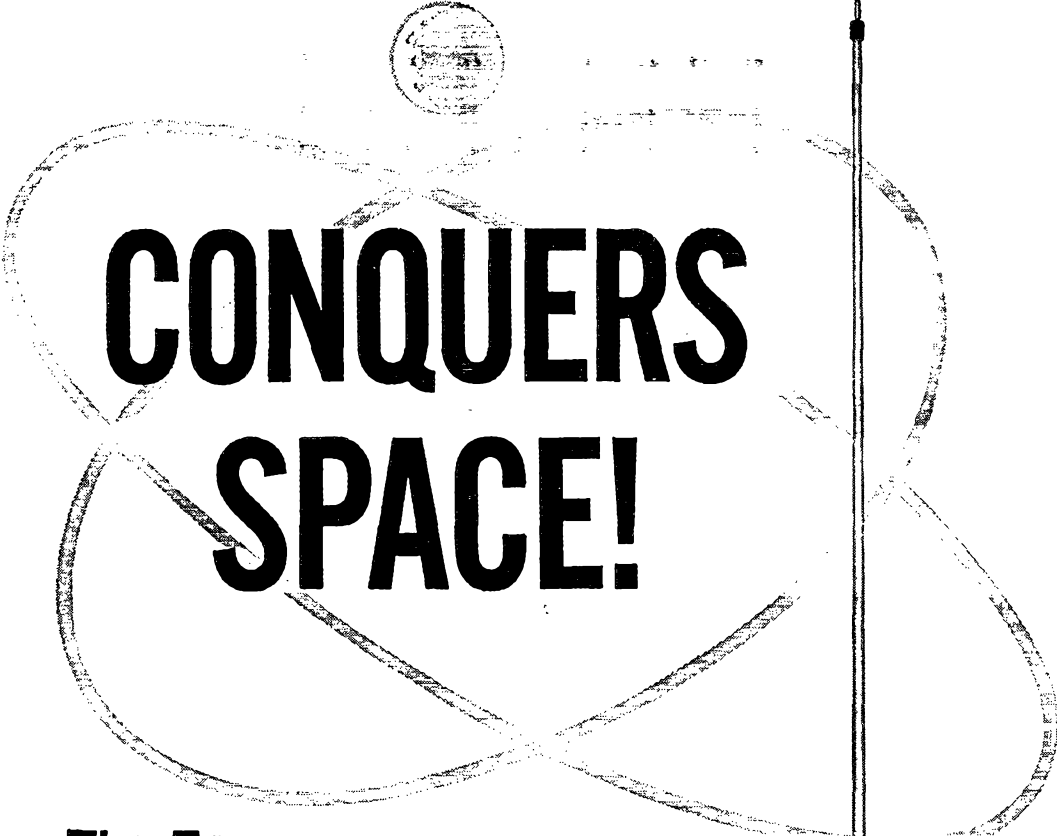
OREGON—SCM, Everett H. France, W7AJN—New appointments: MTW as RM, K7AXF as EC for Coos County. K7IWD, of OSN is the new liaison station to RN7 and is doing a nice job. A good report was received from OSN mgr. BRAT Awards went to AJN, MTW, ZFH, K7CNZ and K7IWD. The Southern Oregon Radio Club of Grants Pass furnished radio communications during Boutnik (boat races) with assistance from operators from other areas. Mobile and fixed stations powered by portable a.c. generators and fixed home station were used. Operators participating were DXY and K7CMV at K7LIX, LWV, CUS, KZU, KEN, BUD, (Please turn the next page)

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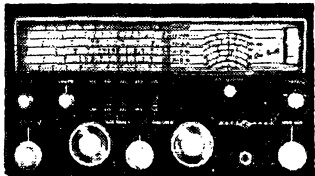
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EFR, DEAI, AHP, CPV, K7ACB, KN7PMB and K7IQQ. K7JID, who operated a ham transmitter from his airplane in flight, gave some interesting position reports on boats in the last part of the race. While on vacation DIC attended a YL convention and brought home a Gonsel. ZB also is vacationing, which accounts for his low traffic report. WKP, our SEC, reports AREC membership is gaining in the state. ESJ has built a new shack in his basement and is overhauling a Navy TCS-12 and a TBW-3 which will be used for stand-by on MARS frequencies. NGW, HHD and MTW have received 10-15-w.p.m. ARRL CP Awards. As your new SCM, I wish to thank all of you for your splendid cooperation. Traffic: W7BDU 273, K7AXF 149, IWD 97, W7AITW 54, ZB 45, ZFH 45, K7KKB 23, WDEM 17, AJN 10, DTT 2.

WASHINGTON—SCM, Robert B. Thurston, W7PGY —SEC: HAMQ, RAM: AIB, PAM: LFA, Washington nets are WSN, 3535 kc. 0200Z; WARTS, 3970 kc. The latest report on the time for the WARTS Net is 0130Z. Information is requested on any other nets with their new time of convening in zula time. The QCWA held its convention in Spokane June 10 and 11. BFI was the chairman for the occasion. GUJ is on s.s.b. from Newport. K7s EUA, CTS, BVM and W7ZNN are in the process of constructing s.s.b. transceivers on 75 meters. KN7OOJ is a new hain in Medical Lake. NSN left Spokane for two years duty in Brazil. New officers of the DK Club Auxiliary of Tacoma are K7AMJ, pres.; XYL Irene Koth, vice-pres.; and Helen Asplund, secy.-treas. The Tacoma Club started its hidden transmitter hunts June 7 and the last hunt will be held Sept. 20. Approximately three hundred amateurs attended the Bremerton Hamfest at Bremerton May 21. CWN, of Seattle, won a three-element tribander beam. The new officers of the Roosevelt High School Radio Club are K7NPU, pres.; K7JRF, vice-pres.; K7GZN, secy.; KN7MXL, treas. FCB and his XYL spent a June vacation in W6-Land and are on 75-meter mobile. WFC is on 75 meters with a 6AQ5 running 10 watts. 2-meter f.m. activity around Seattle is running high on 146.76 Mc. LQT joined the ranks of Silent Keys on May 23. Also Felix Thompson, ex-W7ZV, passed away in May. The Spokane Radio Amateurs has obtained a bakery truck and is converting it into an emergency vehicle 2 through 75 meters. The club also has a 10-kw. generator on a trailer for its power supply. K7MCB is a new Conditional Class licensee in Lind. FIX says he has discontinued PANN until he retires again. IST took part in the V.H.F. Party June 10 and 11. K7DDQ is QRL on the new c.d. communication center. AXT is going to Spokane for the QCWA Meet. KN7OET has a new HQ-170C and a Viking Ranger. K7MFF hopes to be portable in Enumclaw this summer. AMC has a new vertical and worked 160 meters for the first time in over 30 years. EBU is planning a trip to KLY-Land. K7IEQ passed the General Class exam. K7HZN has a new vertical. OEB reports that code classes are working out FB. GBU is sporting a new Rambler sedan in which to haul his KWM-2. GIP has an SB-10 on his Apucle and is receiving very good reports. BA and VI have returned from a vacation to KH6-Land. Loyd soon will celebrate 10 years of making BPL without a break. K7GBW renewed his OBS and W7EBU his OPS appointment. HUT has received his appointment to the Air Force Academy in Colorado. K7HIL is going in the Navy for four years. REC will be QRT for the summer while working in Alaska. Traffic: (May) W7DZX 1067, BA 611, K7MFF 212, W7GYF 194, K7IEY 149, W7APS 82, AMC 67, ACA 44, K7GBW 23, W7GIP 23, K7BBO 16, KN7OET 14, W7AIB 8, K7DDQ 8, W7EHH 8, AXT 7, JC 4, OMO 2. (Apr.) W7GIP 21, OEB 19, BTB 13, K7APT 2, W7GAT 2.

PACIFIC DIVISION

NEVADA—SCM, Charles A. Rhines, W7VIU—DVJ, PWE, HJ, JU FVY, KIUU, 6RAY/7, K7MBQ, K7ESN, K7ICW, K7NFE, K7LBQ and K7MER attended the Southwestern Division Convention in Phoenix and pronounced it a big success. KHU continues his fine OO work and is adding to his traffic totals. Traffic: W7KIUU 263.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K6DYX—Three amateur organizations in the section were affiliated with the League in May: Litton Industries ARS of San Carlos; Banjanner RC of Fremont H.S., Sunnyvale; and Project OSCAR Assn., Saratoga. Monterey hams enjoyed meeting League General Mgr. John Hutton at a pizza party on the wharf during his recent swing through the West. The SCARS c.d. group received special commendation from the Redwood City fathers for its fine performance in Operation Alert. A talk on communications receivers by W6VZT was much appreciated by the Salinas Club. The West Valley Club had a pancake breakfast at Oak Meadow Pk. in Los Gatos on June 18. The Mission Trail Annual Round Up was held at Asilomar in Pacific Grove, June 17 and 18. Seven
(Please turn the next page)

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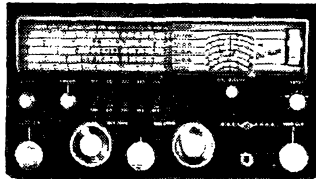
THE VHF AMATEUR

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amateurs in the section submitted entries in the February FMT. Five of these were *not* OOs. K6MZN has new frequency measuring gear and has his fingers crossed pending results of the May FMT. W6RFF has finished rebuilding a power supply for QRO but now finds the pole pig has a short. W6KRG has a new Heath "Twoer" and ground plane installed for c.d. W6ZXS is doing technical writing for Lenkurt Electric. W6YHM again is QRT for the summer because of the annual trip to Alaska. Welcome to a relative newcomer in SCV, W6NYA, ex-W6EIH of Iowa, where he was prominent in RACES work. New appointees: W6LSS as ORS, W6BZE as OPS. Traffic: (May) K6KCB 622, K6GZ 267, W6OLQ 267, W6YHM 149, W6FON 114, W6NYA 107, W6AIT 87, W6DEF 87, W6HC 82, W6YBV 64, W6LSS 61, W6AUC 30, W6OIH 18, W6RFF 16, W6ZLO 15, K6VQK 11, K6ROE 5, W6KRG 4, K6SMH 1. (Apr.) W6YBV 104, W6ZRJ 42.

EAST BAY—SCM, B. W. Southwell, W6OJW—It is with deep regret that I inform you of the sudden passing of K6DQM, Section Emergency Coordinator, from a heart attack May 27. Alex will be long remembered for his untiring work in the furtherance of the AREC within the section and his loss will be felt deeply. W6LVX/6 made BPL for April and May, and is the new manager of the NCN. The Pacific Area Net traffic has gone to 7 Mc. because of poor 3.5-Mc. conditions. W6LVX/6 has a new vertical antenna. K6KLY is a new OES, and reports 6-meter openings the week of May 20-28 with all districts, VE7, KL7 and KH6 being heard. W6FDJ discussed transistor circuitry at the May meeting of the ORC. W6BB, University of California ARC is on 3.5- and 7-Mc. c.w. and 14-Mc. phone. The NCN held a picnic May 21 at Roberts Recreation Area. The MDARC visited the VOA transmitting plant at Dixon as its May field trip; 40 members were present. The MDARC selected a site on Mt. Diablo for Field Day. W6LVX/6 is a new OBS, W6GXC is a new Tech. Class licensee. The editor of *The Carrier*, the MDARC newspaper, wants some active reporters. Contact W6PIR for information, please. K6KLY, K6YBS, W6GCPY, W6UGO, K6QLS, K6QLF, K6JNW and K7IDII 6 are doing a fine job on the IARC TVI Committee. W6SVV gave an FB talk on tunnel diodes at the IARC meeting in April and our Pacific Division Director, W6HC, was speaker at the May meeting. New members of the HARC are W6KUN, W6ICR and W6GSE. W6KCCZ is QRL homework. W6YKP has a new 50-Mc. transceiver. W6KUU is going to Missouri. W6OWO's XYL is on the sick list. K6YBS got the bugs out of the Castro Valley High School DX-40 rig. W6JYB is going s.s.b. K6QFT will be trustee for the Castro Valley HSRC. W6MXK is now a Tech. Class licensee. K6VXX is mobile on 50 Mc. W6HKD has a Ranger, an HQ-170 and a tribander. W6KUN is running 65 watts to a TCS transmitter. W6OJW got R6K, WUN-55, WCA and CHC No. 185 awards. The XYL of K6GK is in the hospital. Traffic: (May) W6LVX/6 561, W6NBX 175 (Apr.) W6LVX/6 586.

SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY SEC: K6IKV. ECs: K6BNB, K6GOT and K6BYS. OBSs: W6AF and W6WGO. PAM: W6GQS. OOs: W6WLI, W6GDO, K6ER, W6ZJW and K6EIL. ORSs: W6WGO and W6EPI. OES: W6PIV. OPSs: W6WGO, K6EIL, W6PIV and W6GQS. Anyone for mobiling? If so, then the Sacto RAMS is for you! It's a live-wire club with W6QHF, pres.; K6YVV, vice-pres.; W6GIT, secy.-treas.; W6QPX, W6OOR and K6ZFL, directors. The RAMS Mobile Net meets on 3965 kc. each Sat. at 10 a.m. with K6YJL as NCS and is planning a camp-out at Big Meadows near Calveras Big Trees. The Mission Trail Net (phone) meets daily at 7 p.m. on 3854 kc. with W6WGO, pres.; W6OOR, vice-pres.; W6DZD, treas.; and W6RXN, secy. W6LNN, K6ZYU, K6PKX, W6IRN and K6RPO have been issued AREC certificates. W6ZJW and K6EIL have been appointed Official Observers and W6WGO has been appointed OPS, ORS and OBS. W6WLI advises his work is interfering with his OO duties but not for long. Trinity County C.D. activated an emergency net with W6PCI, K6TWR and W6QYX as charter members. W6GQS has a new all-band flat-top antenna, and as the PAM of Sacramento Valley is organizing a Sacramento city-wide round table net on 3945 kc. phone at 7 p.m. each Mon. W6AF still is working DX but having v.t.o. troubles so may have to go crystal. K6ER, Sacramento Valley OO, has been busy cleaning up his own chirps. W6ACJ and K6YZU have been awarded NCN certificates. Traffic: K6EIL 6.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU The Fresno Amateur Radio Club sponsored a code and theory class and wound up the season with 15 passing the Novice and Technician Class examinations. K6BKZ was in charge and received a very fine present from the students showing their appreciation. K6VFE is on s.s.b. with an IIT-37, a crank-up tower and a triband beam. K6EJT went to the Phoenix Convention, came

(Please turn the next page)

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Richard E. Hayes, K8UXU

From New Hampshire:

"... We feel that our new Zeus is the best thing that ever happened to us since we have been in ham radio (5 years)..."

Hazen & Beatrice Bean, K1JFQ

From Florida:

"... We are well satisfied with the results of this unit as we have worked forty DX contacts in little more than three hours on May 23, 1961, including six new states which we were unable to work in the past two years with a 120 watt, 6 & 2 transmitter of a different mfg..."

Jack Edlow, K4YIW

From California:

"... Never before have I been more pleased with a piece of gear than I am with my Zeus. In two days I have worked 24 states with several contacts in each, (phone) on six meters. And the signal reports—yow! For the most part unbelievable..."

Jeanne & John Walker, WA6GEE

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"Words cannot express the pleasure and performance of ZEUS. I have worked 5 states 5-9, plus I have given you \$1,000,000 advertisement..."

Dr. A. Schleeter, K30EC

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"... I want to inform you of the excellent results obtained with the Zeus Transmitter I bought one month ago. Taking advantage of the band opening, I have been able to work up to the present thirty-eight states, including California..."

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"... This set is terrific. I've had terrific results with it. It's the best rig—ever."

George E. Missback, K4QOE

K8CHE in Ohio tells about 99'er

"... with the 99'er haywired in from a four element beam, through 100 feet of coax, through a matching network, through a length of 72 ohm twinlead, and then through a length of 300 ohm twinlead to reach the 99'er, we could read the Michigan stations Q5! and back through the above haywire we were able to put 4.4 watts into the antenna as measured by a RF ammeter!..."

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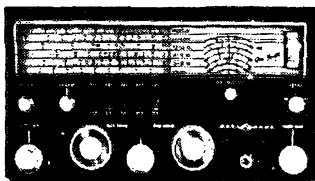
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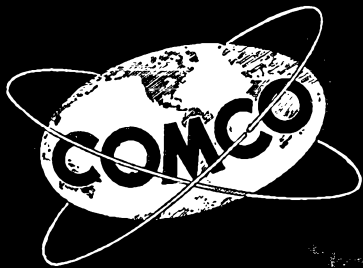
back with a KWM-2 and is on all bands s.s.b. K6SVM has a DX-100. K6BGK has a new pole up in his yard with an antenna attached. W6QON now has a 40-meter antenna up and is active on 40 meters. W6UBK is thinking of s.s.b. K6HHH is on 6 meters. W6RCU is a new Novice call in town. W6MXR has a complete S/Line and is on s.s.b. W6MXR also is the new editor of 2SKIP. W6ONK has a new 40-meter beam and says "20 is dead." WA6ENH is heard on 75-meter s.s.b. W6PIX is heard on 75-meter s.s.b. The San Joaquin Valley Net held its picnic in Fresno May 21, and had 40 people in attendance. The SJN had 27 sessions, 554 check-ins and 174 traffic count. K6OZL has his Cheyenne in his car. K6ROU is glad that school is out so he can work some DX. Summer is here, fellows, and it takes only a few minutes out of your life to sit down and jot down some of your activities and send a report to your SCM. Traffic: K6ROU 338. K6OZL 91. W6EFB 27. W6ADB 13.

ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH—PAM: W4DR. V.H.F. PAM: W4ACY. RM: K4CPX. This issue of Section Happenings will be devoted to acquainting the ARRL members with the Emergency Coordinators. Many of you have registered your station with the SCM simply because you did not know your Emergency Coordinator. Please in the future send your AREC blanks to the nearest EC: Albert W. Paiker, W4BAW, New Bern; Berry L. Hinnant, W4RJ, Whiteville; Ted Winstead, W4QC, Elm City; Hubert B. Sapp, W4YQN, Concord, N.C. James M. Torrence, K4YYJ, Salisbury; C. Weldon Fields, W4AJT, Greensboro; Ira G. Boswell, W4AEH, Graham; Harry Voorhees, W4CPI, Winston-Salem; Ed T. Lineberger, W4DGF, Gastonia; Earnest Pilgrim, W4TMO, Forest City; Quimby Smith, W4GXR, Skyland; Frank Worthington, K4PFP, Waynesville; Joe Benesh, K4AI, Morganton. We are in need of ECs in many locations. For example, Raleigh, Wilmington, Charlotte, Wadesboro Area, Elizabeth City, to name just a few. Persons interested in field organization work should write me giving your qualifications and the expiration date of your ARRL membership. Or better still, how about the different clubs in the area electing an EC and sending along his name to me? As I pointed out in the April happenings, some of the ECs are doing a bang-up job and with the members of AREC are planning much good work and training. How about YOU?

SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4GQV—SEC: K4PJE. PAM: K4HE. RM: W4PED. The SCN, on 3795 kc., handled 167 pieces of formal traffic in May; the SCEN, on 3930 kc., handled 38 formal, 105 informal and 11 announcements. The high scorer or best operation in Field Day will win the "plaque" for the coming year which is now held by Rock Hill Club. This trophy will be awarded as usual at the Rock Hill Hamfest on Oct. 7. W4TLC is active on 6 meters from his new location. W4VIW received his WAS s.s.b. and WAC s.s.b. K4PNX has received his commercial radio-telephone license. The Mike & Key Club report shows 100 per cent ARRL membership and outstanding activity. W4DX has given up NCS for Sunday a.m. after many years of faithful service. The "old-timers" will miss him sorely, for his net has been an established "institution." The Rock Hill Hamfest at Joslin Park will be held Oct. 7, 1961. Traffic: K4ZHV 204. K4BRP 70. W4AKC 69. K4AVU 63. W4HDR 51. K4WJR 40. W4PED 36. K4KIT 32. W4CID 20. W4VIW 12.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—SEC: W4VMA. PAMs: W4BGP, K4DCN and K4JQO. RMs: W4LK, K4MXF, K4ENP and W4QDY. Your SCM, SEC and PAM W4BGP, along with many other Virginia amateurs, attended the big and successful hamfest at Roanoke May 20-21. While there, ye SCM appointed K4JQO Asst. PAM, as mgr. of the new Va. S.S.B. Net and K4DCN, Asst. PAM, as mgr. of the VFN. W4BGP won first place in the mobile judging. Incidentally his favorite XXL, from Alexandria, is awaiting her Novice Class ticket. It's in the wind for a division convention, sponsored by the Roanoke Club. New appointments: K4OEJ, K4GKN and K4UOT as ECs; W4PFC as ORS; K4DCN, K4IAN and K4YZT as OPSs. Congrats, men, W4JSJ/4, a workhorse, is going to Okinawa the end of July. W4OOL reports hearing a W44AUA (the first W44) on the Virginia nets. The Hampton Area held a wing-ding AREC drill with all the trimmings including a helicopter. Special mention goes to W4VMA and K4UOT. W4TE says he met 45 net skeds during May! W4AAD now is out of school with a brand-new sheepskin. K4IIP is back on the air from his new QTH. K4QIX still is working on the 1296-Mc. project. A number of our members participated in the Armed Forces Day activities, getting themselves QSLs and certificates. DST is taking its usual toll of the traffic nets. W4JUJ received the IITH Award. Carol, K4AJL, nabbed her first DX on 6 meters. Watch out, (Please turn the next page)



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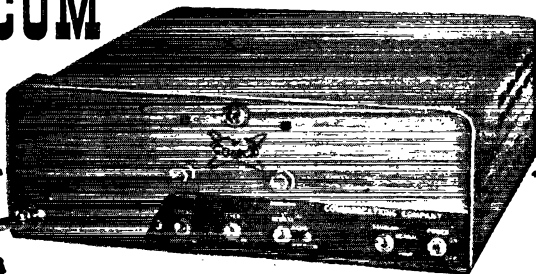
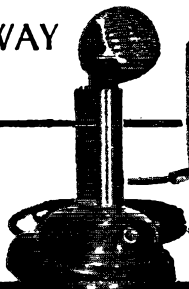


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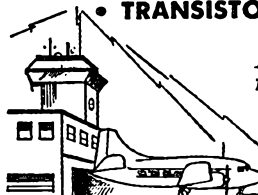
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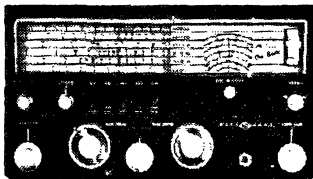
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Larry! OT W4HA had a fine visit to ARRL Hq. and renewed old acquaintances. Traffic: (May) W4PFC 550, W4FOR 274, W4JSL 4 198, W4WVO 107, K4FSS 104, W4LKC 103, W4DLA 84, K4PQV 75, W4RHA 67, K4MEV 56, W4QDY 52, W4BGP 48, K4LAL 42, W4OOL 42, K4YZT 42, K4IAN 41, W4TE 26, W4VMA 22, K4JQO 20, W4AAD 16, K4FMJ 16, K4TFL 13, K4IIP 10, K4BAV 7, K4IQX 6, K4ARO 4, K4UVT 4, W4IOW 3, W4ZM 2, W4UJ 1. (Apr.) K4VDC 558, W4HA 22, W4VMA 4, K4TFL 3. (Mar.) W4MYA 38.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM - Congratulations to VMP and SSA on an outstanding West Virginia Hamfest, held at Jackson Mills July 8 and 9. The Bass Lake Picnic will be held Sept. 3. Check details in the Hamfest Calendar. Congrats to the East River ARC on its affiliation with the ARRL. K8JLF will be in Germany this summer as a Foreign Exchange Student. K8LOU is striving for WAS on 6 meters. K8CSG has a new three-element tribander and is active on RTTY. ESH has several new states as a result of openings on 6 meters. The Parkersburg Radio Club held its Annual Picnic July 30. The first contact of the BARC station was W1AW with a 1/2-watt rig. The BARC has a program for visiting Boy Scout Troops to explain amateur radio. VOI has a new car with mobile gear installed. ELX completed college and will be working in Massachusetts. SNG is now 5FNJ located in Texas and seeks his Dad. BOK, on 40-meter c.w. FNI has been active with the WVA Phone Net. The State Radio Council met in Parkersburg in May and Jackson Mills in July. All clubs should be represented on this council. Keep talking about the West Virginia Centennial. Traffic: W8NYH 53, HZA 21, K8CSG 16, QXSS 14, LOU 12, JLF 6.

ROCKY MOUNTAIN DIVISION

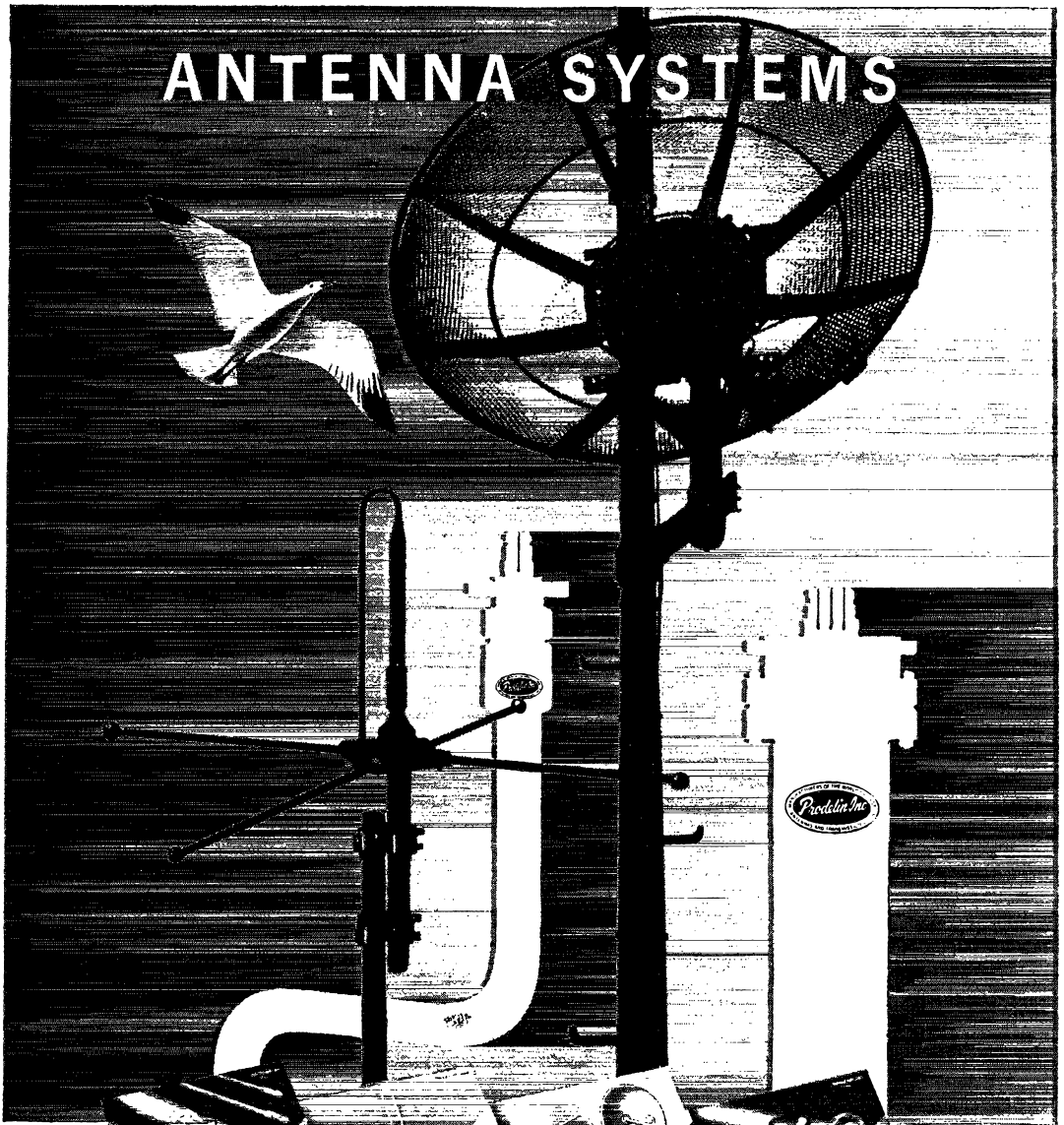
COLORADO—SCM, Donald S. Middleton, W0NIT—SEC: SIN, PAMS: CXW and IJR, RM: MYB, OBS: K0DCC and K0EPD. The IIN has been plagued with skip on both 40 and 75 meters. TWN was moved to 40 meters June 12 because of 80-meter QRN. QGO bought another house and is temporarily off the air. 2VQS/Ø has a new Apache. The Western Slope Radio Club, Inc., supplied the Shriners with communications on May 20 using 3 fixed stations and five mobiles. Pueblo amateurs supplied 15 mobiles to assist in a city-wide rubbish collection May 20. Any amateur operator contacting one hundred Colorado amateur stations using any mode and on any of the authorized amateur bands are eligible for the Denver Radio Club "Rocky Mountain Canary Award." Write to Denver Radio Club, Inc., Box 356, Denver 1, Colorado. Congratulations to LVS and RSA, who took over for TTB at the last minute and conducted a successful hamfest at Pueblo June 3 and 4. BPL cards were awarded this month to BES and FEO for May traffic. Traffic: W0BES 686, FEO 307, K0QGO 187, W2VQS Ø 78, W0MYB 61, K0RTI 52, LCZ 3.

UTAH—SCM, Thomas H. Miller, W7QWH -Asst. SCM: John H. Sampson, jr., 70CX. SEC: K7BLR. HELP WANTED: Local SCM needs active PAM and OBS. For information write to QWH. TWN moved to 7060 kc. daily at 0300 GMT effective June 12. QWH, OCX and BGU earned BRAT Awards on BCN. OCX also earned one on TWN. Erratic band conditions coupled with atmospherics gave BCN a rough month. Credit is due net members, especially K7RGU, for patience and perseverance in getting traffic through under trying conditions. QDY is back on the air with 500 watts on all bands. He is now working on some 2-meter gear. Lyle also boasts a newly-completed shack. Appointments should be endorsed each year. AREC nets in Salt Lake, Utah and Weber counties are very active. Traffic: W7OCX 102, QWH 38.

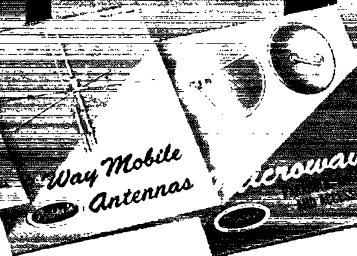
NEW MEXICO—SCM, Newell F. Greene, K5IQL -Asst. SCM: Carl W. Franz, 5Z1N. SEC: BQC PAM. ZC, V.H.F. PAM: FPB, RM: Z1N. The Breakfast Club meets Mon. through Sat. at 0630 MST on 3838 kc. NMEPN meets Sun. at 0700 and Tue. and Thurs. at 1800 on the same frequency. NMRP meets Mon., Wed. and Fri. at 1900 on 3570 kc. TWN meets daily at 2000 on 3570 kc. Summer vacations cut in on traffic and net totals. The Albuquerque and Santa Fe Clubs hosted V.H.F. Editor Ed Tilton, 11DQ. Bernalillo County AREC is working hard to whip up an active net on 29.6 Mc. and practice sessions on 29.55 Mc. K5VLI is New Mexico reporter for *The Monitor*. He will appreciate news items. Father Clem brought home a prize from the Phoenix Convention, but reports he turned it over to Rev. Connie. Traffic: (May) W5Z1N 162, W2MTA:5 160, W5UBW 98. (Apr.) W2MTA:5 94.

WYOMING—SCM, L. D. Branson, W7AMU—Sec: IAY. The Pony Express Net meets Sun. at 0830 MST on 3920 kc. The Wyoming Jackalope Net meets Mon. (Please turn the next page)

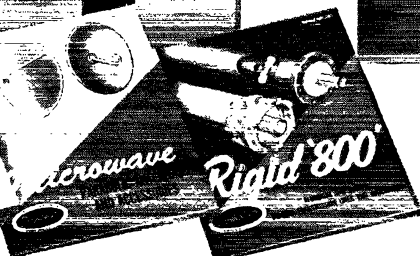
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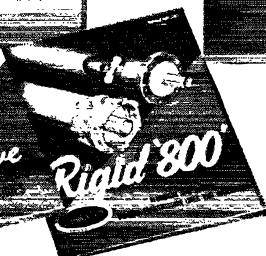
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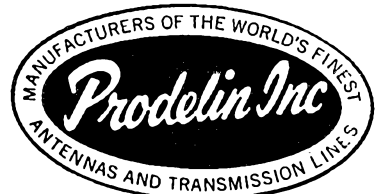


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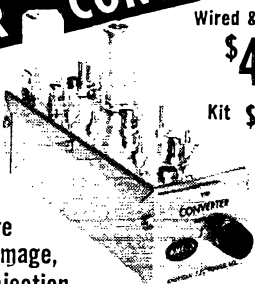
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The new deluxe "Cadillac" line of Ameco VHF Converters uses three RCA Nuvistors—two as RF amplifiers, the third as the mixer. This combination produces an extremely low noise figure, high gain; high image, spurious and IF rejection. These converters do not become obsolete as the output frequency is easily changed when a new receiver is acquired. The CN Converters are built on a compact (2"x2½"x6¾") satin finished copper chassis. A gain control is included. Power requirements: 100 to 300V, at 30 ma. and 6.3V, at 1A. The Ameco PS-1 Power Supply is ideal, available in Kit form (PS-1K) at \$10.50 or Wired and Tested (PS-1W) at \$11.50.

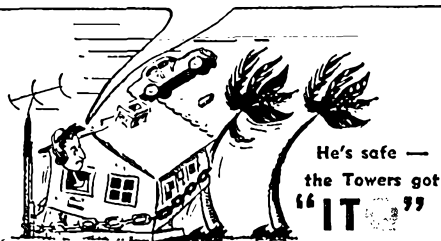
Model CN-50W, CN-144W, CN-220W Nuvistor Converter, wired and tested for any one band (specify IF output). **\$44.95**

Model CN-50K, CN-144K, CN-220K Nuvistor Converter, in kit form, for any one band (specify IF output)**\$31.95**

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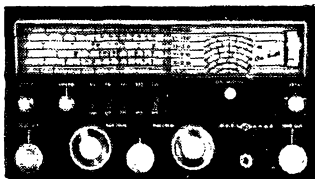
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NORTHWEST HAM SHACK
Division of Northwest Radio of Michigan
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through Fri. at 1200 MST on 7255 kc. for traffic. The YO Net is a c.w. net on Mon., Wed. and Fri. at 1830 MST on 3610 kc. DTD got new final 803s—about 800 watts d.c. input. Fifty or more are RACES members in Wyoming. K7IHO left for Seattle. HII was appointed Assistant Communication Officer for Wyoming RACES. HKE has a new antenna. Casper hams held Field Day on top of Casper Mountain. PVR moved to Albuquerque. NVI is going to school in Chicago. The XYL of NNX is home from Salt Lake Hospital. Traffic: W7HH 58. GZG 56, EUZ 52, BHH 42, AMU 15, GDX 14, NAIW 13, AEC 12, CQL 10, HDS 9, CQX 8, YWW 7, BK1 2, BXS 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William D. Dotherow, K4AOZ—SEC: K4JDA. RM: W4RLG. PAMS: K4PHI and K4HTO. New appointments: K4KJD and K4KDE as OPS; W9BQC/4 as OO. Class I. Congratulations to K4PFM, newly-elected manager of the AENP Evening Net and thanks to retiring manager, K4PIH, and his secy., K4TDJ, for their excellent work the past two years. W4TKL and his XYL are the proud parents of a baby boy. K4OCV and his XYL, K4SFP, have a new Drake 2A receiver. K4KDE has an HQ-180 receiver. The following stations have received AENP net certificates: K4QMH, K4GHR, K4ETY, K4NPK, K4YTT, K4WSH and K4WHV. A committee composed of W4DS, K4RIL, K4KJD and W4FQQ has completed organization of the Alabama Sideband Net. K4KJD has been elected manager of AENM. The Alabama Sideband Net meets every night at 1830 CST on 3965 kc. K4SAV has 813s on c.w. at 600 watts. W4RLG welcomes the following to AENB: K4LNA, Birmingham; K4PWE, K4KKG and K4MAY, Mobile; K4NNR, Huntsville; K4WSH, Dadeville. K4YUD has earned an RN5 Net certificate. K4HVN has a new Collins S/Line s.s.b. station. W4DS is having fun building a Heathkit mobile receiver. K4RCA reports that K4ROR moved to an antenna farm on top of Colbert Heights, Tusculum. W4TOI is working on 2-meter equipment. W4DGH has exchanged his Challenger for a Ranger. K4ZXX has new kw. and s.s.b. rigs. *Six Meter News:* W4YER is now on 6 meters with help from K4DJR. K4UMD has graduated from code school in Birmingham. The following stations have received AENO Net certificates: K4CTB, K4ZKG and K4RQE. K4FJZ reports that the Auburn Emergency Net meets each Thurs. at 2100 CST on 50.55 Mc. K4WHW acted as relay station for 4 Michigan mobile stations May 27 and 28 on 6 meters when the mobiles could not copy each other; K4WHW was OP operating with a DX-40. AENX manager K4TIY reports April attendance was 55 per cent. OESs W4WGI, W4UAR, W4CIN, K4FJZ and K4IQU report plentiful 50-Mc. band openings during May with all call areas worked. W4CIN had s.s.b. round tables with California, Texas and Arizona. W4WGI has a new 50-ft. tower and five-element wide-spaced beam. W4CIN and K4MBM are running tests on 432 Mc. K4MBM operates s.s.b. on 2 meters and 50 Mc., also 50-Mc. f.m., and a.m. 220 Mc. Because of a recent serious illness, W4JX has resigned as V.H.F. PAM. Traffic: (May) K4ZXX 404, K4PFM 138, W4RLG 122, K4WSH 116, W4PVG 66, W4KIX 61, K4YUD 49, K4AOZ 44, K4PIH 41, K4SAV 39, K4HJM 37, K4LNA 33, K4GNS 27, K4UDK 25, K4KHC 17, K4WHW 17, K4BTO 15, W4YER 14, W4MI 13, K4ZNI 12, K4RIL 10, K4RCA 8, K4HVN 7, K4KDE 7, W4WHW 7, K4TVZ 6, K4TDJ 5, K4AAU 4, W4CIU 4, K4DJR 4, W4CIN 4, W4DS 3, K4KJD 2, K4UMD 1. (Apr.) K4ZXX 277, K4DSO 20, K4CND 7.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4YTT. RM: K4KDN. RM RTTY: W4EHU. PAMS: 40 W4SDR, 75 K4LCP, v.h.f. W4RMU, s.s.b. W4CNZ. Section nets: FPTN, 3945 kc. M/S 0700; FMTN, 7230 kc. M/S 1200; TPTN, 3945 kc. daily 1730; GN, 7115 kc. daily 0830; QFN, 3650 kc. daily 1830 and 2200; FEPN, 3910 kc. Tue. 1830; FSNB, 3940 kc. Sun. 1700; FAST, 3940 kc. M/F 1930; NHN, 3725 kc. Sun. 0730; MCEN, 3900 kc. Sun. 1330E. Many operators not seeing their traffic totals in this column forget that there is about three months delay before showing in QST. All traffic totals are reported to ARRL. K4LLI is pres. of the DBRC amateur and citizen band with code classes and theory. W4NGR had his troubles during the St. Johns River marathon boat race. Shirley, W4WPD, finally sent in a traffic report after handling thousands of messages during the past 8 years. The Lee County AREC Net now meets Thurs. at 1830E on 3885 kc. W4LVV has a new frequency standard so expect a new OO Class I soon. K4DAD/4 is doing FB with new 1215-Mc. gear. W4AYV has a new 4X150A 6-meter s.s.b. amplifier. K4VGD is on with a Heath "Sixer." K4AKQ, in spite of no small physical trouble, still is active in traffic and the 2-Meter C.D. Net. K4ANR, the XYL of W4FE, has an A-1 Operator certificate. K4BY, after two heart attacks, is back with us and more active than ever. W4DVR is in the same boat. Glad to see K4GBS
(Please turn the next page)

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- Complete with Rotor Head and Mounting Kit for self supporter or building attached.
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- Model GPK-S40 Ground Post..... \$75.00
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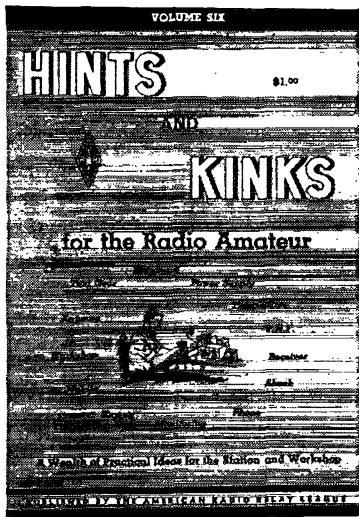
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THE AMERICAN RADIO RELAY LEAGUE

WEST HARTFORD 7, CONN.

and W4GOG reporting in the net. Traffic reports are up 20 since Jan. Are you ready for the hurricane season? Traffic: (May) K4SJH 597, W4SDR 317, K4LFC 233, K4KDN 224, W4AKB 184, W4TRS 141, W4DVR 132, K4ENW 118, K4COO 114, W4FE 104, W4FPC 101, W4CNZ 96, W4EHV 92, K4VSA 89, K4FMA 61, K4DBT 60, K4BZ 59, W4EAT 53, W4FFF 50, K4BY 49, K4BHL 48, K4AX 47, W4WPD 45, W4BKC 39, W5ESB/4 37, W4AZJ 36, KN4YSN 35, K4MTP 33, W4IYT 31, K4OZS 31, K4ANR 27, W4LSA 27, W4VCX 27, W4NGR 26, K4BOO 25, K4VNA 25, W4AYD 24, W4HTH 24, W4UHB 24, W4SMK 22, W4CWD 21, K4AKQ 20, K4DAX 19, K4RDY 18, K4JZU 17, K4MZR 17, K4WIP 17, K4ZIF 17, K4FQS 16, W4BBZ 12, W4DSH 12, W4LMT 12, K4YPN 12, K4BNE 11, K4ANJ 10, K4RBR 10, W4QVJ 9, K4RNS 9, K4TTT 9, K4VGD 8, K4JJZ 6, W4TAS 4, K4JZX 2, K4LLT 2, WN4BNC 1. (Apr.) W4SDR 249, K4RBR 20, K4VGD 8, W4LVV 3.

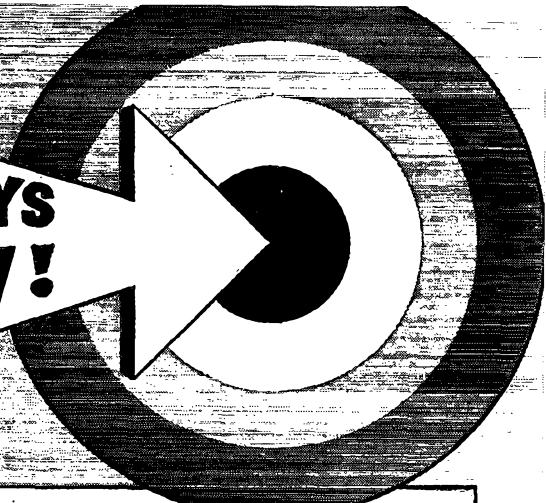
WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH SEC; W4MLE, PAM; W4WEB, RM; K4UBR. Tallahassee: W4EUE has moved to the Gulf Coast, near Mexico Beach. W4MLE was happy to see the close of the Legislature session, so he could get back to hamming. A roster of key stations throughout Fla. has been made to expedite traffic-handling during emergencies. Madison: W4PBO has a new ham awaiting his ticket. Perry: W4ZVY is working DX on 15 meters. K4NJH is building a high-power final. W4DEG has acquired a surplus scope for monitor. W4KQP is getting used to the Viking Invader. Carrabelle: W4SJP is new EC for Franklin County. Assisting him will be K4TNL in Lanark and W4GWU in Apalachicola. Fort Walton/Eglin AFB: The EARS now has an SB-10 for the Apache, plus an HW-20 2-meter transceiver. V.h.f. activity should increase, with a quantity of ARC-is available through Eglin MARS. Milton: W44AGL is a new EC for Santa Rosa County. Gulf Breeze: K4ZMV is building station control and 150-watt final using an 814. Pensacola: K4JDW hopes to start a radio club at Escambia H.S. W4SRM is the new president of the NAS Club. Many local and West Fla. hams were at the Mobile Hamfest. W4HKK took home first prize. The PARC is moving into its new club house near Municipal Airport. Traffic: (May) K4UBR 375, K4JDW 59, K4VND 55, W4WEB 29, K4ZMV 6, W4SJP 4. (Apr.) K4BDF 26.

GEORGIA—SCM, William F. Kennedy, W4CFJ SEC; W4PAMJ, PAMs; W4LXE and W4ACH, RM; W4DDY, GCEN meets on 3995 kc. at 1830 EST Tue. and Thurs., 0800 on Sun. GSN meets Mon. Through Sun. on 3595 kc. at 1900 and 2200 EST with W4DDY as NC. The 75-Meter Mobile Net meets each Sun. on 3995 kc. at 1330 EST with K4YID as NC. The GPYL Net meets each Thurs. on 7260 kc. at 0900 EST with K4ZZS as NC. The Atlanta Ten-Meter Phone Net meets each Sun. on 29.6 Mc. at 2200 EST with W4BGE as net mgr. The Georgia S.S.B. Net meets Mon. through Fri. on 3972 kc. at 2000 EST with K4RHB as net mgr. The Atlanta Radio Club Phone Net meets at 2100 EST on 21.36 Mc. each Sun. night with W4DOC at NC. A very large gathering of hams were here in Atlanta for their Annual Hamfest June 3 and 4. Homer, your RM, has moved to Augusta, Ga., and his new address is 2608 Fuller Drive, Augusta, Ga. K4FJD graduated from Fort Valley High School May 30. K4BAI is active now that school is out. New officers of the Middle Georgia Amateur Radio Club, K4VEN, at Macon, Ga., are W4YVW, pres.; W4UJC, vice-pres.; K4DEJ, secy.; K4RCL, treas.; K4BAI, act. mgr. K4TEA's DXCC is now 180/165 and he has WPX No. 171 and CHC No. 150. Contact K4RWM, as he is interested in getting the Georgia Teenage Net started again. K4IBI has won the *Atlanta Journal Cup* after being voted the best all-around student at Russell High School. He plans to attend Georgia Tech this year. Traffic: W4DDY 112, K4FDD 40, K4BAI 11, K4OGG 8, W4RWB 8, K4FPZ 7, K4TEA 1.

WEST INDIES—Section Change: Effective Aug. 1, 1961, ARRL announces that the West Indies Section henceforth includes only Puerto Rico and the Virgin Islands. Cuba, attached at one time for operating matters, has had no appointment and no activity report status for several years.

WEST INDIES—SCM, William Werner, KP4DJ—SEC: AAA. C.D. Radio Officer: MC. WT renewed his OPS appointment. AWH is a new OPS at Aibonito using an HT-32A, a Drake 2A, a triband beam and dipoles for 80 and 40 meters. He received WAC on s.s.b., DXCC on s.s.b. is 52/20 since Jan. 1961, and he is the first KP4 to receive the Lion's Head Radio Club Award from Africa. AWH made 425 contacts in 22 hours for a score of 61,000 points in the DX Phone Contest, and is a member of the Inter-Continental Traffic Net on 14.320 kc. at 1200 GMT Mon., Tue., Thurs. and Fri. The new Mango Net meets Mon., Wed. and Fri. at 2100 GMT on 3810 kc. NCS is AWH and members are AED, AMK, AM1, AQY, ASK, ATJ, ATV, AXN, AWZ, AYZ, CH (Please turn the next page)

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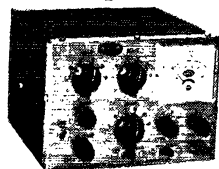
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Final 6146 runs straight through on
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Complete kit,
specify 6 or 12v fl. \$84⁹⁵

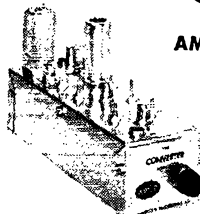
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Completely wired and tested \$44.95



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Choice of separate models for
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frequency easily changed for
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Three RCA 6CW4 Nuvistors used,
two as RF amps, one as mixer
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70 db. Power required: 100-150
V @ 30 ma, 6.3 V @ 1 amp.



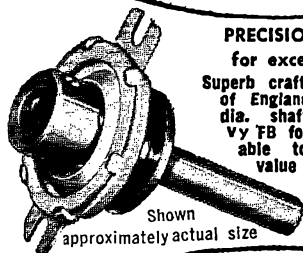
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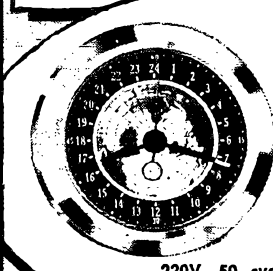


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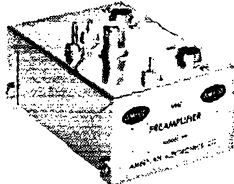
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@ 50 mc, 3.0 db @ 144 mc
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Specify frequency desired.



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- INPUT: 12.6V dc with 17 amp max. current draw at full load.
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SINCE 1886

DJ, ES, WT, VP2DW, W4RUF/KP4 and WA6QPE/KP4. CH now has a DX-40 v.f.o. and a long wire working all bands A1/A3. MC is Civil Defense Radio Officer. AYZ, at Roosevelt Roads Navy Base, is using a DX-40. ASK, at San Patricio, is using a DX-20 and a hi-fi audio amplifier as modulator. DJ, AYH and AYI have new Drake 2-B receivers. PJ, III, AQQ, ALY, AXT, AYZ, AWH and WA6QPE/KP4 have Drake 2-A receivers. New officers of the PRARC are ACF, pres.; AYA, vice-pres.; DJ, sec'y.; AOK, treas.; CK, MC, SV, ACH and ALY, directors. The new address of the PRARC is Box 1754, Hato Rey, P.R., Box 1091, San Juan, is now ARRL QSL Manager. AOD, at Colegio San Jose, has a new Hy-Gain multiband doublet and swapped an NC240-D for an HQ-129X. He left Puerto Rico June 9 for a summer church assignment in Hollywood, Fla. API, studying at Cornell U., is home for the summer and will do some hamming on 6 meters with a "Sixer," an HT-32A and an NC-300. AOD is on 28.8 Mc. daily from noon to 1 p.m. to give signal reports to fellows in the States. K3ONC, ex-KP4RK, writes from Washington with news about KP4s! ONC is active on 20-meter s.s.b. using an HT-37/Warrior KW, an RME-6900 and a three-element Thunderbird atop a 40-ft. tower. He writes that W5UEQ, the brother of KP4EK, is active on 20-meter s.s.b. from a new QTH in Woodville, Tex. W4PYC/KP4 operates from San Antonio, near Isabela, using an HT-32 and a rhombic. KC is back on with a Viking I and an HRO. BY is police chief in Ceiba. KE is active again from Aguadilla, his son ANG is ready for the General Class exam and his brother ASA is working for new TV Channel 3 in Mayaguez. AET has an Invader rig in Arecibo. AKS is active from Caguas with a Thunderbolt linear on 20-meter s.s.b. ACF is vacationing in Biloxi, Miss., and may be contacted through W5YEN or W5UOO on 14,315 kc. s.s.b. week-end noons. AFL's station consists of a DX-40, a DX-100, a Cheyenne MT-1, a Comanche MR-1, a Hallcrafters S86, an NC-183, an SB-10, a Hy-Gain tribander on a 40-ft. tower and folded dipoles for 40 and 80 meters. WP4AWM, in Penuelas, uses a DX-40, an S-86 and a coax-fed dipole on 7190 kc. AAA ordered an SB-10 to put the Valiant on s.s.b. plus a Gonset KW linear amplifier. AOO, WA6QPE/KP4 and Capt. Tom Little organized a DXpedition to VP5, South Calicos Island, in April. AYA is now installed in his new house in Caguas. ALY rebuilt the DX-35 for 40 per cent more power, especially on 6 meters. AYZ at Roosevelt Roads, uses a DX-40, a V.F.O., a Hornet Tribander and a 75-meter dipole. AWZ, AUQ and WANT, Norfolk, handled emergency traffic for a woman in Norfolk whose husband was in an air crash and confined to a military hospital in San Juan, all in ten minutes. AXN uses a DX-20 modulated by the audio amplifier of a Heath HW-29. The Antilles Emergency Weather Net meets at 1100 GMT daily on 7245 kc. with AEB as NCS. The secondary frequency is 3805 kc. AQY is using a Viking I, an HRO-5 and a 40-meter center-fed antenna with a 600-ohm line for both 40 and 80 meters. ASK put up a 120-ft. Windom, single wire fed, at the new QTH in San Patricio. AYZ requested an OPS application form. ATV had to lower the 40-meter antenna to make room for the 20-meter beam. WA6QPE/KP4 has a new HT-37. ADK is on 6 meters with a DX-35, an SX-32, a VHF-152 and a halo antenna from Rio Piedras. W9GAV/KP4 operates from the 9th floor of an apartment building with an auto antenna stuck out of the window. ZM is on 20- and 40-meter s.s.b. using a Pacemaker and a pair of 813s to a Mosley 4-band trap vertical. Traffic: (May) KP4WT 137, AOD 101, AFL 4, AWH 3. (Apr.) KP4WT 122, AOD 88, AWH 1. (Mar.) KP4WT 134, AOD 115. (Feb.) KP4AOD 162, WT 152, AWH 11. (Jan.) KP4WT 92, AOD 60.

CANAL ZONE—SCM, Thomas B. De Meis, KZ5TD —The June meeting of the CZARA was not held formally because of insufficient members to set up the meeting. A TVI complaint was successfully handled by the TVI committee to the satisfaction of all members. LC is setting up at his new location with a Viking 2000 and a 20-meter beam. All net activities have gone slack with little participation on AREC and MARS nets. Several stations will be going QRT for vacations, including TD. KR is active on phone. JT plans on building a triband quad. The Crossroads Amateur Radio Club had a barbecue with over fifty people attending. AD has a new Viking 2000. TF and HFN have installed a new Viking Valiant. GM and AR graduated from Cristobal High School and won scholarship awards. BA and BC are on a Stateside vacation. The Crossroads ARC was active on Field Day. The Air Force was quite active on Field Day. MQ reports his DX is at 123/75 and he will be moving his location to the Pacific side. TS, another Canal Zone teenager, once again is active on 20-meter c.w. Traffic: KZ5OA 47, CD 24, OB 21, VF 21, AD 18, FG 12, TD 9.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W6JQB
(Please turn the next page)

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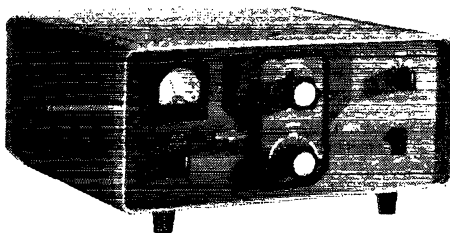
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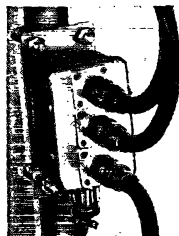
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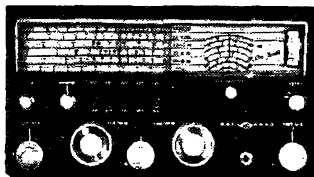
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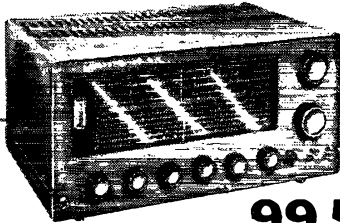
SEC: W8LIP. PAMs: W6BUK, W6ORS and K6PZM. RMs: W6BHG and K6LVR. The following stations earned BPL in May: K6MCA, W6GYH, W6WFF, K6SUJ and WA6LPS. Congrats, fellows! A good crowd from the section attended the convention in Phoenix. W8VFP reports fine activity on the All Points Traffic Net. WA6MFH and WA6QFC moved to Hawthorne. A new call in the section is WV6QNN, operating on 40- and 15-meter c.w. WA6GSV received his WAS. Congrats, Bob! W6NAA is working on the ham radio booth for the L.A. County Fair. Two new General Class stations in Covina are WA6GBZ and WA6KCL. A new twist in family licenses son is WA6OWN, dad is WV6JIC! K6QPH is now handling TCC skulls. WA6HUO worked some South American DX on 10 meters even with poor conditions. W6BHG has a 2-meter ground-plane up 40 feet. New officers of the San Gabriel Valley Radio Club are W6QYY, pres.; K6KIU, 1st vice-pres.; W6GVU, 2d vice-pres.; WA6LGZ, secy.; W6BRO, treas. K6CLS 6 is the new manager of the Pacific Area Net. Congrats, Jerry! WA6CKR is planning to attend the MTN Round-up in Monterey. WA6KVS has a new jr. operator! K6SIX, K6MGO, WA6MFH, WA6QFC and many others have reported some excellent openings on 6 meters. A big picnic was held to honor Uncle Fred, W6AKY, on his 85th birthday. Support your section nets: On c.w., the Southern California Net operating on 3600 kc. at 0300 GMT daily; on phone, the SoCal 6 Net operating on 50.4 Mc. at 0300 GMT daily. Traffic: (May) K6MCA 1341, W6GYH 870, W6WFF 513, K6OZJ 430, K6CLS 6 405, K6SUJ 300, WA6JDB 263, K6QPH 225, WA6LPS 191, WA6BCZ 180, WA6JOC 124, W6BHG 121, K6SIX 80, K6VYN 50, WA6KQN 48, WA6LOI 41, WV6QNN 34, WA6CKR 28, K6MGO 26, WA6KVS 19, K6UYK/6 19, W6SRE 18, WA6QFC 15, W6BUK 10, WA6MFH 9, W6NAA 9, W6CK 6, K6HOV 6, WA6HUO 6. (Apr.) W6NKR 4, W6UGA 4.

ARIZONA—SCM, Kenneth P. Cole, W7QZH—Asst. SCM/SEC: George Mezey, K7NIY. PAM: OIF. RM: LND. The Copper State Net meets at 1930 MST Mon. through Fri.; the Grand Canyon Net Sun. at 0800 on 7210 kc.; the Tucson AREC Net Wed. at 1900 on 3880 kc. The success of the Southwestern ARRL Convention held in Phoenix, Ariz., surpassed even the expectations of the most optimistic committee member. The attendance of approximately 1200, represented 15 states and five foreign countries. Taxi service to and from the airport to K7KYV, Thorne Donnelley's \$70,000 amateur layout at Mummy Mountain, and to other places within the city was furnished by the Mobilaires, who had their base station located on the 11th floor of the Hotel Westward Ho. The convention was honored by the presence of John Huntoon, Ray Meyers and other League officials. Senator Barry Goldwater, the main speaker at the Convention Banquet, urged the use of amateur radio to further friendly and peaceful understanding and relations with our foreign neighbors. Prizes were won by K6EJT, K5AXN, Sarah Kennedy, 6MIM, WA6BWC, WA6OJV, Bruce Gavin, K6JYB, K6JQD, EAQ, K6BXX, K6PLQ, George Hood, Mrs. R. R. Cramer and Mrs. Robert Legg, the XYL of 6QYY. The State of Arizona needs a c.w. net. If interested, contact 0WHIE/7 on 3830 kc. or at his home address, 5631 South Oriole, Tucson, Ariz. The repeater station being constructed by the Catalina Radio Club should be ready and working soon. Election returns: Phoenix VHF Club—K7DVO, pres.; K7CIN, vice-pres.; K7LYD, secy.-treas.; Scottsdale Amateur Radio Club—K7KCB, pres. LND, RM, needs c.w. operators for the 12th Regional Net. Please contact Hugh on the Copperstate Net (see time and frequency above) or direct correspondence to 342 West Latham, Scottsdale, Ariz. Traffic: WLND 140, W0WHE/7 134.

SAN DIEGO—SCM, Don Stansifer, W6LRU—Many in the San Diego section attended the excellent Southwestern Division Convention in Phoenix in late May. Master of Ceremonies at the DX Breakfast was W6LRU, who introduced W6JII, who told about the San Diego DX Club work with the W/K6 QSL Bureau, and W6RCD, who is now the QSL manager for VR6TC. Danny, YP2VB/MMI, still is working in San Diego and spends all his spare time getting the *Yasme III* ready for another Pacific tour to rare DX spots. K6LKD, in Escondido, was appointed Asst. Manager of SCN on June 1. A new General Class licensee in San Marcos is WA6REK. K6LJA, in Orange County, already is making contacts and plans organizing the 1962 Southwestern Division Convention to be held at Disneyland June 1, 2 and 3 next year. The Newport Amateur Radio Club held its Field Day on the ranch of member Gary Wolverton. WA6NKH, from Seal Beach, now is stationed at Ft. Huachuca, Ariz. Four stations in the section made BPL in May: W6s EOT, IAB, YDK and K6BPI. San Diego EC W6EWU reports a new net on 6 meters recently was formed. If you are interested, contact Tom. The June meeting of the San Diego DX Club was held at the home of W6JII. W6RCD spent two weeks active duty in (Please turn the next page)

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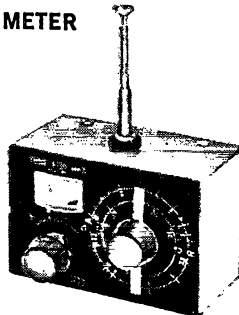


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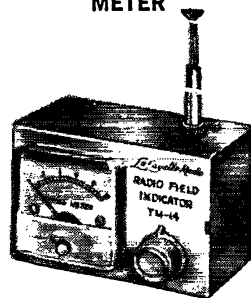


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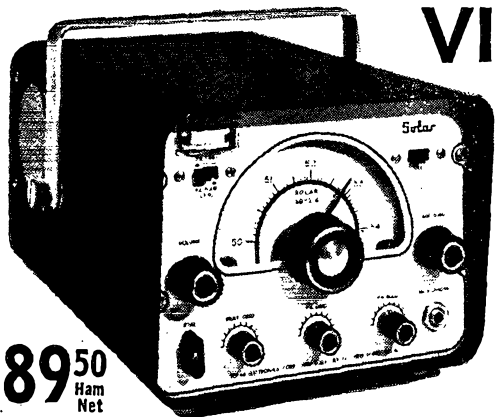
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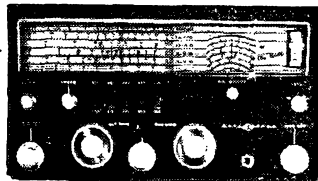
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the Navy in June. W6KSE is now on s.s.b. with a new rig, receiver and a beam. On RTTY now is W6MIT. W6NCP, in Orange County, topped all section entrants in the spring ARRL FMT for accuracy. The El Cajon High School Club again was active in Field Day from a good location. Traffic: (May) W6IAB 4906, W6YDK 1367, K6BPI 1266, W6EOT 688, K6LKD 194, WA6CDD 170, WA6ATB 42, W6ELQ 7. (Apr.) WA6DBC 145.

SANTA BARBARA—SCM, Robert A. Hemke, K6CVR—SEC: W6JLY. The Radio Club in the Arroyo Grande Area is becoming a fast-growing club. Its paper, *Spark Gap*, shows that it's a get-going club. The Poinsetta ARC was given a talk by K6RYB on Tunnel Diodes and how they can be used in different circuits. Refreshments were served after the meeting. The Oxnard County ARC had a Field Day spot that proved to be a good one. W6JLY attended an RTTY lecture at the Phoenix Convention and is all set to go RTTY now. These people from the Santa Barbara Area were seen at the convention: K6GHU, K6KCI, WA6OKN, W6JLY, K6EUM, K6CVR and WA6FGV. Traffic: W6JLY 11, W6YCF 5.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W6BNG—Asst. SCM: E. C. Pool, SNFO. SEC: K5AEX. PAM: BOO. RM: LR. CUI is the new EC for Camp County. The Terry County ARC completed its winter code and theory class with good results, three new Novice and three new Conditional Class amateurs. GEX and KN5KNY are new hams in Brownfield. The Terry County ARC also is teaching a code and theory class for 8 members of GIRLS-TOWN U.S.A. which is 36 miles from Brownfield and requires a 72-mile drive twice a week for the instructors. Odessa has organized the Permian Basin ARC. The Panhandle ARC has a new club house and plenty of v.h.f. equipment. HNG has a new baby girl as of May 29. The Plainview ARC holds code and theory classes the 2nd and 4th Tue. each month. If you are in that area, visit the club. Meetings are held in the north side of the City Auditorium at 8 p.m. YUO is touring the western part of the country in a new Thunderbird with a kw. s.s.b. NSI is mobile in a new Corvair, whip-mounted up front to get away from ignition noise. The Carswell Air Force ARC was host to a joint Army and Air Force MARS meeting June 3. The Telephone Company gave a very interesting demonstration of communications equipment present and future. Congratulations to Capt. Al Cline on an FB program. A tour of the flight line and the base MARS station was enjoyed by all 160 MARS members and amateurs who attended. Traffic: K5QWR 660, W5BKH 214, GY 155, ANK 51, K5VWJ 45, ILL 41, PXV 32, W5GNF 27, K5AVX 15.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—The Electron Benders of Tulsa sponsored a Novice contest featuring operation and home-built equipment. Bob Carter and Bob Price were the high operators and Garry Crookram and Dick Weddle were high in the home-built equipment part of the contest. The ACARC has just graduated a new code and theory class and also presented EUL, K5KFS and EHC with certificates of appreciation for outstanding service. BBA is proud of a new antenna. The Bartlesville Club responded to a call from civil defense to furnish communications during flood threats there. Stations helping were K5HZF, K5JTC, K5OVT, K5ONP and K5UZL. K5DLP and EJK, PAMs for 75 and 40 meters, both deserve special recognition for the work they have done on the phone nets. Both are retiring from these appointments and a deep-hearted thanks from the SCM goes to both. Special recognition also goes to K5CAF, AZO, CZB and KY for work on the Storm Net. Many others also have done a good job. Traffic: K5IBZ 93, OCX 82, W5DRZ 49, K5JGZ 32, W5MFX 27, K5DLP 23, JOA 15, ZCJ 14, W5PNG 12, CCK 9, K5OOV 8, W5UYQ 7, WAF 4, K5CBG 2.

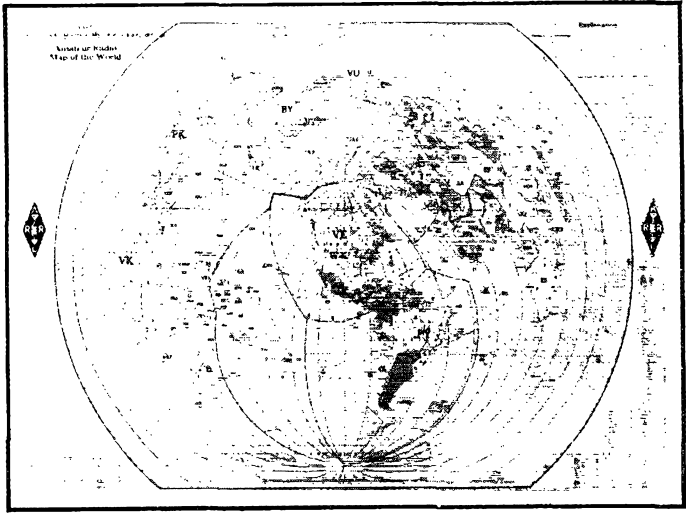
CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: H. C. Hillyard, VO1CZ, and A. E. W. Street, VE1EK. SEC: VE1BL. The annual meeting of the NSARA will be held at Stillwater, Guysborough County, Sept. 3. New appointments include OM as RM. ABL has been transferred to Newcastle. TG has been transferred to California and ex-OZ is now 2B1Q on Grindstone Island. AHU is the call of the Upper St. John River Valley Club. Old-Timer certificates have been issued to BY, IU, LG, LI, NP, RT and XG. New converts to s.s.b. include QR and QZ. New calls include AHV and TU. Do you have a new amateur in your area? Please send his call along for inclusion in this column. Also, please let me have your traffic reports early in the month. It is a well- (Please turn the next page)

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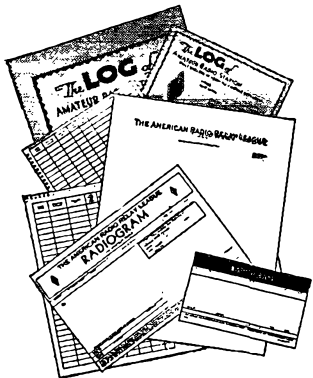


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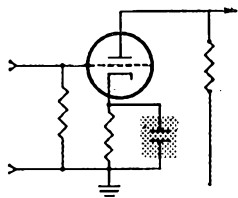
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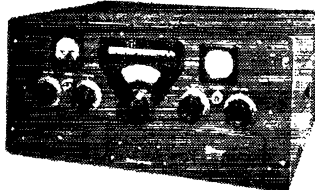
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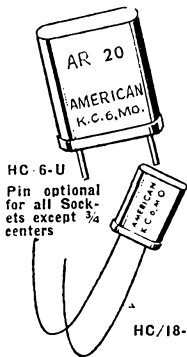
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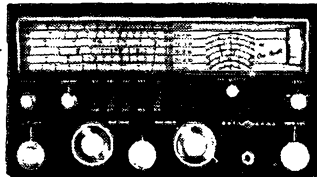
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sessions 27, check-ins 2784, registered messages 265, verbal 44. AAF, our RM, says the B.C. Emergency Net again stays on *standard* time to agree with other areas with which we work. Stations in other towns report on the net (3650 kc. 0300 GMT daily). AIG, our P.A.M., reports some QRM on 3755 kc. (0200Z). The SCM has appointed LL as OBS. BBB reports there are 25 YLs in B.C. and 150 in Canada. Traffic: VE7BDP 130. BAY 84. BFK 84. AAF 72. BDL 65. BAZ 41. BGE 41. TT 38. JQ 14.

MANITOBA—SCM, M. S. Watson, VE4JY—The ARLM held an auction of ham gear at the May meeting with VE4UR acting as auctioneer. UR and LJ, employed by IBM, have been transferred and will be sorely missed for these boys were active hams, LJ having edited the ARLM *Satellite* since its inception. The highlight of May was the banquet held in honor of Noel B. Eaton, 3CJ, ARRL Canadian Division Director, at the Charter House, Winnipeg, on June 2. This gathering was doubly successful in that ARRL President Goodwin L. Dosland, W0TSN, also was present and with 80 hams attending it was a unique experience. Both officials had their charming XYLs with them and all present were treated to clear and informative addresses on the activity of the League both in Canada and the world at large. On May 31 Noel addressed the Brandon Club and was enthusiastically received. Field Day was held at the farm of WS at Rosser, under the direction of AB and HL. Among other clubs active in this event was Bousejour under the direction of JW. Preparations are well under way for the Manitoba Hamfest to be held at Brandon Sept. 2 and 3 at which ARRL President Dosland will attend. LC, QSL Manager, has been authorized to destroy all cards over a year old, so get your envelopes in fast. Traffic: VE4QD 18, JY 14, EF 7, AN 2.

SASKATCHEWAN—SCM, H. R. Horn, VE5HR—It was a pleasure to welcome Noel Eaton, 3CJ, our Canadian Director and his charming XYL on their return from the Annual Board of Directors Meeting. Noel gave a very interesting talk followed by a question-and-answer period on proceedings of the Board and other ARRL and Canadian radio matters. Meetings were held at Saskatoon and Regina. HR attended the Regina meeting, as did a good representation from Moose Jaw. HR also visited the Prince Albert Club and it is all set for the Annual Saskatchewan Hamfest. Ron Hook gave an interesting talk on Northern Sask. Radio Communications as handled through the Dept. of Natural Resources, of which Ron is in charge. New appointees are GI as OES at Regina and HQ as OBS and OO in Saskatoon. Listen for HQ and the latest ARRL Official Bulletins at 1910 CST on 3780 kc. Mon., Wed. and Fri. PEN (c.w. net) has suspended activities for the summer months and will resume in September. Watch for first QNT. RU has WAZ on phone for the first VE5 as such. Congrats. AI, GI now is on 75-meter mobile. OF has a Mosley three-element 14-Mc. beam. KZ does an FB job as net control for the Regina Sunday Net. Traffic: VE5NQ 31.

Correspondence from Members

(Continued from page 77)

What may eventually come to amateur radio is that a minority of wrongdoers will spoil it for the rest. Because of these amateurs, the FCC eventually might make it tough for the rest of us.—Dale Brandser, K0RPW, Winsted, Minnesota.

PSE QLF

☞ Lament, the guy who wants off the road for the guy c.w./m; come on, boys, don't let's get too old for new ideas. Why, with these new cars without a clutch pedal, what do you suppose God gave you a left foot for? Pse QLF es BCNU—W. Bradley Martin, W3QV, Abington, Pennsylvania.

JOINS THE RANKS

☞ We are proud to be affiliated with such a fine organization as ARRL. We are sure that the League will continue to uphold the interests of amateur radio as well as it has done in the past.

I personally thank you for the fine kit of materials to help the newer clubs get started in the field of public relations. As publicity director and now corresponding secretary I found it very helpful in gaining public recognition for the deeds of amateur radio.—John F. Leahy, Ioyridge Amateur Radio Club, Philadelphia, Pennsylvania.

(Please turn the next page)

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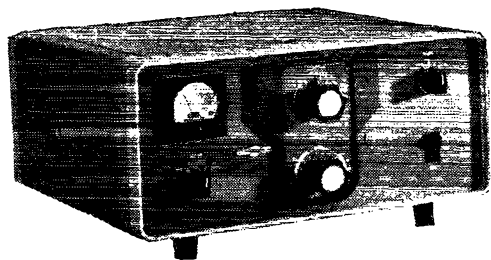
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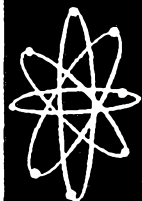
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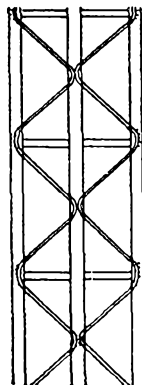
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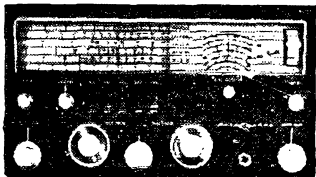
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BDL, IDL, YIP . . .

☞ Re W2YBK's letter, April QST: Fit, the poor c.w. man! Believe me it would be much easier to stick to the names of your QTH than to use airline indicators.

PIT is Pittsburgh as shown in the "location identifier" as we call it in the FAA. I have used it in my work for the past 15 years and don't believe it will work in amateur radio. The corrections, additions, and deletions would take so much time you wouldn't have time to get on the air.

My QTH is 6G7 (St. Clairsville, Ohio) and I sure wouldn't like to tell them I'm from 6G7 even if they knew where it was. My KZ5IP QTH was BLB, or try this for size: K4LIB's QTH is W09. How about Corpus Christi, Texas? Take your choice — NGW, CRP, NGP, or CUX — all are correct. Now here is one if you are good at sending dashes — O00 for Alturas, Calif. If you are good at dots only, try S55 for Ennis, Mont.

I could go on for pages, 145 that is, including Hawaii, Alaska, and Canada. If you are from Greta, Manitoba, the poor feller on the other end wouldn't know if you were saying good-night or giving your QTH when you gave him a "GN." — Ike Price, W8BQV/cx-K251P, 6G7, Ohio.

☞ I have traveled on the airlines rather extensively for the past twenty years and have gotten into the habit of using these city codes myself when making notes, reservations, writing interoffice memos, etc., and have found it rather convenient and expedient. If all of us knew all the city codes thoroughly, it certainly would be a help to use these codes for those who operate the A-1 mode. However, when airline personnel, who use these codes every day as part of their job, occasionally must refer to the code book to decode a city, I can see the hams getting into quite a cauldron of confusion in using the city codes unless they had an official airline guide or a copy of the publication, to which K2YBK referred, in their shacks.

At this point I must take exception to two statements made by W2YBK. In the first place, he referred to the Pittsburg code as "PGH." Reference to the airline guide gives the Pittsburg code as "FIT." In the second place, he indicated that the name of the city can be recognized usually from the city code.

Just as a trial run, see how many cities our readers can extract from the following codes:

CVG COS ACF BNA TY'S MSY ICT YIP GEG
BDL FAT HPN DCA ORF EWR TTN SAN PDX

Those of you who use the airlines quite frequently can probably get about half of those listed. Even experienced airline personnel whose carrier does not service some of the cities would have to resort to the code book. How did you make out? The cities are, in the order listed above:

Cincinnati, Colorado Springs, Fort Worth, Nashville, Knoxville, New Orleans, Wichita, Detroit, Spokane, Hartford, Conn., or Springfield, Mass.; Fresno, White Plains (NY), Washington, Norfolk, Newark, Trenton, San Diego, Portland (Ore.).

One more problem arises. What code would be used for New York LGA or IDL and for Chicago MDW or ORD?

I think the idea is great. I have been using it for years in my personal work. But make sure your receiving station knows the code rather than adding to his present burden of fighting QRAM, QRN, QSB and the local splatterers. — C. B. Salan, K3HHH, Princeton, New Jersey.

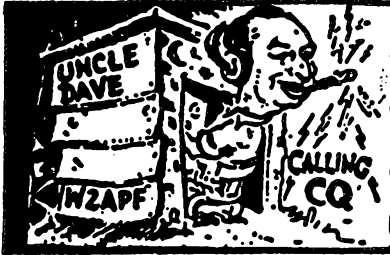
"10-4"

☞ Mr. Conham's letter in June QST cites the CB effort to clean up TVI. Well, sir, I know many Citizens Banders and it seems that none of them uses a filter because, as they say, "It will cut down the output so I can't work Texas."

As far as the Citizen Banders becoming hams, that is OK also. However, I do wish they would leave their "10-4" and "I'll shout you down" back on eleven meters. — R. R. Migliorino, K2YFE, Hawthorne, New Jersey. QST-

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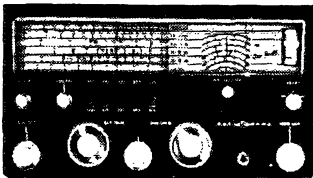
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Happenings of the Month

(Continued from page 65)

teur service, the League felt obliged to register opposition to proposed expanded privileges, not because of opposition to the substance but rather because of our concern over the timing of the proposals in relation to international telecommunications regulatory developments. In the League's view, this aspect is not currently an important factor for consideration in the present proceeding, and the League therefore heartily endorses the proposal to expand privileges for maritime-mobile operation in the amateur service.

THE AMERICAN RADIO RELAY LEAGUE, INC.
By PAUL M. SEGAL
Its General Counsel

JOHN HUNTOON
General Manager
June 1, 1961



25 Years Ago
this month

August 1936

. . . The editorial 25 years ago predicted many advances in the use of the ultra-high frequencies — including television, facsimile, and high-fidelity broadcasting. The editorial mentioned such bizarre services as a doctor's paging service, radioteletypewriters for business and press, locomotive-to-caboose communication, radiosondes, and so forth! All of these have come to pass.

. . . Technical articles included dope on using crystal control on the ultra-high frequencies (three separate articles), a description of a vacuum-tube voltmeter, an inexpensive four-band transmitter with a Type 10 amplifier, how to use an autotransformer, remote tuning of u.l.f. receivers, and miscellaneous hints and kinks.

. . . There was an article on handling ham messages, and the new ARRL message blank was described.

. . . Field Day was so popular in 1936 that a second one was scheduled for late August.

. . . In "Correspondence from Members" W9KA quoted some figures to demonstrate that W0 was the easiest place from which to make WAC in the United States, while W9 was the most difficult. Furthermore, since North America was the hardest continent from which to make WAC, this made the W9 district the hardest place in the world from which to make WAC!

. . . It was reported that six operators made perfect copy in ARRL's annual Copying Bee. Since the "message" was pure gibberish, sent at 22.5 w.p.m., this was no mean feat.

. . . W6CUH wrote about the prediction of DX conditions, noting that radio conditions varied on a 27-day cycle and that this might be related to sun spots. He wasn't positive about this, but did eliminate the moon as the cause of the effect.

MONOBAND BEAMS



- Full Sized
- Wide Spaced
- Light Weight

10 METER—3 Element	\$28.50
Model No. A28-3, boom 10' x 1½"	
10 METER—4 Element	\$42.50
Model No. A28-4, boom 18' x 1½"	
15 METER—3 Element	\$32.50
Model No. A21-3 boom 12' x 1½"	
20 METER—2 Element	\$45.00
Model No. A14-3, boom 10' x 1½"	
20 METER—3 Element	\$62.50
Model No. A14-3, boom 20'6" x 1½"	

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FREE CATALOG

CUSHCRAFT 621 HAYWARD ST.
MANCHESTER N. H.



SO---You think Manhattan Island was a buy ... Well, take a look at THESE Values!

(Don't Forget To Send For The New Summer/Fall "Greensheet"
Catalog. Just Out!)

COAXIAL CABLE . . . FACTORY FRESH STOCK

Type	Nominal Impedance	Price per 100'	Price Per 1000'
RG-8/U	52 Ohms	\$ 8.50	\$ 80.00
RG-8A/U	52 Ohms	12.00	115.00
RG-11/U	72 Ohms	8.00	75.00
RG-11A/U	72 Ohms	9.00	85.00
RG-58/U	52 Ohms	4.50	40.00
RG-58A/U	52 Ohms	5.00	44.00
RG-59/U	72 Ohms	4.50	40.00
RG-59A/U	72 Ohms	5.00	44.00

Western Electric Plate Transformer

Pri: 115 V 60 CPS
Sec: 3100 V. AC C.T. tested @ 500 Ma. 6 1/2" H x
7 1/2" W x 6 1/2" D. Wt: 42 lbs. \$12.50.

7 Conductor Color-Coded Outdoor Cable
3/8" Diameter. 0.6¢ per ft. (1,000 Ft. Spool \$50.00)

Swinging Choke: 300 Ma./5 Hys; 50 Ma./20 Hys. 70 Ohms. \$2.50.

Selenium Rectifier: Up to 50 V.AC/Up to 45 V.DC out. @ 8 A. \$9.75.

Dual Fil. Xfrm: Pri: 115 VAC @ 60 CPS. Sec: (1) 6.3 @ 5.5 A.; Sec: (2) 6.3 @ 2.75 A. \$3.75.

7' Line Cord: 3 Conductor polarized. Heavy-duty. 40¢ . . . 3 Prong to 2 Prong Adapter @ 25¢.

Weston Model 476 3 1/2" Rd. Meter: 0 to 10 VAC. \$2.95.

Weston Model 301 3 1/2" Rd. Meter: 5 Ma. Movement. Dual scale: 0-150 & 0-300 VDC. \$3.95.

7500 RPM Blower Motor: Operates from 24 VAC or VDC or 115 VAC w/resistor. Used, tested. \$1.95. (Brand new — \$2.95.)

8 KV Kilopak Pwr Supply: In: 115 VAC/60 CPS. Out: 8 KV DC @ .2 Ma. (good up to 1 Ma.) Oil-filled. \$12.75.

Dual Plate Xfmr: Pri: 115 V. 60 CPS. Sec: 870 VCT @ 1.13 Amps. RMS. Sec: (2) 906 VCT @ 230 Ma. Herm. slid. 61 lbs. \$5.95.

Superior Elec. Auto Xfmr Type 10: 0 to 132 VAC @ 1 1/4 A. W/dial & Knob. \$5.95.

Superior Elec. Auto Xfmr Type 216U: 0 to 270 VAC @ 3 A. W/dial & Knob. \$11.95.

Var. Capacitor: 18 to 400 Mmf. 1/4" shaft. 600 VDC. \$2.50.

Hickok Model 47 Wattmeter: 3 1/2" Rd. w/ext. calib. resistor. \$7.95.

750 Ma. Silicon Rectifier: 200 P.I.V. @ 28¢ 400 P.I.V. @ 32¢ 600 P.I.V. @ 36¢.

Ward Leonard 80,000 Ohm Bleeder Resistor: Approx. 200 watts. \$1.00.

Johnson Variable Capacitor: 72 to 1008 Mmf. 3500 VDC ceramic insulation \$8.50.

Mosley TA36 — 4 Element Beam: 4 elements on 10 + 3 elements on 15 + 3 elements on 20. . . . Price: \$129.50.

CDR Ham-M Rotator Controls large Antennas. Load rating over 1,000 lbs. Provides 365 Inch lbs. rotating torque. \$110.00.

50 foot/8-conductor Color-Coded Rubber Cable. 50 ft. roll — \$2.95 (outside of cable completely covered with rubber).

Glas-Line (Non Conductive Guy Wire): 500 lbs. tensile strength. (Eliminates need for glass "break up" insulators). Ideally suited for heavy amateur antennas. 100 foot spool \$3.75. . . 600 foot spool \$17.50.

TS175U Frequency Meter: Excellent, like-new condition. W/orig. book. Individually calibrated from 85 thru 1,000 Mcs. (looks like BC221). \$250.00.

Elmac JAN Tube type 4-65A's @ \$10.00.

RCA Jan 2E26. \$1.95

RCA Mica Capacitor: 4,000 Mmf. 3000 V. Peak. \$1.95.

RCA Plate Xfmrs: 1220 V.C.T. @ 360 Ma. Pri: 115 V. w/taps. 60 CPS. Herm. slid. \$4.95.

RCA Plate Xfmrs: Pri: 115 VAC @ 60 CPS. Sec: 905 V.C.T. @ 360 Ma. \$3.95.

Variable Capacitor: Dual 215/215 Mmf. .125 spacing (4500 V.) \$7.75.

Merit Choke: 10 Hy @ 250 Ma. #C-3182. \$2.95.

#213 Sockets for 304TL & 304TH. \$1.15 each.

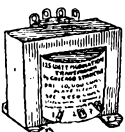
Cathode Ray Tube Shield (for tube type 2BP1) \$2.95.

Cornell-Dubilier 4 Mfd @ 4000 VDC Oil Capacitor. \$9.95 (3 for \$27.00.)

Hughes Swinging Choke: 20 Hy/3.5 Hy @ 50/250 Ma. 75 Ohms. \$1.95.

Filter Choke: 8 Hy. @ 200 Ma. (90 Ohms D.C. Resistance) Herm. slid. \$1.75.

RCA Precision 500 KC Crystal Oscillator: Accuracy 0.0012%. Contains Precision 500 KC xtal oven. 5840 tube. Herm. slid. Mounts on standard 7 pin miniature socket. Requires 6.3 VAC or DC. 100 V.C.D. W/schematic. \$3.75.



Compact 125 Watt Modulation Xfmr: Pri: 10,000 Ohms Plate-to-Plate. Sec: 4550 Ohms (Has screen winding. 3300 Ohms). Open frame, epoxy impregnated. Winding insulation to ground; 5000 Volts Peak. Orig. designed for PP 4-65A's. Dimensions: 3 1/2" H x 3 1/2" W x 3 1/2" D. Wt: 3 lbs. \$6.95. (Two for \$10.00)

Special Sale on Filter Capacitors:

Sangamo 13,500 Mfd. @ 15 V.D.C. 75¢ each.

Mallory 5,000 Mfd. @ 24 V.D.C. 80¢ each.

Mallory 1,250 Mfd. @ 180 V.D.C. \$2.25 each.

Mallory 500 Mfd. @ 200 V.D.C. 90¢ each.

BC-221 Freq. Meter w/modulation. (125 to 20,000 Kcs.)

Like-new! \$99.00.

TV6/U Bendix Electrometer Tube Tester: Choke 5889, 5886, 5803, 5800, 5799, etc. Brand New. With Book \$55.00. Also use as a laboratory resistance meter.

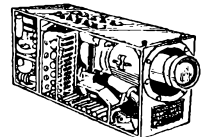


UTC Choke: 6 Hy. @ 500 Ma. (27 Ohms) \$8.95.

UTC Choke: 6 Hy. @ 1 Amp. (33 Ohms) \$13.95.

Jennings UCS Vacuum Variable Capacitor: Capacity: 10 to 300 Mmf. @ 10 KV. Complete, less shaft. \$49.00

RCA CRV-59AAC TV Xmr Camera with 1846 Iconoscope. In original wooden boxes. Exc. condx. Guaranteed complete w/tube. Sold as is, as purchased from gov't. \$95.00.



Xmtr Variable Capacitor: Approx. 20 to 750 Mmf. @ 4,000 V.D.C. Capacitor enclosed in ingenious oil bath, allowing high-voltage and small size. Overall dimensions: 6 1/2" L x 3 1/2" H x 3 1/2" W. \$11.95.

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512 Broadway, New York 12, N. Y.

(Minimum order \$2.00)

() Enclosed is money order or check and my order.

() Send copy of Summer/Fall "Greensheet" Catalog.

"Just off the press".

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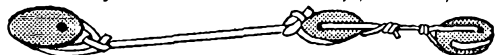
Company.....

Address.....

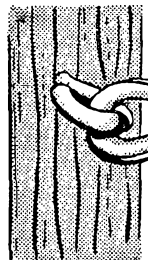
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NON-METALLIC GUY LINE — PERFECT FLEXIBLE INSULATOR — REVOLUTIONIZES HAM RADIO & TV ANTENNA SYSTEMS

Non-inductive, non-conducting, non-absorbing Glas-Line isolates systems from directional arrays, rhombics, etc.



The new main insulator of W3UCT. The Glas-Line is between the two egg insulators running to the lower left. The copper link between the center egg insulator and the upper right egg insulator is for the dead-end feeder of a Zapp antenna.



View of an open thimble and eye bolt for coupling the Glas-Line guy wire to a tree. GLAS-LINE cannot rot, will not shrink, stretch or sag . . . has high breaking strength of over 500 pounds with proper use.

100' SPOOL **\$375** Plus 50¢ for postage & handling
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'SUPER' GLAS-LINE

with 1,000 lb. TENSILE STRENGTH with proper use.

100' SPOOL **\$695** Plus \$1.00 for postage & handling
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Announcing NEW "G-3 50X GLAS-LINE CABLE" with 2,500 lb. TENSILE STRENGTH with proper use.

100' SPOOL **\$1390** Plus \$1.50 for postage & handling
600' REELS **\$6950** Plus \$3.00 for postage & handling

Send check or M.O. No C.O.D.'s please.
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Amateur • Commercial • Marine • Mobile
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A SYSTEM FOR EVERY SERVICE
LET OUR STAFF HELP YOU DESIGN YOURS

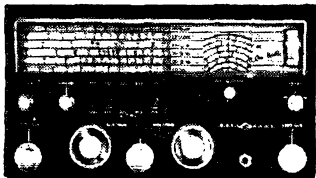
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WE HAVE IT! NATIONAL'S NEW

NC 190



TWO-WAY COMMUNICATIONS

236 Hylan Blvd., Staten Island 5, New York

World Above 50 Mc.

(Continued from page 69)

Clubs and Nets

The "Ontario VHF Association" is now issuing certificate awards for both 50-Mc. and 141-Mc. operation. The "2-meter century award" is given for proof of contacts with fifty different VE3 2-meter amateur stations, with endorsement made for each additional twenty-five new contacts. The "Worked All VE Districts" 6-meter award will be given for submission of proof of contacts on 50 Mc. with any seven of the ten Canadian amateur districts. For further information concerning the awards you should write Gordon J. Barber, VE3AAH, Secy., Ontario VHF Association, 21A Barrington Avenue, Toronto 13, Ontario-Canada.

The "Oklahoma Central 6 Meter Net" has announced that K4PCL, James S. Woodson, Covington, Virginia is the recipient of their 100th "Gold Award" which has been issued by the organization since January 1, 1959. He was given a special award, a white and gold ceramic ash tray with his call letters on it. Only a few of the "Gold Awards" are still available to be issued and when present stock is depleted no more awards will be made.

W8NOH informs us that the "Annual VHF Hamfest" will be held on the first Sunday in August, August 6, at Allegan County Park.

News of a new 6-meter net has reached us via W9PNE. Erice advises that Buzz, W9FCV, of St. Francisville, Illinois, is working on the organization of this net. Purpose — to show the true value of six meters for local and medium distance ground wave coverage, without the QRM of 75 or 10 meters. (Now, Buzz, you know better than that!)

432 Mc. and Up

432-Mc. TV enthusiasts in the Long Island area are requested to get in touch with WA2HILZ. Jim is looking for skeds and information. W6BJI, W6TZY, K6EMY and K6GDI have been plugging the APX-6 conversion in the Fresno area. Gib claims some very good transmission line efficiencies using surface-wave transmission. They are using RG-8/U with the outer covering and the shield peeled off between the launchers. Launcher cones are made of one-quarter-inch hardware cloth about 14 inches in diameter and 24 inches long. Articles in the April 1954 *Electronics* and the June 1951 *Proceedings of the IRE* are recommended reading. I have heard a lot of hams swear they were going to try s.w.t.l., Gib, but I think you boys are the first to do it.

W6NLZ has his 1296-Mc. amplifier delivering 400 watts to a dummy load and expects his 17-foot dish to be delivered by this time. John broke my heart by pointing out that he is only interested in working Tommy by tropo and doesn't think he will spend much time on moon bounce. Here is hoping that we can catch on one of your skeds with the moon in the right position, John. Maybe we can convert you.

W6QXP and W8LIO are both actively engaged in listening to W1BU via the moon. Jerry is having some trouble getting good signals, but Jack is hearing good enough so that he has decided to try sending. Looks like he has come up with a surplus klystron amplifier which will deliver several hundred watts output. Should have all the details by next month. If you can't wait, try dropping a line to W8LIO. DL3FM sends word and pictures of the burying of his master oscillator. Frequency is 1296.160. Karl also purchased a coaxial relay for use on his installation. (I have to admit I never thought of buying one.) He didn't say who made it but as it is costing around \$500, I guess it doesn't make any difference. K2UUR has been flailing the 1296-Mc. band in the New York, New Jersey area with some good success. Frequency at K2UUR is 1296.05. At W1BU it is 1296.0. We did manage to work W1MIL/1 in New Hampshire during the QSO Party for our third state on 1296 Mc. Only novelty was the use of s.s.b. on our end of the contact. W4IIIK isn't making any commitments but he notes that he did find a ten-foot radar dish in a local (Memphis, Tenn.) junk yard and it is now resting in his back yard. I hope this means that we will be able to add Tennessee to our states on 1296 before too long. W1BU is transmitting signals at the moon any night the moon is above the horizon on the east coast between the hours 1200 and 1600 GMT. Schedules will be made on request.

657

Amateur Electronic Supply Still Celebrating Its New Chicago Store Opening!

\$5 DOWN

36 Months to pay the balance if you wish

PUTS ANY NEW Hallicrafters EQUIPMENT IN YOUR SHACK!

	Price	Monthly Payments		Price	Monthly Payments
S-38E Receiver	\$ 59.95	\$ 1.98	SX-140 Receiver	124.95	4.33
SX-62A Receiver	395.00	14.08	SX-140K Receiver	104.95	3.61
S-94 Receiver	69.95	2.35	SR-34AC Transceiver	395.00	14.08
S-95 Receiver	69.95	2.35	R-47 Speaker	12.95	.29
SX-100 Receiver	325.00	11.56	R-48 Speaker	19.95	.54
SX-101A Receiver	445.00	15.89	HT-32B Transmitter	725.00	26.00
S-107 Receiver	94.95	3.25	HT-33B Linear	995.00	35.75
S-108 Receiver	139.95	4.87	HT-37 Transmitter	450.00	16.07
SX-110 Receiver	169.95	5.96	HT-40 Transmitter	109.95	3.79
SX-111 Receiver	279.50	9.91	HT-40K Transmitter	89.95	3.07
SX-115 Receiver	595.00	21.31	HA-1 Keyer	79.95	2.71
S-120 Receiver	69.95	2.35			

Less Terry's Terrific Celebration Trade-In



Here is \$50,000 worth of brand new 1961 Hallicrafters equipment in stock ready for immediate delivery. We must move this stock!



Our Chicago reconditioned equipment department. We need your present equipment to help us fill waiting orders.

= MORE FOR YOUR OLD RIG

You'll probably never get more in trade than Terry (W9DIA) is offering you right now! Tell us what gear you have . . . and what you want . . . mail the coupon below today for Terry's big deal!



Earl W9LUO, who is in charge of our reconditioning shop was factory trained in the Hallicrafters plant.

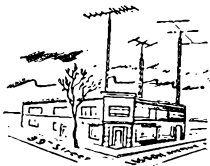
RECONDITIONED EQUIPMENT—WE HAVE IT!

. . . This equipment is in stock at our Milwaukee store . . . available by mail and also to our Chicago store customers.

S-20R Receiver	\$ 39.00	SX-62 Receiver	199.00	Receiver	259.00
SX-24 Receiver	49.00	SB-62A Receiver	295.00	HT-20 Transmitter	99.00
SX-25 Receiver	59.00	SB-71 Receiver	119.00	HT-30 Exciter	229.00
SX-28 Receiver	79.00	S-77A Receiver	49.00	HT-31 Linear	199.00
SX-28A Receiver	89.00	S-85 Receiver	79.00	HT-32 Exciter	429.00
S-38B Receiver	24.00	S-86 Receiver	74.00	HT-32A Exciter	479.00
S-38E Receiver	39.00	SX-88 Receiver	299.00	HT-33 Linear	299.00
S-40 Receiver	54.00	S-95 Receiver	39.00	HT-33A Linear	529.00
S-40A Receiver	59.00	SX-99 Receiver	99.00	CB-1 Citizens Band	69.00
S-40B Receiver	69.00	SX-111 Receiver	190.00	SR-34AC Trans-	
SX-43 Receiver	99.00	S-107 Receiver	69.00	ceiver	249.00
S-53 Receiver	49.00	SX-101 Mark II	269.00	HT-37 Transmitter	349.00

All in like-new operating condition . . . reconditioned in our shops. TERMS: \$5 down . . . up to 36 months to pay. If you don't see what you want, write for availability and special reconditioned price.

ORDER NOW . . . OR MAIL COUPON FOR TRADE-IN DEAL



AMATEUR ELECTRONIC SUPPLY

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Mail Coupon for TERRY'S DEAL!

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Dear Terry: I want to buy a _____

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What's your best deal and terms—

(1) \$5 Enclosed (2) Ship new equipment at once.

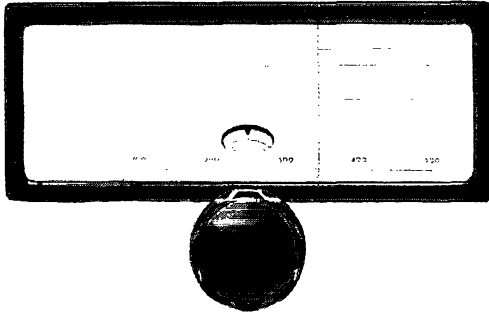
Name _____

Address _____

City _____ State _____

(3) Send reconditioned equipment bulletin

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GEARED SLOW MOTION DRIVE For Amateur Radio & Communications RECEIVERS & TRANSMITTERS

A high grade assembly, flywheel loaded, manufactured to fine tolerances, provides a smooth positive drive with a reduction ratio of 110:1. The vernier with its 100 divisions rotates 5 times for one pointer traverse, giving 500 divisions with positive reset readings. A cam adjustment on the vernier assures correct zero setting. A spring loaded jockey arm maintains tension of the pointer drive. Overall dimensions 9 $\frac{1}{4}$ " x 3 $\frac{3}{4}$ ".

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Stratton & Co., Ltd. (Eddystone) PRICE \$16.50 NET
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BRITISH RADIO ELECTRONICS, LTD.
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in a single custom decal!

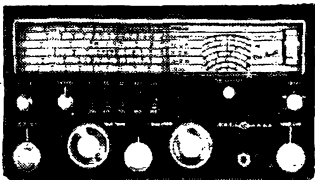


In six attractive colors. Unequaled in appearance. Ideal gift. \$1.95 each. Add 4% tax in Calif. Approx. size 3 $\frac{3}{4}$ " x 9". Mailed P.P. within 7 days. No COD's please.

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190**

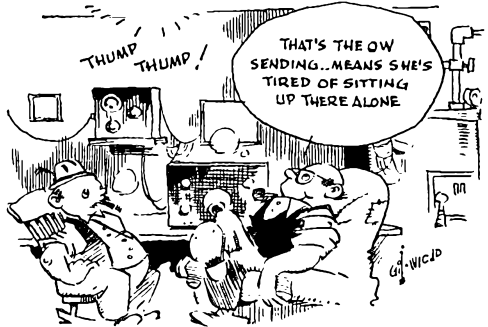


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5314 N. PORT WASHINGTON RD., MILWAUKEE 17, WIS.

YL News and Views

(Continued from page 61)



OM K5CDA/MM, whose photo appeared in our June '61 column, submits a list of "lady c.w. operators encountered in DX wanderings around the world as radio officer aboard the S.S. *Penn Shipper*, all of whom are noted in his log as 'top notch operators and FB fists': Pat, K2PMR; Kay, K2UKQ; Flo, W7QYA; Walera, UA1KAQ; Slava, UA2AK; Monika, DJ6BL, and Nan, KN8SEC.

On June 30 Evelyn Scott, W6NZP, of Long Beach, California, noted her 25th anniversary as a ham and celebrated the occasion with a "personal QSO party". Those who contacted Evelyn on either 20 or 40 phone on that day received a special QSL.

This Is Your Life Show Repeat

Those who missed a highly-praised nationwide telecast concerning hams and ham radio will have another chance to view it. On August 6 NBC-TV will repeat the "This is Your Life" show aired last Feb. 26 with Lenore Kingston Conn, W6NAZ, surprise feature guest. Other hams who appeared on the program were W2LLZ, K6IDUE, JA8AA, W6RGM, and Lenore's OM W6MSC. For story and photo see April 1961 *QST*, page 67 and reference to same in this column, June '61.

W9ZUZ and K9ZUZ are both YLs from Wisconsin — Gladys Jones and Karyn Lapham respectively (item via OM K9URP).

Keeping up With the Girls

Washington YLs are meeting on Wednesdays at 2100 GMT on 7230 kc. W6WDL, NCS of the new "YL Ragglew Get-Together" invites all YLs in the Pacific Northwest to call in.

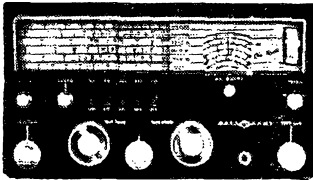
Oregon YLs, three at least, have recently been smitten by "Ham Cupid", according to Bea Austin, W7HHH, who reported the following orange blossom news. On March 11 Sherry Jorgensen, W7ZLT, was married to John McNamara in Bend, Oregon. She was given in marriage by her father, W7ZLR. Her brother, W7ZLU, was one of the ushers, and one of the bridesmaids was K7MAW. Sherry's mother is W7ZLS. Another brother, W7SBR, was unable to attend. Among the YLs at the wedding were W7HHH, W7DHK, W7ETM, K7DMI, and K7JPI. On April 1 Mary Klock, W7QWX, was married to John Rauch in Gresham. She was given in marriage by her father, W7NGG. Her brother, W7QOJ, was an usher. The wedding was attended by all of the hams noted in the first item. On April 8 Beth McCulloch, K7MAW, wed Glen Jorgensen, W7ZLU. Prior to the wedding Beth was honored with a shower at the home of W7HHH. K7KQC, Nancy, and all of the above-mentioned W7 YLs attended.

Georgia Peaches — On March 30 the Georgia Peach YL Net amended its constitution as follows: "All FCC-licensed women amateur radio operators residing in the state of Georgia and all neighboring states shall be eligible for full membership with full privileges. Georgia Peaches who move from Georgia and neighboring states are allowed to retain:

(Please turn the next page)

WE HAVE IT! NATIONAL'S NEW

NC 190



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116 Hartford Ave., Providence, R. I., GA 1-6158
Amateur Headquarters for Southern New England

DKC-RFB **SIGNALS 'POP OUT'**

**WITH DOW'S
PREAMPLIFIER**

Get signals you didn't hear!

Not a gimmick, but a tested and proven accessory. Precision made, fully backed by Dow-Key's traditional Factory Warranty.

HELP YOUR RECEIVER!
The DKC-RFB Booster is a 50 to 70 ohm Impedance matching "broadband pre-amplifier" guaranteed to increase the over-all gain by 1 to 6 "S" units on all bands (1.5 to 30 mc). To improve sensitivity, work with DX, and bring up weak unintelligible signals, you'll want a DKC-RFB. Designed for receivers up to the \$300 class.

price . . . **\$10.75**

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THE LEAGUE EMBLEM

With both gold border and lettering, and with black enamel background, is available in either pin (with safety clasp) or screw-back button type. In addition, there are special colors for Communications Dept. appointees.

- ▶ Red enameled background for the SCM.
- ▶ Green enameled background for the RM, PAM or EC.
- ▶ Blue enameled background for the ORS or OPS.

THE EMBLEM CUT: A mounted printing electrotype, 5/8" high, for use by members on amateur printed matter, letterheads, cards, etc.

Pin, Button or Cut: \$1.00 Each, Postpaid


AMERICAN RADIO RELAY LEAGUE
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TELETYPE WRITER EQUIPMENT • COLLINS

51J-3 RECEIVERS .50-30.5 Mc. Hammarlund SP-600 Receivers, 540 Kc.-5t Mc. Teletype: #14, 15, 19, 26, 28; Kleinschmidt: TT4A, TT76, TT98, etc. Telewriter Receiving Converter, etc. Write to TOM, WIAFN, ALLTRONICS-HOWARD CO., Box 19, Boston 1, Mass. Richmond 2-0048.

NEW LOW PRICES !!!

MODEL TB 1000-4
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- Have 6061-T6 Aluminum in the Elements

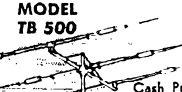
*Pat. Pend. Prices subject to change without notice

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MODEL TB 750**
Cash Price **\$59.75**



Budget Terms only \$5.50 per month
Rated 750 watts

MODEL TB 500
Cash Price **\$49.95**



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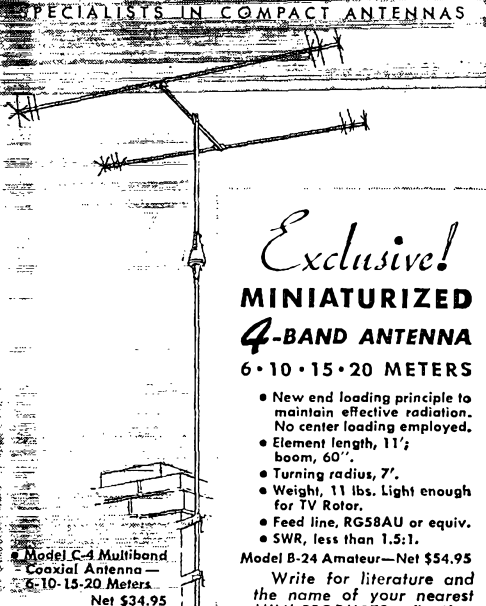
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their membership if they so desire." All members can now give one full point toward a certificate. The requirement for a Georgia Peach certificate is now 10 points. Confirmation of contact with 10 Georgia Peaches should be sent to V.P. Olivia Coogler, K4DNL, 286 S. Howard St., S.E., Atlanta, Ga. A sticker is issued for each additional five confirmed contacts. (Item via K4LIU)

Loaded Clothes Line YL Net meets 1700 GMT on 7235 kc. Monday. The c.w. net meets Wed. at 1600 GMT on 7150 kc. Pres. and NCS is K0GAS; V.P. K5ECP; Secy. K0GIC; Treas. W5YSJ.

Tangle Net, which meets Thursday at 1800 GMT on 14,240 kc. will continue through the summer months. K0EPE, Marte, expresses appreciation to those OMs who have had interest in the net.

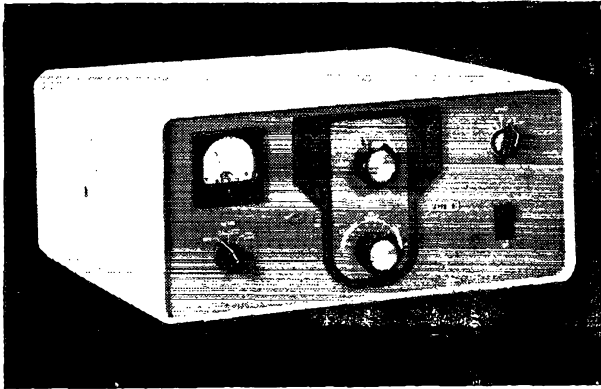
WRONE -- The annual Spring luncheon of the Women Radio Operators of New England was attended by 52 licensed W1 YLs on May 6 at Sturbridge, Mass. K1LJW, Jean, presided at the WRONE meeting at the ARRL N.E. Division Convention April 8-9 at Swampscott, Mass. The ladies' convention prize, a diamond ring, was won by K1OU, Ellen. The club's youngest member, Judy Baldwin, K1MJA, of Simsbury, Conn., was introduced at the YL meeting. Now a Technician, 10-year-old Judy is studying for her General-Class license. **QST-**

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1AAH, Clifford A. Kunz, Weymouth, Mass.
 W1HCB, Charles Rich, East Pembroke, Mass.
 W1PM, Nathaniel B. Judkins, Warwick, R. I.
 W1WGV, Wallace S. Persinski, Pawtucket, R. I.
 W1ZBJ, Joseph M. Bogucki, Colchester, Conn.
 W2IEP, Jerome Blaisdell, Afton, N. Y.
 WA2MYM, Joseph J. Levandusky, Wantagh, N. Y.
 W3DLI, Walter A. McAlister, New Kensington, Penn.
 K3MTL, Courtland C. Manning, jr., Media, Penn.
 W3UOK, William H. Yates, Brooklyn, N. Y.
 W4JQI, Richard R. Mitchell, St. Petersburg, Fla.
 ex-W4URJ, Neill McShane, Charlottesville, Va.
 K5AOA, Arthur J. Bernard, jr., Houston, Tex.
 W5EVI, George C. Becker, Dallas, Tex.
 W5KAU, Dr. Moreton A. Magid, Waco, Tex.
 W5WMC, Archie Arledge, Leesville, Tex.
 K5ZBW, John T. Mayer, New Orleans, La.
 K6DQM, Alexander C. Eastman, Walnut Creek, Calif.
 W6HUA, Field M. Gray, North Hollywood, Calif.
 W6LDJ, S. Thompson McNeal, Santa Ana, Calif.
 K6LEY, Jack V. Spaulding, Seaside, Calif.
 W6NIU, Leland L. Bass, Alhambra, Calif.
 W6OZC, Howard O. Douglass, Tiburon, Calif.
 W6PQF, Rex L. Bvrs, Fresno, Calif.
 K6PUF, John E. Pöffner, San Gabriel, Calif.
 W7IVY, Edward J. Warren, Helena, Mont.
 W7LQT, Arthur R. Cunningham, Seattle, Wash.
 W8SPY, Charles B. Seibert, Morgantown, W. Va.
 W9BKJ, George H. Graue, Fort Wayne, Ind.
 W9ODL, Alvin F. Gerstner, Green Bay, Wis.
 W9SJD, Karl F. Glass, Wisconsin Dells, Wis.
 VE2EL, W. A. Rousseau, Missisquoi, Que., Canada
 VE7PG, William C. Sparkes, Terrace, B. C., Canada
 VK4CU, Charles Walker, Clifton, Australia

Last month we received a newspaper clipping which reported the injury of two youths and the death of a third when, while they were putting up an antenna, a mast struck a high-tension line. We interpreted the newspaper report to be that James Herz, WA2JQI, was the youth who was killed. Fortunately, we were wrong, and WA2JQI is very much among the living. We're glad, and we apologize for the erroneous listing in July QST.



HOW COMPACT CAN YOU GET?

(as compact as Collins has made the 30L-1) This tightly engineered, new 1000 watt linear amplifier is the same size as the famous Collins KWM-2. It has a self-contained power supply, too. Its price: \$520. Its appearance: "solid quality". Order the Collins 30L-1 now, for early delivery.

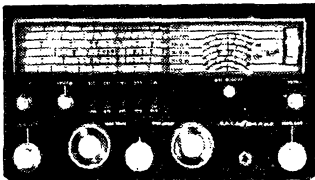


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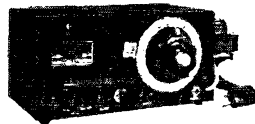
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Eleven meters used to be my favorite ham band. It opened earlier . . . had less QRM . . . and stayed open later . . . than ten. I WAS MAD WHEN WE LOST IT! But right now I'm mighty happy. QSY below and I'll tell you why:

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**LAMPKIN 105-B
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RANGE 0.1 TO 175 MC
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 PRICE \$260.00 NET

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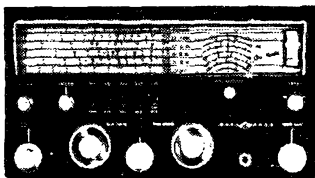
[At no obligation to me, please send me free booklet "HOW to MAKE MONEY in MOBILE-RADIO MAINTENANCE"—and data on Lampkin meters.

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Power Supply

(Continued from page 28)

and R_3 furnish additional filtering.

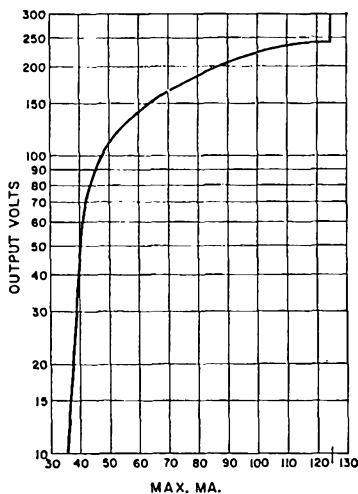


Fig. 2—Curve showing maximum load current permissible at various output voltages, observing the maximum plate-dissipation rating of the type 6080. Curve applies to a single triode section. When two sections are used in parallel, maximum current values shown may be doubled. See text.

Construction

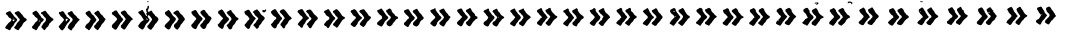
The unit shown in the photographs is built on a $9 \times 7 \times 2$ -inch aluminum chassis. The transformer is centered toward the rear, with the rectifier tube to the right and the quadruple $10\text{-}\mu\text{f.}$ filter capacitor C_1 to the left. In the foreground are the 6080 dual triode, a 5-terminal barrier strip, and two fuse holders for F_1 and F_2 . The toggle switch behind the terminal strip is S_2 . The terminal strip carries output terminals for the positive and negative variable voltages, filament voltage and a ground connection. Output terminals for the fixed positive and negative voltages are on a strip fastened to the right-hand end of the chassis.

Along the front edge of the chassis, from left to right, are the two positive-voltage controls, R_1 and R_2 , the pilot lamp, power switch and the negative-voltage control. The selenium rectifiers, filter choke and other small components are mounted underneath. Exact placement is not critical.

Limitations

The plate dissipation rating of the 6080 (13 watts per section) places a limitation on the current that can be drawn from the variable-voltage taps, particularly at the lower voltages. The curve of Fig. 2 shows the maximum current (per triode section) that should be drawn at various output voltages to stay within the dissipation rating. In most low-voltage applications,

(Please turn the next page)



IN 1914

IN 1914 two eminent pioneers in amateur radio, Hiram Percy Maxim and Clarence D. Tuska, answered the need for a national amateur organization by forming the American Radio Relay League. The following year in an attempt to circulate the latest and most accurate information to serious hams, QST magazine was conceived and distributed. Today, some 46 years later, progressive hams still look to QST for leadership. In its pages can be found new equipment from the workbenches of the experimenter; information about League sponsored contests and conventions; operating tips for the beginner, the average ham, and the DX man; news about traffic nets, and SCM reports; VHF news; humorous stories; and, yes ma'am, even a YL column. Every issue, to be sure, has something for everyone.

THE voice of QST is respected by amateurs for three mighty important reasons: QST is written and edited by hams for hams; QST is backed up by the League staff of 65 full-time people devoted to helping every ham enjoy his hobby to its fullest; QST is owned by the members who exercise their control through their democratically elected representatives, the Board of Directors. In addition almost half a century of experience is at the disposal of members. Whatever the problem—operating, legal, technical—the League staff is ready to serve you. Is it worth five dollars a year for membership? **JOIN NOW.**

QST AND ARRL membership \$5 (Additional Family members at the same address \$1) \$5.25 in Canada, \$6 elsewhere.

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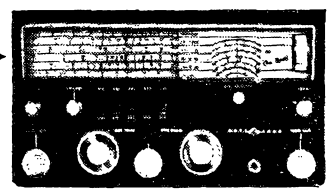
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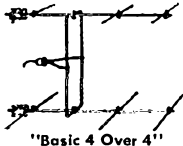
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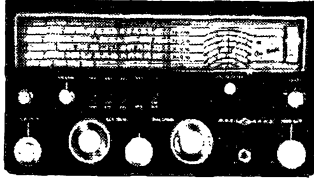


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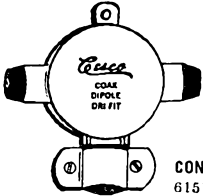
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the current requirements will be within the necessary limits for a single section. The current limits shown in Fig. 2 can, of course, be doubled with the two triode sections switched in parallel. It should be pointed out that Fig. 2 applies only to the case at hand. At higher input voltages, the maximum current to be drawn at the output voltages shown will be less; at lower input voltages, more current (within the maximum current rating of 125 ma. per section) may be drawn by the load without exceeding the dissipation rating of the 6080.

In general, the negative-voltage supply is suitable only for low-current applications, and for biasing vacuum-tube circuits where grid current is negligible. Large currents cannot be drawn from the variable tap (Terminal D) because of the high resistance of the circuit. Appreciable current drawn from Terminal E, or a low resistance from Terminal E to ground (as might be represented by the grid leak of an r.f. amplifier), or appreciable grid-current flow, will alter the bias on the 6080 grids, causing the positive output voltages to change.

Several of these supplies have been built by other amateurs and experimenters and all have worked out very satisfactorily in a wide variety of applications. The smooth variation in both positive and negative voltages makes the supply suitable for use with low-current transistors.

QST

Strays

VE1AJ (18 Windermere Drive, Westmount South, C.B., Nova Scotia) is a safety engineer and would like to hear from others similarly employed.

A real ham! W1MVI (Pat Ham) caused Channel 7 TVI to a neighbor across the road while using a code-practice buzzer.

VE3ALJ has been having fun with a little transistorized phone rig running about 100 milliwatts output. Coupled to a beam on 28.45 Mc. he was able to work VE5RQ and VE5FB, some 1500 miles away.

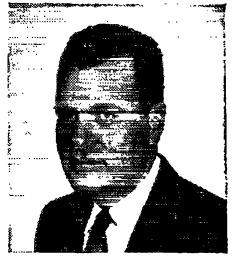
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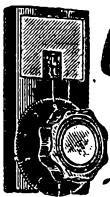
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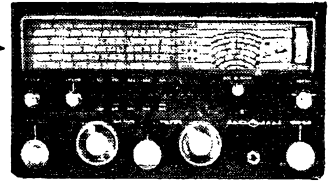
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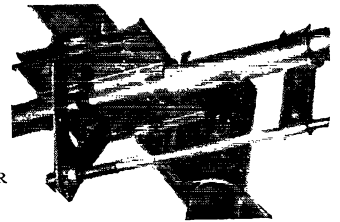
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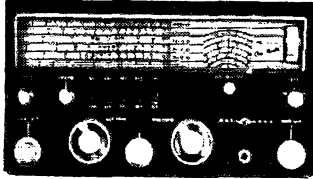
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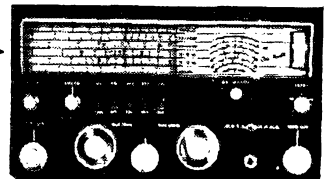
A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 1/4 by 9 1/2 inches in size with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

- W1, K1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass.
- W2, K2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J.
- W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
- W4, K4 — Thomas M. Moss, W4IYW, Box 611, Municipal Airport Branch, Atlanta, Ga.
- W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.
- W6, K6 — San Diego DX Club, Box 16006, San Diego 16, Calif.
- W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.
- W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.
- W9, K9 — J. F. Oberg, W9DSO, 2601 Gordon Drive, Flossmoor, Ill.
- W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
- VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
- VE2 — George C. Goode, VE2YA, 188 Lakeview Avenue, Pointe Claire, Montreal 33, Quebec.
- VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.
- VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — W. R. Savage, VE6EO, 833 10th St., N., Lethbridge, Alta.
- VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
- VE8 — Earl W. Smith, VE8AT, P.O. Box 534, Whitehorse, Y. T.
- VO1 — Ernest Ash, VO1AA, P.O. Box 8, St. John's, Newf.
- VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
- KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan P.R.
- KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii.
- KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.
- KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.

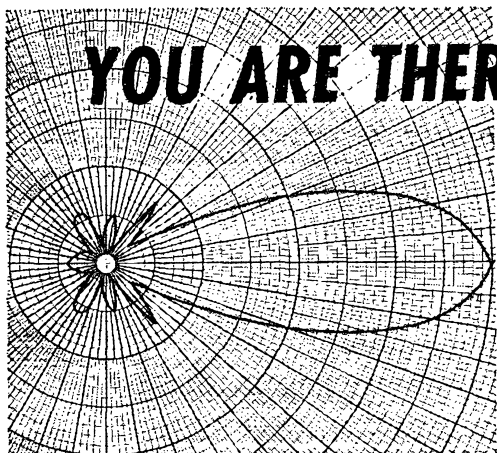
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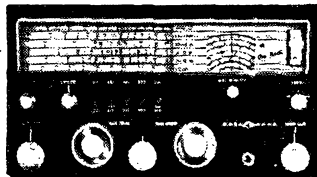
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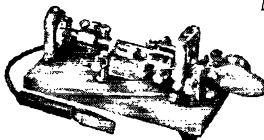


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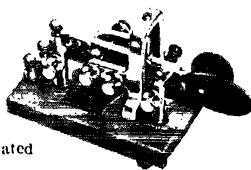
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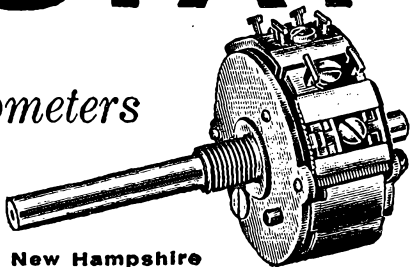
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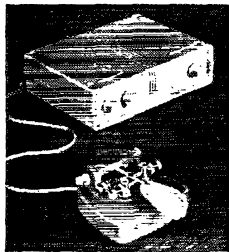
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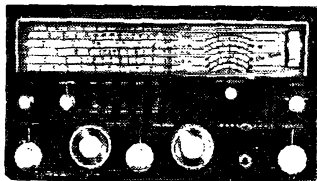
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235 Main St., Patchogue, Long Island, New York

Operation Alert, 1961

(Continued from page 57)

It is true that FCC was not officially monitoring the amateur bands and sent out no notices, but there is a great deal of question about whether this means it was perfectly all right for amateurs to ignore their *regul* that we participate. We like to feel that we are a responsible communications service requiring a minimum of supervision from our regulating government agency. FCC would like to feel this way, too. We'll let each reader draw his own conclusions on the basis of the above data. Observer comments ranged from excellent to terrible: we'd strike an average somewhere between fair and good, with Novice observance between poor and fair. Many observers commented that the Novice bands sounded "as usual," and the only limit to the number of different stations logged was the limited time in which to do so.



Art Melvin, W4UHY, Florida state communications officer, operates the state c.d. station in Jacksonville. W4UHY is also EC for Duval County. Photo by W4IYT.

There is one other aspect to the matter of conelrad alert observance, and that is the conelrad regulations, appended to the general amateur regulations, sections 12.190 through 12.196. We assume that 99% of those who were on the air during the alert were ignorant of the fact that a conelrad alert was in effect. If this assumption is correct, then those amateurs were demonstrating a violation of the FCC regulations, which require each amateur operator to be "responsible for the reception of the conelrad radio alert" (Sec. 12.192).

Thus, an anomaly: those who knew an alert was in progress but deliberately ignored it were violating no FCC regulation because FCC had put observance on a voluntary basis, while those who failed to observe the alert out of ignorance were violating the FCC regulation that required them to have means for receiving the alert.

This alert was announced and publicized. If the real thing should come along, there will be no such advance notice. In such a case, failure to go off the air would not only give a black eye to the amateur service, but might endanger the national security. So, let's get those conelrad monitors working and *keep* them working.

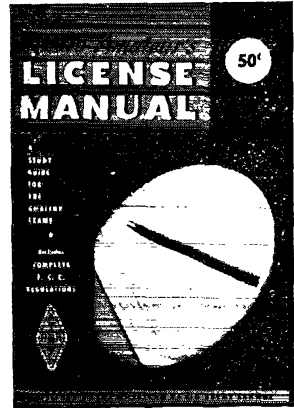
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- Q. Under what conditions may applicants for amateur licenses take examinations by mail?
- Q. What are the requirements for portable and mobile operation?



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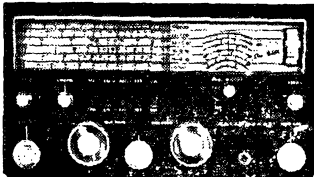
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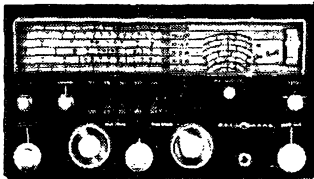
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SOUTHEASTERN ELECTRONIC SPECIALISTS

233 North Tuscarawas Ave., Dover, Ohio

How's DX?

(Continued from page 75)

ZL3VH's Tokelaus plans are nearing pay-off stage. . . . W5QS may be able to facilitate VR4CB QSOs for you near 14,205 kc. at 1200 GMT.

Europe — Sardinian observations through K2UYG's good offices: IS1s DKL and ZDT pool talent to finish a 4-stage 6145 single-sideband rig. Other IS1s on the air include FIC GF TDW and SZU, mostly a.m. from 10 through 20 meters. IS1s DKL GF and FIC like code as well. . . . ZAIKFF tells VE2YA that ZAIKFJ will embark on an s.s.b. DX career as soon as required components arrive from UA3FE. YL operator Vasha mentions activity by ten new ZA1s upcoming. . . . K3CUL, our favorite multi-linguist, translates Russia's *Radio* to establish that UA3FE/Ø managed 1200 QSOs with all continents and 83 countries on his February-March DXcursion to Kyzyl. Ted also notes that 22 U.S.S.R. amateurs now have worked 50 or more countries on sideband, UA3CR in the vanguard with 139/113, closely followed by UA1DZ with 146/99. . . . W9QGR's research affirms that UA1KED's Alexander Island QTH is on the western fringe of the F.J.L. group. . . . K5CDA/mm finds his study of Russian script and radio code paying off in easier access to such U.S.S.R. certifications as W-100-U. . . . WA6MCU tells us that K1ECT, stationed in Morocco, assisted Spain-based USAF personnel to secure urgently needed X-ray gear for a hospital near Montellano. Much good will was displayed and earned via ham radio. . . . F3DJ, in lines to WIWPO, claims 104 countries confirmed through F3DJ/mobile c.w. operation. . . . DL1s BS PI and others are much exercised about the master-of-ceremonies procedure so prevalent in single-sideband DX activity these days. While there's nothing basically awry with hook-up assistance, the guy at the rare end should exhibit a little judicial selectivity by logging and QSLing *only* genuine two-way QSOs. And *he's* the judge of this, not the emcee. . . . K6OQT now lives in Torino, Italy, sans hamming privileges but Hank has his operational eye on possible San Marino and/or Andorra action. DXers with helpful ideas or encouragement can reach him at via Gofredo Casalis 4, Torino. . . . VE3ALEJ notes that Poland is issuing a postage stamp saluting that country's ham society. . . . Continental commentary courtesy NCDXC, VERON and WGDXC: OH2s ER HN NB and SS guided OHØA doings. . . . IIs KDB and RAM booked summer DXcursions to Sardinia. . . . LZ1WD, Bulgaria's solo single-sideband entry, expects to be joined soon by LZ1HA. . . . SVØWQ/Rhodes is reported running 600 watts to a ground-plane on 14,100-kc. c.w., 2200 GMT.

South America — LU8XQ has an interesting Stanford U. lab assignment in Tierra del Fuego studying "whistlers." Bob will be scheduling W6YX on 14 and 21 Mc. till 1962. K6TZX reports a whopping signal from LU8XQ's 32S-1 and Thunderbolt. . . . K2YFE finds VP8FV near 21,200 kc. at 2300 GMT running a half gallon to a rhombic. Harry expects to be iced in at Hallelujah Bay till next April. . . . WIBAN specifies CP5EA's availability on 14,330 kc. at 0200 GMT, Thursdays and Saturdays. Hugo has 150 watts out of a 10-B and homespun linear into a 3 element spinner 60 feet high. . . . K4ZRA, poking around for some 7 Mc. Two in the N. Y. State QSO Party this spring, surprised himself by working LUIZL. Never underestimate Old Forty! . . . CE3AG, venerable bandmark of the far south, enjoyed a spring visit to the antenna farms of W6s AM HJT QJU UEU YY and others up our way. . . . SL3ZO hints of a possible YNITAT & Co. Galapagos probe next month as HC8JN.

Hereabouts — Niagara Radio Club plans a dandy DX program at the ARRL New York State Convention in Niagara Falls on the 15th-17th of next month. Check with the club at Main P. O. Box 682, Niagara Falls, N. Y., for full attendance particulars. And don't forget the DX delights promised by the Pacific Northwest 1961 DXCC Convention on the 19th-20th of this month in Vancouver, information available from VE7KJ. . . . FP8AP, through W2EQS (FP8AS), urges amateurs not to bother Paris or French consulates about intended hamming jaunts to St. Pierre & Miquelon. Much better to check with Gus direct. . . . K4DWU (KS4BC) received five eager letters in response to our recent mention of his DXpeditionary intentions. Check with K8VDV concerning a Buckeye Award involving QSOs with a minimum of 22 Ohio counties. Toner Rugg mentions a Canadian Provincial Capitals certification available through VE3HB. W6KG offers up-to-date data on his Colvin Award upon return from KL7KG DX triumphs. . . . WVCORS and others are disturbed by apparent Novice use of v.f.o.s in the 21-Mc. band, also by the occasional appearance of U. S. phones on Novice frequencies. *Careful*, fellows. . . . W5RU is back in the game after a 36-year layoff. Roy now enjoys the DX sport on 20 phone and c.w. as much as he relished his pioneer days as 5R1. . . . The scientist brother of JA3RF paid a recent surprise visit to WA6IVM. "No dice on XE5QLT/XE5 hamming this summer," regrets W1QLT. But watch for Towne as W1QLT/mm near the Alacran reefs on 7050- and 14,050-kc. c.w. or 15 phone. **QST**

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.

(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 non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

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PEORIA Hamfest, Sept. 17, Peoria Area Amateur Radio Club. Tickets \$1.00 until Sept. 9. Write Steve Perry K9AXG, 505 E. Jefferson St., Washington, Illinois.

SYRACUSE VHF Club 7th Annual Roundup October 7, 1961. Three Rivers Inn, speakers, awards, floorshow, steak dinner. Write K2TXX, 236 Ester St., Minoa, N.Y.

HAMFESTERS Radio Club announces its 27th annual picnic on Sunday, August 13, 1961 at Santa Fe Park near Chicago. For more information write W9ALS.

SIXTH Annual York County Hamfest, August 27, 1961. Contact John Zett, W3FLD, 2740 Grandview Avenue, York, Penna.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold W5BC, Ralph Hicks, Box 6097, Tulsa, Okla.

COAXIAL Cable new 58¢ 30 ft. length, \$1.00; 180 ft., six lengths, \$5.00. Send postage one pound per length. Radio magazines, buy, sell, trade. R. Farmer, Plainview, Texas.

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6 COILS for Transistor 6 meter converter December QST \$5.95. Postpaid U.S.A. Specify I.F. W5ZKT, 1441 Pleasant Dr., Dallas, Texas.

HQ-170 with clock. Brand new appearance and performance. Manual and original factory container. Best offer. Going mobile. W1HUM, I. J. Hemingway, 12 Sunset Terrace, West Hartford, Conn. A Dams 2-6520.

TOROIDs: Uncased 88 Mhy, like new. Dollar each. Five/\$4.00 P.P. DaPaul, 309 So. Ashton, Millbrae, Calif.

WANTED: Cash for surplus tech manuals, one or one hundred. State condition and equipment type. W4FXQ, Box 2513, Norfolk, Va.

WANTED: Commercially-built transceivers and QST for any months of 1921, 1923, 1939 and 1940. A. T. O'Neil, Camp Lakeview, Lake City, Minn.

JOHNSON Thunderbolt KW linear, amplifier, in exc. condx. \$425.00; Johnson KW Matchbox, new, \$95.00. Johnson TR switch, \$20.00. Cert. check or money order only. Dennis Dressler, K0LAD, 5024 Auburn Rd., RR #7, Topeka, Kans.

QSLs? SWLS? WPE? Largest variety samples 20¢ (refunded). Rus Sakkers, W8DED, P.O. Box 218, Holland, Mich.

QSLs Twenty exclusive designs in 3 colors. Rush \$3 for 100 or \$5 for 200 and get surprise of your life, 48-hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

QSLs. Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 10¢. K2VOB Press, 62 Midland Blvd., Maplewood, N. J.

QSL-SWL-CB-WPE. Finest. Since 1946. Largest assortment. Priced right. Send 10¢ for samples to: Glenn Print, 1103 Pine Heights Ave., Baltimore 29, Md.

QSLs "Brownie," W3CJ1, 3110 Lehigh, Allentown, Penna. Samples. 10¢ with catalogue, 25¢

QSLs-SWLS that guarantee higher percentage DX verifications! Samples 25¢ deductible. C. Fritz, Box 1684, Scottsdale, Ariz. (Formerly Joliet, Ill.)

QSLs-SWLs. Samples 10¢. Malgo Press, 1937 Glensdale Ave., Toledo 14, Ohio

QSLs. Faster, lower prices. Catalog 25¢ (refundable) samples stamped envelope. Dick Crawford, K6GJM, Box 607, Whittier, Calif.

DELUXE QSLs. Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢

CREATIVE QSL and SWL Cards. Are you proud of your card? If not let us print your next order. Write for free samples and booklet. Personal attention given to all requests. Bob Wilkins, Jr., KN6ZMT, Creative Printing, P. O. Box 1064-C, Atascadero, Calif.

SUPERIOR QSLs, samples 10¢. Ham Specialties, Box 3023, Bellaire, Texas

QSLs, 3-color glossy, 100, \$4.50. Rutgers VariTyping Service, 7 Fairfield Rd., Somerset, N.J.

PICTURE QSL Cards of your shack, home, etc., Made from your photograph. 1000, \$13.00. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

QSLs, 300 for \$3.95. Free Samples. W9SKR, "George" Vesely, R.R. #1, Box 208-A, Inglewood, Ill.

QSLs, SWLS, reasonable prices. Samples 10¢. Robert Bull, W1BXT, Arlington, Vt.

QSLs, SWLS, XYL-OMs (sample assortment approximately 934¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sdate, fabulous, DX-attracting, prototypical, snazzy, unparagoned cards (Wow!). Rogers, K8AAB, 961 Arcade St., St. Paul 6, Minn.

QSLs-SWLS. Samples free. W4BKT Press, 123 Main, McKenzie, Tenn.

1 1/2" Call QSLs (2 sides printed), 100, \$2.75 samples free. Garlepy, 2624 Kroemer, Ft. Wayne, Ind.

GLOSSY QSLs, 100, 4 colors, \$3.50. Others less. Samples 10¢. Dick, W8VXK, 7373 No. M-18, Gladwin, Mich.

QSLs, Samples free. Phillips, W7HRG, 1708 Bridge St., The Dalles, Oregon.

QSLs-SWLS, 100 2-color glossy, \$3.00. QSO file cards, \$1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo.

QSLs. Samples dime. Rubber stamps: name, call and address \$1.35. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSLs, SWLS, Rubber stamps, Samples 5¢. Nicholas & Son Printery, P.O., Box 11184, Phoenix, Ariz.

QSL: samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

QSLs, \$2.50 and up. Samples 10¢. RLB Print M.R. 12 Phillipsburg, N.J.

FAST Service, send stamp for QSL samples. K2 Press, Box 372, Mineola, L.I., N.Y.

QSLs, Samples 10¢. W7HIZ, Wines, Box 183, Springfield, Oregon.

FREE Samples. Economical QSLs-SWLS. Bolles, 7701 Tisdale, Austin, Texas.

RUBBER Stamps for hams, sample impressions. W9UNY, 542 North 93, Milwaukee, Wis.

QSLs. Large selection styles including photos. Lowest prices. Fast service. Samples dime. Ray, K7HLR, 679 Borah, Twin Falls, Idaho.

RUBBER Stamps, name/address \$1.00. A. Travis, 2002 West 8th Austin 3, Texas.

RUBBER Stamps, \$1.50. Call and Address Clint's Radio, W2LDO, 32 Cumberland Ave., Verona, N.J.

QSLs, SWLS that are different, colored, embossed card stock, and "Kromekote". Samples 10¢. Homeprint, 2416 Elmo, Hamilton, Ohio.

ORIGINAL QSL's. Dime. Filmercrafters, Box 304, Martins Ferry, Ohio.

RUBBER Stamps for hams, sample impressions. W9UNY, 542 North 93, Milwaukee, Wis.

100 QSLs. 82¢. Samples, 10¢. Meininger, Jesup, Iowa.

100 Beautiful multi-colored QSLs. \$4.75; 25¢ brings 9 different samples, deducted on your order. Arthur Greenberg, P.O. Box 92, Centuck Station, Yonkers 2, N.Y.

QSLs. Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

YLRL Specials, OM's, reasonable, nice designs, samples dime. W2DJH Press, Warrensburg, N.Y.

QUAD Tribander: Complete simplified construction and feeding plans, drawings, \$1.00. No stubs. Barrington Specialties, Box 154, Barrington, R.I.

COLLINS Spkr. 312A, \$25.00; pair 4-125 Elmac used, \$10.00; Rk. 4D32, new, \$15.00. QSTs 1953 to 1960, \$10.00. F.o.b. WITHM.

FOR SALE: HT32, 75A3 DX100B, Telectro tape recorder. Must sell. Write Dan Pierce, K0QCT, 1930 Ave. A, Kearney, Nebr.

WANTED: Old time wireless receivers, xmtrs & etc., Magazines, books, give prices and description, W5WB, 702B N. Fillmore, Amarillo, Texas.

CHICAGO LAND Amateurs! Factory authorized service for Hallicrafters, Hammonds, A.Shibe, Gonsel. Service all amateur equipment to factory standards. Heath's Electronics, Inc., 1145 Halsted St., Chicago Heights, Ill. Tel. SKyline 5-4056.

SELL 2 mf. G-E capacitors, 4000V DC, \$5.00 or 2 for \$9.00. Guaranteed. Dawson, 5740 Woodrow Avenue, Detroit 10, Mich. FOR Collins in Detroit Area it's Michigan Ham Headquarters; also large selection of trade-ins on display. We stock most all Amateur gear and parts and should be able to handle all orders promptly. M. N. Duffy Ham & Electronics, 2040 Grand River, Detroit 26, Mich. Tel. WO 3-2270/

SELL: HT-33A, used 11 months, factory modified, class AB1, in exc't cond. \$485.00. HT-32A used 13 months, exc't cond. \$450.00. Mesley TA-33 Sr. perf. \$60.00. K1MMU, 30 Granston Lane, Darien, Conn.

SOUTHERN California: Transmitters and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman Orange, Calif. Tel. KElitos 8-0500.

WANTED: All types of aircraft or ground radios, 17L, 618S, 383, 390, 185 units. Especially any item made by Collins Radio whatsoever. Also large type tubes and test equipments. For fast action write Ted Dames, W2KWU, 308 Hickory, Arlington, N.J.

SAN Francisco and vicinity: Receivers repaired and realigned. Factory methods. Special problems invited, any equipment. Associated Electronics, 58 South P Street, Livermore, Calif. S:incer, W6KF.

ATTENTION! Mobilcoils! Lecce-Neville 6 volt 100 amp. system, \$50; 12 volt 50 amp system \$50; 12 volt 60 amp system, \$60; 12 volt 100 amp syst. \$100. Guaranteed no ex-police car units. Herbert A. Zimmermann, Jr. K2PAT, 115 Willow St., Brooklyn 1, N.Y. Tel. DEwcy 6-7388.

TRANSISTOR Six or two meter converter circuit boards for construction articles Dec. 1960, May 61, OST, \$20.00. Custom-built transistor converters. Daniel Meyer, 430 Redcliff, San Antonio 12, Texas.

FOR Sale: Brand new surplus Westinghouse MW radio frequency unit, tubes 2-30 Mcs. Has seven vacuum variables, output harmonic filter, built-in frequency multiplier. Requires external 2-4.5 Mcs. VFO drive of one watt. Excellent for CW, AM, NFM, FSK, SSB, etc. Requires tubes, easy to build copper tubing coils power supplies. Commercially rated at 4 kilowatts input. Perfect for maximum reliability rig at 1 kilowatt input. Sell for \$500. Cost over \$4000. Send stamped envelope for photo, further details. W2IWW, 415 Keyes Rd., Utica 4, N.Y.

SX-71 in mint condx, \$125.00 Bill Bell, W4JTR 6702 Greenleaf St., Springfield, Va.

WANTED: Collins 32W-1 exciter, state price and condx. W9TGI, 801 Glenvale Rd., Glenview, Ill.

EXC. Condx. HRO-60, XCU-2 table spkr and coils A.B.C.D. AC, \$330.00 sale or will trade on 75A4 w/serial no. above 4000. W9UZZ, 146 N. Washington, Lockport, Ill.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA. Wayne Nelson, Concord, N.C.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 399, Mt. Kisco, N.Y.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase W8RP, Park Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan, Tel. NORmany 8 8262.

HAM TV Equipment bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

CANADIANS! QSLs in fluorescent colors, by silk screen process. Free samples. Martin, 8 Kensington St., Woodstock, Ont., Can.

CANADIANS: Cash for your surplus tubes, any quantity any types. New only. Want large amounts of Army Surplus Tubes. Sam Klein, 5730 McAlcar, Cote St. Luc, Que. P., Canada.

CANADIANS! DX-40. Millen VFO. F.C. gear. You pick it up in Toronto, \$150.00 takes it. Write VO2WW, W. Walker, Box 94, Goose Bay, Lab., Canada.

CANADIANS! Heath fixed/mobile complete, sale or trade. Want Valant, 5100B or 32V4. A. Petrow, VE3CTC, Radio Range, Nak na Ont. P., Canada.

CANADIANS! Johnson 6N2 converter, factory wired, RME DB23 Preselector, both \$150.00. Make offer! Will ship prepaid. VE2AKF, Box 1, Abbotsford, Que. P., Canada.

SELL Boxed, like new Ranger, \$230.00; 1500w, 400 Ma. pwr. supply, \$35.00. K6C radio set, \$28.00. 4-250A's, \$45.00; 4-10A's, \$18.00. Dow coax relay, \$9.00. new DB 23; \$45.00; RCA 500w. mod. xfrm., \$22.00. Rev. P. Bitner, Desboro, Ont., Canada.

WANTED: HT-32 or HT-37. Also KW linear. W2GJ, 12 Harbor Road, Oyster Bay, L.I., N.Y.

SELL: James C-1470 12V DC 110V AC mobile power supply, \$30.00. Harvey-Wells T-90 and APS-90 AC supply. Excellent shape. \$125.00. Leon Case II, K1GAW, 123 Maple Ave., Windsor, Conn.

FOR Sale: Seven vacuum relays, Jennings Radio Mfg. Corp., San Jose, Calif. R21, \$16.00. R22, \$16.00. R23, \$16.00. R24, \$16.00. R25, \$16.00. R26, \$16.00. R27, \$16.00. R28, \$16.00. R29, \$16.00. R30, \$16.00. R31, \$16.00. R32, \$16.00. R33, \$16.00. R34, \$16.00. R35, \$16.00. R36, \$16.00. R37, \$16.00. R38, \$16.00. R39, \$16.00. R40, \$16.00. R41, \$16.00. R42, \$16.00. R43, \$16.00. R44, \$16.00. R45, \$16.00. R46, \$16.00. R47, \$16.00. R48, \$16.00. R49, \$16.00. R50, \$16.00. R51, \$16.00. R52, \$16.00. R53, \$16.00. R54, \$16.00. R55, \$16.00. R56, \$16.00. R57, \$16.00. R58, \$16.00. R59, \$16.00. R60, \$16.00. R61, \$16.00. R62, \$16.00. R63, \$16.00. R64, \$16.00. R65, \$16.00. R66, \$16.00. R67, \$16.00. R68, \$16.00. R69, \$16.00. R70, \$16.00. R71, \$16.00. R72, \$16.00. R73, \$16.00. R74, \$16.00. R75, \$16.00. R76, \$16.00. R77, \$16.00. R78, \$16.00. R79, \$16.00. R80, \$16.00. R81, \$16.00. R82, \$16.00. R83, \$16.00. R84, \$16.00. R85, \$16.00. R86, \$16.00. 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RECEIVER: HQ110, like new condx, guaranteed, \$165.00; Rohm heavy communication tower, 63 feet, one year old, \$110; Mosley VPA 70-3, worked 225 countries, \$30.00. Write K2IRO.

NC300, with calib. and sprk., exc. condx, \$210; Viking II and VFO in perf. condx, \$200; Globe Matcher Sr. (has SWR bridge), \$50. Will deliver from Fitchburg, Mass. or West Hartford, Conn. J. Lindholm, WIDGL, P.O. Box 1, West Hartford, Conn. AD 2-5532.

WANTED: Heathkit K-S power supply. Kit or completed unit. Send card stating condition and price. K4VUQ, Goodin, 486 Hollyhill Dr., Lexington, Ky.

SALE: BC344 receiver, 150 to 1500 Kc., \$55.00. You pay expressage. T17B microphone, no plug, \$2.50; 3E29/829B, \$3.50 each; pair B&W 3975 balloons on chassis, \$4.50. Turner 80 microphone C4 stand, \$8.50. W2TB, 39-20 220th St., Bayside, L.I., N.Y.

CLICKLESS Viking Adventurer 40 watt c.w. xmitr with 40-10M VFO, \$39; Unwired CheapEasy 120W SSB xmitr, parts and instructions, \$27; 1800V CT 225 Ma. plate xfmr plug; new chassis plus pwr. supply parts, \$19.00; 12V DC ARC5 Q5-r and dyna-motor, \$19; International 21 Mc to Q5-r converter, \$9.00. W2LHB/3, 10205 Folk St., Silver Spring, Md.

SELL: HQ-180C, \$340.00; Globe Chief Deluxe, \$45.00. Both like new. W0KLG, Box 425, Dassel, Minn.

MUST SELL: Johnson kilowatt amplifier with desk. Latest model, \$1150. Collins 500 Kc to 30 Mc receiver, Model 5113, new condition, \$675; Central Electronics Model B slicer, like new condx, \$45.00; Morrow portable mobile transmitter and receiver with 110 volts AC and 12 volts DC supply. Hardly used, \$350.00. All above equipment guaranteed as described. Sid Gogel, 1096 Laux Place, N. Belmore, N.Y. Tel. SUNset 1-0568.

SELLING Out: W3MBCB going to ET3 land. Elicoo SSB-100 SSB/CW/AM xmitr, \$275.00; 3-811's GG linear w/pwr supply, 750 watt CW, \$125.00; both for \$369. Many other items. S.A.S.E. for list. R.D. 1, Box 492, Gibsonia, Penna.

TX-1 Apache, 1960, mint condition. \$200. Allen Blackledge, 1923 N. 3rd Ave., Laurel, Md.

POSITION Open, Antenna Engineer, experienced in antenna design and project work in the field of communications antenna systems. Write including complete resume and salary requirements to Roger Olson, Director of Engineering, Hy-Gain Antenna Products Corporation, 1135 North 22nd St., Lincoln, Nebraska.

NC-98 with crystal calibrator, \$90. K4QCT, 410 Marmore Ave., Coral Gables, Fla.

VALLANT, factory-wired and tested, in brand new condx, \$300. WA2V5, David Lippman, 192 Lyons Ave., Newark, N.J.

HT32A, SX101A, mounted in 1959, 15 ft. travel trailer, sell as a unit only, \$1500; HT-33A, \$500, rotor-brake, \$100; TTY converter, \$50. K0BLF/6, 3015 Bayshore Blvd, 212, Redwood City, Calif. Tel. EM 6-8364.

FOR Sale: Hammarlund HQ-145, 9 mos. old and Viking Ranger. Both in mint condx. Both for \$395. WA2PBY, 163-70 16th Ave., Whitestone, L.I., N.Y. Tel. BAYside 5-2933.

NAVY Freq. meter, new, 90-450 Mc., \$150.00; Heath Q mult., \$10.00; Hammarlund Pro-310 rcvr, \$300; DC-100 and exc., \$160 or trade for hi-fi equip. WA6EIB, B. Parkinson, 1095 Bill Road, Paradise, Calif.

HAVE GSB-100 and XYL, not compatible. Both in gud condx. GSB-100 easiest to ship for best over \$300 F.o.b. K6SRM, Apt. 4, 3900 Montgomery, Santa Rosa, Calif.

FOR Sale: 2 new 4-125As, \$25.00 pair new 12V dynamotor 400V, 375 amp. \$8.00. G. Carter, 8015 Loyola Blvd., Los Angeles, Calif.

VIKING Kilowatt in like-new condx, final tubes have never been out of sockets since installed, with audio driver transformer, \$895.00; AM/CW/SSB exciters available. Will accept reasonable trades of commercially built ham gear. Gene Hubbell, W9ERU, Box 273, R.R. 4, Rockford, Ill.

SELL: Heathkit Comanche or Hallcrafters SX-99, \$100; BC348R surplus RX wired for AC, \$30.00; Si-Jim all-band mobile whp, \$15.00; PSR-6 p/s, \$15.00; 28V DC p/s, \$30.00; call or write L. Gene Rupp, K8MZY/2, Ivanhoe 9-1575.

COMPLETE Mobile system, Cheyenne transmitter, Super Six converter and transistorized power supply. Best offer. Exc condx. Robert Pohorenc, Wilson 1-3992, 5 Denny St., Ossining, N.Y. K2RDM.

COLLINS Receiver 75S1, never used! \$400. Mrs. W. G. Peterson 2125 East 18th St., Ada, Okla.

GONSET GSB-100, exc. condx, \$310. Keller, 514 Stevens Rd., Morrisville, Penna.

COLLINS KW-1, like new, many extras, terms to responsible purchaser. Lloyd Norberg, W7EHQ, 2502 Jefferson Ave., Tacoma, Wash.

CLEANING House! SX101A, \$265; Heath VFO, \$15.00; GDO, \$15; RF Signal Generator, \$15; Johnson Jo-pass, \$10.00; Jones MicroMatch, \$15.00; 24 hr. clock, \$8.00; Mercury 911 steel mike, \$14; Shure 102C carbon mike, \$12.00; Electronic key, \$3.00; many components, stamped envelope for list. Tony Casciato, 54B Forrestal, Quonset Point, R.I.

MORROW MBR5 receiver, in new condx, with sprk base/110 volt pwr. supply, and 12 volt power supply, and 12 volt D.C. power supply, \$140.00. Lou Williams, 225 South Fourth, Springfield, Ill.

W9JS still looking for that old banjo! Lots of good trading gear. Send complete details to Rich, 419 E. Willow, Wheaton, Ill.

TRADE: Vornado automobile air-conditioner for mobile gear. Sale: Gardiner, Type S automatic code-sender with tapes, \$22.00. Captain Frank Johnson, 59th Signal Co. APO 34, N.Y., N.Y.

XYL Wishes to see basement floor. Most equipment very good, unmodified. Questions write: HRO 30, nine coils, calibrator, FM adapter, excellent, \$415.00; 4 Kw. plate transformer, \$25.00; 5275 Mc walkie-talkie, \$55.00; pair 3938 Kc. surplus DAV-2 walkie-talkies, \$35.00; 18.00 one, prop. pitch motor, \$24.00; BC-433, \$8.00; Bud 6 ft. rack, \$22.00; Gcn.rah Rad.o, 869-A generator, \$45.00; 720 A frequency meter, \$115.00; Heath: Sixer, \$35.00; Mohawk, \$245.00; DX 1003, \$115.00; MP-1 transistorized mobile supply, \$22.00; 220 Mc. "Two" \$25.00; Motorola high FM mobile, 30D transmitter, \$27.00; three skirt 145 Mc. collinear, \$30.00; Gonset G-60B and Vibra-tor supply, \$145.00. Jim Trout, W8GGK, RFD #1, Box 724, Sevierville, Mich.

FOR Sale: Viking Ranger, \$200 with push-to-talk in exc. condx. Going sideband. Ben. K1LZB, 185 High St., Wall, Maine, Conn. HALLCRAFTERS SR34, 6-12-110V, in exc. condx, \$235.00; Drake 1A, latest model, less than 50 hrs use, like new condx, \$185.00; new Heathkit N5: neca profess. onally w.rec. Sell for k.t. price, \$159.95; Collins KWS-1, perfect. All latest factory modifications, \$1000. The above equipment is very clean, always under dust covers. Priced F.o.b. Tucson. Also silver plated 717A 2-meter converter, 14 Mc. IF 303 no.se with rwr. supply. A red hot DX converter, \$40.00. W7MCL, 401 E. Cooper, Tucson, Ariz.

WANTED: 800 cyc. filter F455C and verier tuning knob for 75A3. K4QWQ, Smith, 440 Berkshire Rd., Charlotte 9, N.C.

MOVING Again! Practically new AR 22 w/100 ft. cable, \$25.00; Hy-Gain TH-2, \$40.00. Hy-Gain 6 3D multiband doubler, \$20.00, Mosley V-4 6 vertical, \$16.00. Hap Davis, w5LSC/1, 1 Whittier Rd., Franconia, Mass.

COLLINS KWS-1 complete with EV664 mike and bug; 75A4 w/in speed dial, Panadapter and matching s-kr, in excellent condx, complete station, \$15.00. W3UWM, 8181 Brittany Pkce, Pittsburgh 37, Penna.

SELL: Gonset 6 meter Communicator III, perfect, \$140.00. Joe K3CQY, Roanoke, Penna.

FOR Sale: Vacuum relays, Jennings Radio Mfg. Ty. c R 2, test 50 Kv, RMS amps. 20, at 30 Mc. Insulat.on 30 Kv. Sol.no.d 115V AC, R2-50-No4 52, Drawing V5MM 358.1. Includes in- vited. J. G. Cree, 100 South Second St., Chambersburg, Penna.

WANTED: Q5's for personal collect.on; Jan. 1917, 1917, 1917, May 1917 and September 1917. WICUT, Box 1, West Hartford 7, Conn.

RME 4350A ham band receiver. As good as new, \$180 cash. R. L. Martin K1CJX, 218 Salmon Brook, Granby, Conn.

WANT: Cameras, Leica, Nikon, Canon. Swap ham gear or cash. W9DFW, 101 Raav.ve, Jeffersonville, Ind.

FOR Sale: Complete station: DX-40, VF-1, RME 4350A, BC-348L converted to 115V AC. All are in exc. condx. WA6HUZ, 1785 Burton Way, Bakersfield, Calif.

KWML-516F-1 supply. Never used mobile, exc. condx, \$575. W2EDF, 68 Monell, Islip, N.Y.

REGENCY ATC-1 with companion revr. 1 to 3; revolv sensitivity on all bands. \$75. K9ICG, Rte. 3, Box 241, Gothen, Ill.

SELL: HT-33A, purchased Ju'v 1959 but log shows under 150 hours filament on. Full KW PEP, 30D A-1 condx, will demonstrate, \$375.00. Also Collins 516F2 used two weeks, \$90. W5CQF, 4/19 Cartier Ave., New Orleans, La.

SACRIFICE: 500 watt a.m. and SS3. All band VFO xmitr, \$250; HQ-170 rec and pre-amp, \$200. Write for details. W3-YAD, 201 Lighthouse Rd., Wilmington 3, Del.

FOR Sale: G4ZU "Birdage" beam, complete, new, factory carton, \$75.00; Johnson Valiant, \$295.00; SX-100, \$190. Both like new. W2COY, Hox 425, Sidney, N.Y.

HT-32A xmittr, used under 50 hours. Perf. condx, \$450.00. WA6GLF, Will Schuman, 111 W. Hillcrest, Monrovia, Calif. Tel. EL 9-4908. EL 8-8121.

THUNDERBOLT (F/W), like new, \$425.00 plus shipping. Bill Jesse, W4GMN, Box 371, Lebanon, Va.

SACRIFICE: Potent 813 Kw., fully metered, bandswitching 80-60, over \$240.00 worth of new parts alone. New 813 and spares. Taker's choice. Heavy power supplies, 20V, Collins 310B, also HQ-100C, BFO, \$120, LA-1, \$55, K8IKB, 14-14 Timin, Findlay, Ohio.

SALE: Complete SS3 station. SX111, Heath Apache and SB-10, all in new condx. Also have mike and cables, \$550. Also have Heath tube checker, VTVM and sig generator. K. M. Olinger, W8JSF, 6434 McHigh Pl., Cincinnati, Ohio.

SX-88, excellent condition, original carton, \$350.00. Victor Szpazanski, 258A, 22nd St., Brooklyn, N.Y.

TOWER: 20 ft., 2 sec. Rohm #40 (18" triangle), hot d.p.ped galv., 10 ft. 2" alum. mast, prop-pitch motor, indicator, cable, w.r. supply, guss roof mount. Complete, ready to install. O.P.M. cost \$168.00. Your best offer. Please send descr. only. WA2BS, Formica, Brooklyn, N.Y. CA 1-2404 after 7 PM.

FOR Sale: New B&W 850 A, \$25.00. Want B&W 852. WSDYA, 613 Pearl St., Bluefield, W. Va.

75A-4 #2519, perfect, \$535.00; 75S-1 #2592, \$385.00; 75S-1 #2627 with Collins noise blander, \$469.00; Collins 32V-2, exc., \$250.00. Drake 2 A, factory warranty, \$225.00. W8WGA, 3451 Ridge Ave., Dayton 14, Ohio. CR 7-0403.

A-1 Reconditioned equipment. On approval. Trades. Terms. Hallcrafters SX-99 \$99.00, SX-100 \$199.00, HT-37, S 85, SX-111, SX-101A, HT-32, Collins 75A-1, KWM-1, 32S-1, 75S-1, Fimec AF-67 \$109.00; Gonset G-66B, G-77A, G-50, GSB-100; GSB-101; Hammarlund HQ-100 \$129.00; HQ-110 \$179.00; HQ-120X; HQ-140X; HQ-140XA; HQ-150; FQ 160; HQ 170; HQ-180; Johnson Adventurer, 6N2 \$99.00, Viking II \$179.00. Valiant: National NC-98 \$89.00, NC-300, HRO-60, NC-183D, NC-303; Heath Globe, RME, other items. List free. Henry Radio Company, Butler, Missouri.

WANTED: Tektronix scope. Cash or trade. H. T. Cervantes, W2DB, 190 Croton Ave., Mt. Kisco, N.Y.

FOR Sale: Model 26 RTTY teleprinter, keyboard and all accessories, w/gud condx. \$30.00. F.o.b. Jim Long, K4UHL, Tarboro, N.C.

SELL: SX88 receiver and speaker. Will not ship. Sven Hesta, W0NAN, 301 Second Ave., N.W., Waukon, Iowa.

GLOBE CHIEF 90-A. \$35.00. Gud for Novices. K3KLE. Dave Kistler, 52 Moffet Street, Wilkes-Barre, Penna.

JOHNSON Viking "500" factory wired, 4-400A, excellent, \$465; HRO-50T-A. H. C. D. AC coils, 100,1000 kc. calibrator, \$155. B&W L-1000-A linear with power supply, \$195.00. W3IYQ, E. L. Sietke, Box 6000, Torrance, Philadelphia 14, Penna.

SELL OR Trade: Parts and equipment, receivers, etc. Magic stamps. Send for list. K110Q. S. Main, Unionville, Conn.

LETTINE 242 6M, 44.95, S-53A, \$34.95; Simpson 260 meter, like new, \$24.95; Heath grid dipper, \$11.95. Command rcvr, 6-9, \$5.00. K4JCX, 121 Maple, Oak Ridge, Tenn.

SCHEMATICS, Parts, Components. Free catalog. Lezlew Electronics, Box 895, New Brunswick, N.J.

EXCELLENT 6M SCR522 xmt, power supply, Simpson meter, relays and beam, \$39.00. Also two new 826's. K1KRO, Glastonbury, Conn. Tel. ME 3-9243.

SELL: Complete station. All components are in gud working order and for sale separately. 20 A exciter with 458 VFO, \$160; home brew pr. 813 GQ final and driver with hvy, duty pwr. supplies, 75A1 rcvr. with CE slicer and Q multiplier, \$190.00. Model 26 teletype with table, \$65.00. Term. unit, polar relays, electronic key, Jones MicroMatch and a score of other items. Write for list. A1 inquiries answered, W8CVA, Don Baker, 3416 Pickwick Pl., Lansing 17, Michigan.

SELL: KWM-2 with AC pwr. supply, \$965.00. Used less than 6 mos. W. B. Desnoes, W2BC, 117 Lorraine Ave., Mount Vernon, N.Y.

BARGAINS: NC-1 83D receiver, \$175; 400-watt plate-modulated transmitter, \$150; HRO-M receiver, needs work on it, \$25.00; 800-watt power supply kit, \$25.00, others; Meissner TVI suppressed VFO transmitter, \$20.00. K2KRU, Tel. MO 6-8513.

WANTED: Heath XC-6 six meter converter, K3AGG, 27 High St., Carbondale, Penna.

A Steal at \$325.00! 1000 watt transmitter; 6-160 meters, quality consrx. Plate modulation. Commercial VFO, exciter included. Bud cabinet. Modified 522 for 2 meters, 20 wts w/p.s. \$30.00; Tetracat converter 5 tubes, sensitive. Sorcads 2 meters over 6-10 Mc., \$25.00. Super Pro. receiver, w/p.s. spkr. and cabinet, 1.5-40 Mc. recently aligned, \$90. RAX rcvr, w/p.s. 7-28 Mc., \$20; all above operating now. Unfinished 250W c.w. rig w/1250V PS, \$15.00. Reason for selling all above: college. WA6ABZ, 1055 El Medico, Pacific Palisades, Calif. Tel. GL 4-4607.

COLLINS 516F-1 power supply converted for 110 volt 60 or 400 cycle operation. 120 Bass Accordion, Crucianelli by Panordian. Swap for commercial sidband equipment or sell for cash. W2UPY.

CRYSTALS. Vacation closing of plant, August 13 to September 1. See previous issues of QST classified for information on all types of crystals and crystal product packages. Look for us here next month. Crystals since 1933. C-W Crystals, Box 2065Q, El Monte, Calif.

SACRIFICE!! All in like-new condx with instructions and/or maintenance booklet, cleanest yet seen. BC-221 100 meter, \$69.50; PCA-2 type T-200 or BC-1031 Panadator, \$49.50 each; 1-177 tube tester, \$19.50; ART-13 transmitter, \$29.50; BC-342 receiver with A.C. pwr. supply, \$49.50; TS34/AP oscilloscope, \$34.50. Stamp for list of power tubes and other gear prices. F.o.b. First money-order or certified check. Must sell to pay father's hospital bill. WALPL, P.O. Box 3667, Fayetteville, N.C.

FOR Sale: S-40B and Heathkit Q-multiplier, \$50. K1MZG. SP-600 JX26 Hammarlund rcvr. \$4.54 Mc., \$295.00; SP-600 JX17, \$395; HRO-60, \$299.00; 75S2, \$499.00; Collins 51J2, 51J3, R390A, etc. Teletype Kleinschmidt printers, RTTY converters. Alltronics-Howard Co., P.O. Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

SIXERS crystals FT-243 choice \$1/00. K3HHE.

WANTED: KWM-1 or KWM-2 with AC power supply. State serial number, condition and best cash price. K9UOX.

HELP Kennedy's GNP. Hallcrafters SR-34AC, \$250; 75A1, 3.1 mech. filter, matching speaker, \$240; DX-100, SSB switching, variable loading \$150; SSB 100 watt phasing xmt, VFO, VHX, beautiful, \$100. All F.o.b. K9ZHR, 2705 East 38th St., Indianapolis, Ind.

QUICK SALE. Need college money. NC-183-D, exc. condx, best offer over \$170. Viking I factory TVI suppressed, best offer over \$90. Will deliver within 80 miles radius. W3COX, T. J. McCormick, 109 S. Potomac St., Hagerstown, Md.

SELL: NC-300, \$220; Heathkit tencer JT-30, \$25; Globe Chief with screen modulator, \$40. Ernest Brown, K4QYW, 109 Ozon, Atlanta, Ga.

SIX Meter Gonset III, D-104, xtal, \$225.00. K2VNR, 99-32 66 Road, Forest Hills, L.I., N.Y.

BUY: Hallcrafters SX-62 or similar recent hi-fi allwave receiver. Little, 1000 S. 26th, Arlington 2, Va.

75A3, \$330, Eldico SSB100 phasing type, 144 watts, \$175; Telrex 20 M Minibeam, LP filter, in exc. condx. Complete station, \$500. Warren Nissen, Ashokan, N.Y.

HALLICRAFTERS S-85 for sale. In exc. condx, \$50.00. John Rybicki, 2238 Spruce Rd., Homewood, Ill.

W0CVU back on the air. Lost Telrex Xmas tree because tower failure. Using 20 meter wide-spaced Telrex and Hy-Gain Thunderbird.

WANTED Good used or new 833A's and 813's priced right. W4BPD (QTH correct).

WANTED: 592/3-200A3 tubes and sockets, two Jenn ngs VAC 3-40 mmfd, variable, vacuums. Have 15 RTTY to trade. Gordon V. Roper, K8TIF, 2937 Barth St., Cedar 9-0581, Flint 4, Mich.

HT-33, HT-32, SX-101 all in mint condx, \$1100 package deal. Sry, no shipping. W8GWA.

SELLING My entire station: Viking Valiant, \$200; HQ-140X, \$130.00; DB-21 Preselector, \$25.00; DX-35, \$25.00. Raymond Neubauer, K2TCD, Myers Corners Road, Wappingers Falls, N.Y. Tel. AXminster 7-7030.

COLLINS 755-1 receiver plus set of 10 new spare tubes. New; cost, \$335. Sacrifice for \$345.00 if sold soon. Can ship in original packing F.o.b. Chicago. R. Yeager, 1455 Wilson-Chicago 40, Ill.

SELL: SX-71, \$65.00. Homebrew transmitter, guarantee 35 watts output, c.w. only, 6146 final, \$10. Wilfred Ingrassia, 1, Englewood Ave., Nanuet, N.Y.

WANTED: In perfect unmodified condition: HR-60, Ranger or Valiant. Serial and price to: G. Anderson, 7318 Rainier, Seattle, Washington.

WILL Swap for ham radio equipment: Bolex Model H16T (used, in new condition) with case and Switar FL5 25 m lens and Switar FL8 16 mm lens, \$243.00; Speed Graphic 3/4 x 4 1/4 w/xtra cut film holders, F.45 lens, \$95; 2 Leica M3 with case and meter, one with F1.5 Summarit lens, one with F2.0 lens, each \$199.50, Busch Pressman 2 1/4 x 3 1/4 camera, \$75. D. L. Marks, W2APF.

RANGER Just put into first-class shape at factory with new tubes where needed. Why must it move over? Because an Invader is moving in—so, \$225 F.o.b. West Hartford gets the Ranger a new home. Another \$225 and my NC-300 with crystal calibrator is yours, too. L. A. Morrow, W1VYG, 99 Bentwood Road, West Hartford 7, Conn. Phone ADams 2-2073.

"HORSE-TRADER" Ed Moory will buy used KWM-2's, 75A-4's and HT-37's in mint condition, Bargains: Drake 2, \$239.00; Central Electronics 200-V, \$629.00; KWM-2, \$889.00; 32S-1, \$459.00; 75S-1, \$369.00; Collins 51J-3, \$399.00; Viking Valiant, \$299.00; Gonset GSB 101, \$259.00; Collins 75A-4, \$519.00. Perfect KWM-2 and matching supply, \$975.00. Factory modified HT-33, \$259.00. Freight-damaged 30L-1, \$389.00; HQ-129X, \$99.00; HT-37 Demonstrator, \$359.00. Terms: Cash and no trades. Ed Moory Wholesale Radio, Box 506, DeWitt, Ark. Phone: WHitney 6-2820.

WANT: Best Hammarlund HQ-110 receiver that \$100.00 will buy, also best Viking II with VFO that \$50.00 will buy. Ray Daniels, KØKYH, 1418 Division St., Hopkins, Minn.

SELL: HQ-170, \$275.00; Ranger, \$150.00; D-104, \$10. K2DKJ, McQuillan, Yonkers, N.Y. Tel. BE 7-7079, 3 French Terrace.

SACRIFICE!! Viking II xmt, \$150.00. Ron Condry, K8PTV, 100 McNamara, Anamosa, Iowa.

HIGH Power hams, attention! Must settle estate of late W4GLR. Will sacrifice beautiful custom-made KCW rig, P.P. 2507HS final, 15 meters, all 4" square, completely Westinghouse. First quality components throughout. All sections thoroughly shielded, and in Par-Metal cabinet, with dolly. Has Collins BC310 exciter and external speech amplifier. Also FB 600 watt rig, P.P. 100THs in final, 8 meters, sections 100% shielded in custom-made cabinet with dolly. First quality components. Plus lots of miscellaneous surplus and complete details. Contact Smithy, W4DEO, 1533, 17th Way, S.W. Birmingham 1, Ala.

SELL: Viking Ranger with D-104 mike. In perf. condx. Must sell. Joseph Friedman, 75 Lenox Road, Brooklyn, N.Y. Tel. UL 6-5950.

FOR Sale! HT-32 xmt and SX10111A rcvr, both in mint condx. Highest bidder over \$650.00 or will trade for collection of U.S. coins. W6LH, 814 N. Sutter St., Stockton 3, Calif.

RTTY, teletype Mod. 15 with Alltronics-Howard converter, \$250.00. Frank Lewis, RR 1, Harrod, Ohio.

SELL: Hallcrafters SX-101, MK III, \$260.00; HT-37, \$355, or both for \$590.00. Both are in exc. condx. Capt. J. Eklund, 2748B Falcon Cts., McGuire AFB, N.J. Phone RA 3-2427.

BIG SHOUT: KW band switching linear final, 813 driving GG 803's, shielded and commercial in appearance, \$100; modest final, 15 meters, all 4" square, completely self-contained in aluminum chassis, vj neat in appearance, \$45.00; 10B exciter and VFO, \$110.00; 75A-3, perfect, \$350. W7BMQ, Thurston, Box Elder, Montana.

HALLICRAFTERS S53A with Conrad warning light. Coverage includes CB and 6 meters. Price \$40.00. W2HYX, 1032 Westbrook Dr., Rome, N.Y.

VIKING II and VFO, in A-1 condition, \$225.00. WIARD.

FOR Sale: KL-1 and KS-1 Chippewa Amplifier, wired, complete with interconnecting cables and 220-volt a.c. cord. KL-1 is modified for grounded grid operation, \$330 takes both units; KL-1 alone is \$225.00 and KS-1 is \$130. Also RX-1 receiver, wired with AVC fast flow switch and Damp Chaser, \$225. Everything F.o.b. Stevensville, Mich. Will consider trading all three units for late model 75-S-2, K8BLI.

SELLING Out, NC-300, w/xtal calibrator, \$260.00, matching speaker, \$10; HQ-150, \$190.00; matching spkr, \$10.00; National VHF-Rcvr AM-CV-FM, 27 to 250 megacycles, model HFS w/p.s. \$135.00. Viking-Ranger \$195.00; DX-40, \$50 all equipment w/ gud and complete with instruction manuals. Sell for these prices or best offer. W4NAUF, Jimmy Luke, 36 Shea Rd., Portsmouth, Va.

FOR Sale: Globe King 500A with WRL VFO, like new. Wanted: KWM-1 with 12V DC power, John V. Smith, K2MWR, 5 Pelham Ave., Port Washington, N.Y.

VIKING II modified for SSB adapter, 122 VFO, 10 pr xtals, \$240.00 or trade for Apache, K3JLR, 305 Worthington Rd., Towson 4, Md.

SELL OR trade: BC-221, TS-175 w freq. meters to 1000 Mcs w/orig. calibration books, RCA model 46A color video dot/crosshatch generator, RCA model WR61B color bar generator for good communications relay, or xmt. Phil Schutze, K5MRP, 1100 Pecan Drive, Tularosa, N.M.

COLLINS 75A4 with 3.1 filter, speaker and reduction knob, \$25; Heath Chyenne, \$95. Heath Comanche and speaker, \$100. UT-1 AC power supply, \$28.95. HP-10 power supply, \$44.95. Gordon L. Wright, K5EHX, 4515 Glaston Rd., Dallas, Texas.

NEW Heathkit Mohican transistorized all-band rcvr, assembled by experienced builder, \$100; 2 latest model, never used, Johnson 8-band trans. Band units, \$235.00; G-E narrow band 30.50 Mc. FM 60 watt output, base station, 50 ft. telescoping crank-up tower, \$400. W9DSV, Box 87, Webster, Wis.

DX-35, VFO-1, LA-1, QF-1, SX-99, DK60-G2C relay; Sonar LP-7 filter, all with manuals, will deliver within 30 miles, \$260.00 takes all. Bill Rodney, W2IKH, 41 Devonshire Road, Cedar Grove, N.J.

LIKE New 32S-1 transmitter, 75S1 receiver, 516F2 power supply 212B-3 speaker, Astatic 10D microphone with DS10 stand. Complete ready to go, \$999.95. W2FNE, Mike Rosenberg, 35 Strawberry, Roslyn Heights, N.Y. MA 1-4798.

WANTED: 3 Element 20 meter or Tri-Band beam. K1DXA, Box 425, Avon, Conn.

SELL: Heath QF-1, \$9.00 complete. Bonadics, 95 Stillwold Drive, Wethersfield 9, Conn.

FOR Sale: New RME 6900 receiver, in factory carton, \$269.00. Won this receiver in a contest. Do not need. Have a 75A4. K4PIU. Herb Hoover, 1126 Elizabeth St., Eau Gallie, Fla.

200 watt, AM-CW, band-switching transmitter with VF-1, Variac controlled 1/2 K.W. pwr. supply, \$125.00. W2EWL SSB exciter, \$50.00. Eico Grid-dip meter, \$25.00. Matchmaster 52 ohm, \$25.00. W2ASF, 13 Sunnybrook Rd., Bronxville, N.Y.

HQ129X, \$125.00; DX40, \$60; Heath VFO \$15; Heath Q-Multiplier, \$10. All are in excellent condition, with manuals. Separate or all for \$200. Will ship C.O.D. W4DML, Bob, 2218 Harden Circle, Hendersonville, N.C.

AR22 Rotor, complete, 20 bucks or will swap for SWR Bridge or what have you? W2FSB, Charles Lalloz, 2625 Fix Road, Grand Island, N.Y.

SELL: Excellent HQ-140X with Heath QF-1 and xtal. Cal. \$150.00. Pay cash for good 75A2A or 75A3. KQDR, 5 Baldwin, Framingham, Mass.

LATE Serial No. 75A4, filters, speaker, 32S-1, 516F-2, and D-104 mike, \$1150. W5REV, 1608 Wm. Brewster, Irving, Texas.

HRO60 with calibrator, coils for 10-15-20-40, 75M and broadcast coils, in perf. condx. Phone HE 3-0803. First certified check or money order for \$350.00 gets it. H. Webb, K2GKH, 125 Ocean Ave., Jersey City, N.J.

JOHNSON Thunderbolt, \$465; Pace-maker \$290. Both latest models L.W. Gonset linear, model 500W, \$125.00. W2DTD, 29 Charles St., Merrick, L.I., N.Y.

FOR Sale: \$700, new condx, new 6146s. Sry, no shippo. \$150.00. W2DOR, 52 Houston St., Newark 3, N.J. MA 4-5338

HQ-110, perfect, \$150.00. Hallieraters HT-19 transmitter, \$25.00; Mosley Y-4-6 vertical, \$20.00; lots more, write for details, KOCIS, 965 South Delaware, Springfield, Mo.

SX-111, like new condx, orig. carton, \$195.00; RME 84, vy gud, \$55.00; Eico 720, excellent, \$55.00. Ken Law, W9KIU, 5873 N Overhill Ave., Chicago 31, Ill.

WANTED: Transmitter, receiver, escapement for airplane. W6DFR.

FOR Sale: Chicago Area only: HRO60, in exc condx, six coils, crystal calibrator, matching speaker, \$325.00; Globe Champion 350A xmtr with Globe F.W. AT4 ant. tuner and SWR ind., \$350.00. F. J. Lidd, W9EQK, 3811 So. 56th Court, Cicero 50, Ill. Phone TO 3-0951.

813 Amplifier with 1600V power supply and plate modulator for sale. 1.5 to 15 Mc. commercially wired. K9KRW, 2764 Lauretta, Highland Park, Illinois.

COLLINS 30S-1 linear amplifier, \$1050. W9KOK, RI B59 Winnebago, Illinois.

WANTED: Gonset G-76 power supplies, AC and/or DC. Chet Zynel, W8NOW, P.O. Box 120, McKeesport, Penna.

WANTED For personal use: General Radio rf impedance bridge 916 A, 916AL, 1601 or 1606A. Also bridge oscillator for above. John Nagle, 626 E. Main Street, Moorestown, N.J.

CRYSTALS for 80-2 meters. 25¢ each. Guaranteed. Send for list of frequencies. Stancor power xfrm. 1200V CT, 200 Ma plus filament windings \$4.75 each plus postage. W6IMC, 210 Alden Road, Hayward, Calif.

SACRIFICE exlnt condx, NC-98 with acc., 20 meter beam. K2OOF, George Pidot, Jr., Piping Rock Rd., Locust Valley, N.Y.

SELL: New Jersey Area! HT-32, perfect condition! \$400.00. Heath HA-10 Kilowatt Linear, new, \$230.00. W2PUL, 1 Washington Ave., Martinsville, N.J.

FOR Sale: 2-element Mosley 40-meter beam, H.V. transformer, Thordarson 6000V-4900 V at 500 Ma, 300 watt modulation transformer, 15 watt driver, and other parts. Stamp for list. Need: good Tribander, low-powered Johnson Matchbox, J. Brucella, W2LEC, 14 Giornay St., Shrewsbury, N.J.

SWAP only for mint condx U.S. stamps only! Transistors, subminiature capacitors, components, etc. All items brand new, never used. Send for list. Leonard D'Airo, K2CDZ, 383 Pittsburgh Ave., Massanqua Park, N.Y.

DX-35, mike, \$25.00; B&W low pass, \$6.00. K8GHY, 319 N. Clemens, Lansing, Mich.

MOHAWK RX-1 Receiver with speaker, \$280; Globe Scout 680A transmitter, \$75.00; XC-6 converter, \$25.00. WA2IUM, O'Rourke, 14 Sutton Crest, Manhasset, N.Y.

HRO60 w/spkr, A.A.C. B.C.D. coils, xtal calibrator, product detector. Just factory aligned, all in exc. condx. \$345.00 F.o.b. Glendale, Calif. W6BIF, 1246 Raymond. Tel. CTRus 1-3000.

SELL: B&W 5100-B transmitter, \$250.00; CE MM-1 scope, \$70.00. K9AQV, 125 N. Bassford, La Grange, Ill. Tel. FL 2-0669.

"GO Sideband Cheaper" Eldico 100SB, in A-1 condition. First check gets it \$295.00. 20A-1, \$169.50; 10B, \$119.50; S101-A, never been fired, \$100 off. Also have good Ranger at \$169.50 and Viking II at \$159. Hurry—need money. W4JSH, P.O. Box 1212, Lexington, Ky.

SELLING Surplus Ham equipment and parts cheap. Send for free list. Chipman, W4PRM, 816 Melrose St., Winston-Salem, N.C. Carolina.

STAMPS Wanted: Collections, mixtures, old envelopes. In exchange will buy, ship anywhere your equipment requirements. Charles Lasky, Jamaica 31, L.I., N.Y.

SELL AN/ART-13 xmtr with power supply, \$80. Also 40-meter ARC-5 with power supply, \$80.00. Both for only \$150.00. Write WA6NAW, P.O. Box 482, Kelseyville, Calif.

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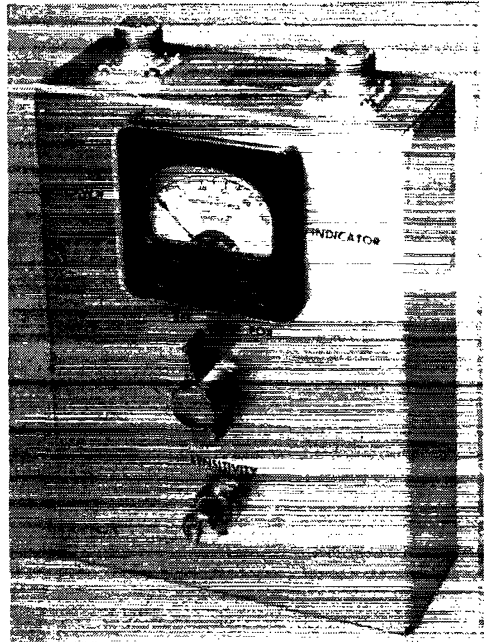


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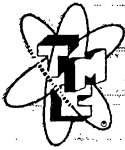
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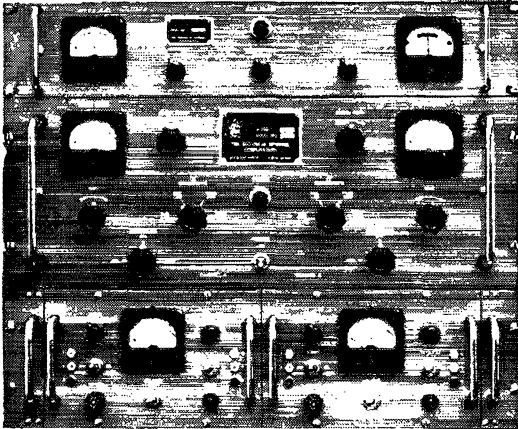
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The TMC Model SBC-2 is a single sideband converter-demultiplexer system which may be used with any high quality communications receiver to provide optimum reception of single, double or independent sideband signals. The system incorporates a fully transistorized dual channel demultiplexer with four 3kc outputs for wide band ISB multiplex operation.

The SBC-2 system contains a sideband converter consisting of four plug-in IF amplifier sideband filter channels which provide 3kc and 7.5kc upper and lower sideband selection plus two discrete detector/audio amplifier channels. The output of the converter feeds the dual demultiplexer which provides four 3kc audio channels by means of frequency division. These four audio channels may contain voice, multiplex, facsimile or data information.

The SBC-2 system features a unique dual loop electronic AFC/memory system which provides frequency correction to better than one cycle. Independent AGC is incorporated in each IF channel, and may be derived from either upper or lower sideband or the carrier.

The SBC-2 system is a modern all electronic replacement for the CV-157/TD-98 combination.

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NC-173 Receiver.....	119.00
NC-183D Receiver.....	199.00
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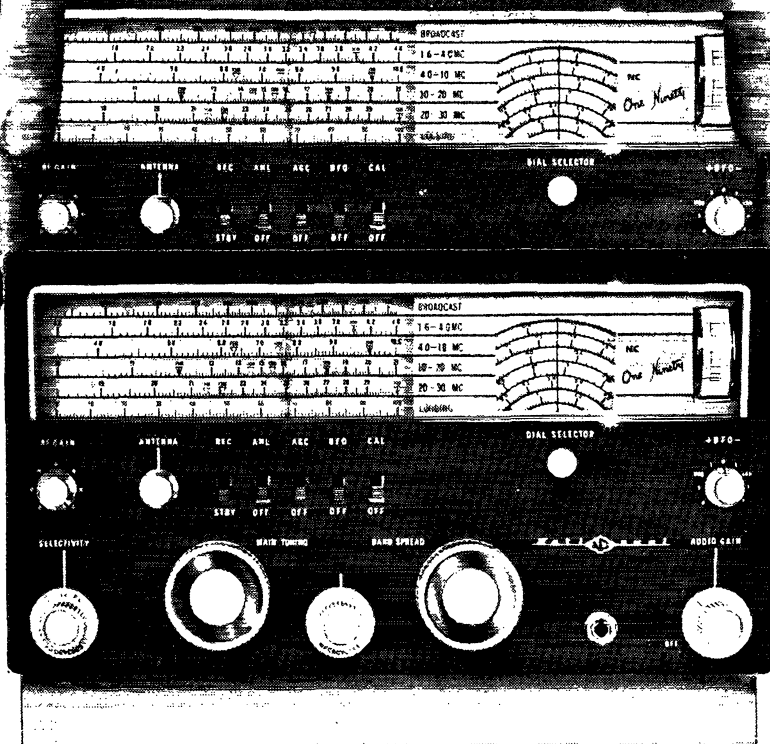
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RCA Type	Class of Service	Max. Plate-Input Watts	Max. DC Plate Volts	Max. Freq. For full Input (Mc)	Max. useful Freq. (Mc)	Heater (H) or Filament (F) Volts
5763	CW AM	17 15	350 300	} 50	175	6.0 (H)
6417	Same as RCA-5763, except for heater voltage					12.6 (H)
2E26	CW SSB AM	40 37.5 27	600 500 500	} 125	175	6.3 (H)
2E24	Same as RCA-2E26, but has quick-heating filament					6.3 (F)
6893	Same as RCA-2E26, except for heater voltage					12.6 (H)
832-A*	CW AM	50** 36**	750 600	} 200	250	6.3A(H) 12.6(H)
807	CW SSB AM	75 90 60	750 750 600			60	125	6.3 (H)
1625	Same as RCA-807, except for heater voltage and use of medium 7-pin base					12.6 (H)
6524*	CW SSB AM	85** 85** 55**	600 600 500	} 100	470	6.3 (H)
6850*	Same as RCA-6524, except for heater voltage					12.6 (H)
4604	CW	90	750	60	175	6.3 (F) quick-heating
6146	CW SSB AM	90 85 67.5	750 750 600	} 60	175	6.3 (H)
6883	Same as RCA-6146, except for heater voltage					12.6 (H)
829-B*	CW SSB AM	120** 120** 90**	750 750 600	} 200	250	6.3A(H) 12.6(H)
7203/ 4CX250B	CW SSB AM	500 500 300	2000 2000 1500			} 500	—	6.0 (H)
7094	CW SSB AM	500 400 335	1500 2000 1200	} 60	175			6.3 (H)
813	CW SSB AM	500 450 400	2250 2500 2000			} 30	120	10 (F)

*Twin-Type **Total for both Units ▲For parallel-heater connection
●For series-heater connection ■Max. Ratings for amateur use

For technical data on any of these types write RCA, Commercial Engineering, Section H-37-M, Harrison, N. J.



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